



www.bis.gov.in

उत्पाद मैनुअल
सुरक्षा उपयोगी काँच — विशिष्टि
भाग -1 वास्तुकला भवन और सामान्य उपयोग
2553 (Part-1): 2018 के अनुसार

PRODUCT MANUAL FOR
SAFETY GLASS — SPECIFICATION
PART 1 ARCHITECTURAL, BUILDING AND GENERAL USES – SPECIFICATION
ACCORDING TO IS 2553 (Part-1): 2018

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	मानक संख्या IS No.	:	IS 2553 (Part -1) : 2018
	शीर्षक Title	:	Safety Glass — Specification Part 1 Architectural, Building and General Uses
	संशोधनों की संख्या No. of amendments	:	02
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	The allowable defects (spot faults, linear faults, reams, strings, lines, optical faults) in flat annealed glass used in the manufacture of safety glass shall not exceed the limits specified in 4.4 and 4.5 of IS 14900. Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	कृपया Annex-A देखें Please see Annex – A

c)	नमूने का परिमाण Sample Quantity	:	i) For Toughened (Tempered) safety Glass (For Thickness 5mm and above : Actual Size - 05 Nos. (Min Area of Glass = 0.36 m²) 610 X 610 mm cut size samples - 04 Nos. 1938 X 876 mm cut size samples - 06 Nos. ii) For Toughened (Tempered) safety Glass (For Thickness below 5 mm) : Actual Size = 05 Nos. (Min Area of Glass = 0.36 m²) iii) For Laminated safety Glass : Actual Size - 05 Nos. 300 X 300 mm cut size samples - 15 Nos. 1938 X 876 mm cut size samples - 06 Nos. Note : Quantities specified above are for mandatory tests, if optional tests are required to be tested, additional quantity is required to be sent accordingly. Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	Sampling Guidelines during operation of licence		One sample for independent testing (either Factory sample or Market sample) shall be drawn during an operative year
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B देखें
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C देखें
5.	एक दिन में संभावित परीक्षण Possible tests in a day		Dimensional and visual tests such as thickness, dimensions, squareness, shape accuracy, girth, length, edge straightness deviation, cross-curve deviation, Fragmentation test, Flatness, Determination of defects, Resistance to shock, Boil and Bake test, Fracture and adhesion tests Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.

6.	लाइसेंस का दायरा /Scope of the Licence:	
	2553 (Part-1) :2018 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है “ Licence is granted to use Standard Mark as per IS 2553 (Part-1) 2018 with the following scope:	
7.	Name of the product	Safety Glass — Specification Part 1 Architectural, Building and General Uses
8.	Type of Safety Glass	Flat Toughened (Tempered)/ Curved Toughened (Tempered)/ Laminated
9.	Nominal Thickness	From ... mm up to and including ... mm
10	Applicable optional requirements	Surface compression, mechanical strength – four point bending test, humidity test

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

ANNEX – A
TO PRODUCT MANUAL FOR
SAFETY GLASS — SPECIFICATION PART 1 ARCHITECTURAL, BUILDING AND
GENERAL USES
ACCORDING TO IS 2553 (Part 1): 2018

Grouping Guidelines

IS 2553 (Part 1):2018 classifies safety glass into 2 types: Toughened (Tempered) and Laminated Safety Glass. Further requirements for Flat Toughened (Tempered) and Curved Toughened (Tempered) safety glass are specified. Accordingly, the following grouping guidelines based on nominal thickness and type of glass, shall be followed for processing applications for grant of licence and extension in scope of licence:

- i) For covering all nominal thicknesses in a range within the scope of licence, samples of the highest and lowest nominal thicknesses may be drawn for testing.
- ii) However, separate samples to be drawn for Flat toughened (tempered) safety glass, Curved Toughened (Tempered) and laminated safety glass to cover in the scope of the licence.
- iii) Licence may be granted or change in scope may be allowed for covering all the thicknesses within the range if the samples are found passing in testing.
- iv) However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the varieties to be covered in the licence.
- v) During the operation of the licence, samples of all varieties covered in the scope of licence shall be drawn by rotation.

ANNEX – B
LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Sr. No.	Tests used in with Clause Reference		Test equipment
	Cl. No.	Test	
1.	5.1.2	Distribution of Allowable Defects	i. Arrangement for determination of optical faults as per Annex C of IS 14900:2018 - ii. Arrangement for determination of spot faults as per Annex D of IS 14900:2018
2.	5.2.1, 5.2.2, 5.3.1, 5.3.2	Thickness, Dimensions, squareness and edge displacement	i. Vernier calipers and micrometer ii. Measurement Tape iii. Measurement Table (Flat surface, preferably backlit) iv. Spirit Balance
3.	5.2.2.3	Dimensional tolerances for curved toughened (tempered) Safety Glass	i. Gauge or a 1 : 1 scale template ii. Flexible steel tape of 1mm scale interval iii. Straightedge ruler with 0.1 mm scale interval iv. Scale
4.	5.2.3, 5.2.3.1	Fragmentation Test (6.1 of IS17004 and Annex E	i. Pointed steel tool (hammer of about 75 g mass, a spring loaded centre punch, or other similar appliance with a hardened point) ii. Test table with arrangement for holding the specimen at the edges (for example, by a small frame, adhesive tape etc) iii. Vernier calipers, measurement tape/scale, protractor, frame (for particle count)
5.	5.2.4	Flatness	i. Arrangement for measurement of overall bow, straight metal ruler or a stretched wire (as per 5.2 of IS 17004) ii. Apparatus for Measurement of Wave and Roller Wave- straight edge and feeler gauges (as per 5.3 of IS17004) iii. Apparatus for Measurement of Edge Lift -feeler gauge (For Horizontally Toughened Glass Only) (as per 5.4 of IS 17004) iv. Apparatus for Measurement of Local Distortion - feeler/taper gauge (For Vertically Toughened Glass Only) (as per 5.5 of IS 17004)
6.	5.2.5.1	Resistance to shock	Apparatus for ball drop test, steel ball (6.2.1 of IS17004) (for glasses of thickness less than 5 mm steel ball to be used shall be of mass (227 ± 2) g)
7.	5.2.5.2, 5.3.8	Resistance to human impact	Test apparatus for resistance to human impact (6.4 of IS 17004)
8.	5.2.6	Surface compression (optional)	Surface Compression Test equipment using polaroscopic method (6.5 of IS 17004)

9.	5.2.7	Mechanical Strength — Four Point Bending Test (Optional)	Mechanical Strength Test — Four Point Bending Test equipment (6.3 of IS 17004)
	5.2.8	Fabrication in Glass	Vernier caliper, Scale
10.	5.3.3	Light Stability Test	Light Stability Test apparatus (7.6 of IS 17004) with arrangement to maintain a temperature between 38°C and 49°C throughout the test
11.	5.3.4	Boil and Bake Tests (7.1 of IS17004)	i. Thermometer ii. Hot Water tank with means of maintaining water temperature at 100 +0/-2°C iii. hot air oven capable of maintaining 100 ±2°C iv. Arrangement to store samples vertically v. Arrangement for assessment of the test sample at temperature lower than 30°C
12.	5.3.5	Fracture and adhesion test	Apparatus for Fracture and adhesion test as per either method 1 or method 2 of 6.2.2 of IS 17004
13.	5.3.6	Defects in the central area	i. Arrangement to place specimen in vertical position with sunlight incident ii. Matte grey screen
14.	5.3.7	Humidity test (optional)	i. Humidity chamber capable of maintaining temperature of 50 + 5°C and relative humidity of up to 100 percent with temperature and humidity indicators ii. indicators iii. Arrangement for Inspection of the samples at a distance between 300 mm and 500 mm in front of a white diffused background.

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1. For the guidance of manufacturers, the recommended definition of control unit is: All safety glass of same nominal thickness and type and manufactured by the same method under similar conditions in a day shall constitute a control unit.

1.3.1 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.2 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as "R" or other tests which can be subcontracted as "S". Subcontracting is permitted to BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as "R" in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as "R" in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS

website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark, as given in the Schedule of the licence, shall be marked on each piece of safety glass provided always that the safety glass thus marked conforms to all the requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 **Additional Marking requirements:** The material shall also be marked with the following additional requirement on shall be marked on each piece of glass,

a) "For BIS certification details please visit www.bis.gov.in"

4. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method Cl. Ref.	Test Method IS		No. of Sample	Frequency	Remarks
5.1.1	General	5.1.1	IS 2553 (Part 1) : 2018	R	Each piece	-	Visual
5.1.2	Distribution of Allowable Defects	4.4 and 4.5	IS 14900	R/S*	Each piece	-	* No testing required if flat annealed glass used in manufacturing of safety glass is ISI marked as per IS 14900.
5.2	Requirements specific to Toughened (Tempered) Safety Glass						
5.2.1	Thickness	5.1	IS 17004	R	5 percent but not less than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
5.2.2.1 & 5.2.2.2	Dimensions and Squareness	5.2.2	IS 2553 (Part 1) : 2018	R	5 percent but not less than 5 pieces	Each Control Unit	-DO-
5.2.2.3	Dimensional tolerances for Curved Toughened (Tempered) Safety Glass						
5.2.2.3.1	Shape accuracy, girth and length	5.2.2.3.1	IS 2553 (Part 1) : 2018	R	5 percent but not less than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
5.2.2.3.2	Edge Straightness Deviation	5.2.2.3.2	IS 2553 (Part 1) : 2018	R	5 percent but not less than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
5.2.2.3.3	Maximum Cross-Curved deviation	5.2.2.3.3	IS 2553 (Part 1) : 2018	R	5 percent but not less than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.

5.2.3	Fragmentation Test	6.1 5.2.3.1	IS 17004	R	2 Sample	Each Control Unit	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.
5.2.4	Flatness	5.2.4	IS 2553 (Pt-1): 2018	R	5 percent but notless than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
5.2.5	Resistance to Impact	6.2.1, 6.4.5.2	IS 17004	R	2 Sample	Each Control Unit	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 fails.
5.2.6	Surface Compression (Optional)	6.5	IS 17004	S	As agreed between manufacturer and purchaser		
5.2.7	Mechanical Strength-Four Point Bending Test (Optional)	6.3	IS 17004	S	As agreed between manufacturerand purchaser		
5.2.8	Fabrication in Glass	5.2.8	IS 2553 (Pt-1) :2018	R	5 percent but notless than 5 pieces	Each Control Unit	
5.2.9	Edge Working of Glassfor toughening	5.2.9	-do-	R	-do-	-do-	
5.3	Requirements Specific to Laminated Safety Glass			R			
5.3.1	Thickness	4.2 & Table 1	IS 17004	R	5 percent but notless than 5 pieces	Each Control Unit	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
5.3.2	Dimensions, Squarenessand Edge Displacement	5.3.2	IS 2553 (Pt- 1) : 2018	R	5 percent but notless than 5 pieces	Each Control Unit	-DO- (applicable to cut sizes)
5.3.3	Light stability test	7.6	IS 17004	S	Three Samples	Three months	All samples shall pass. In case of any single failure, draw another 3 samples from the lot and repeat the test. None of these 3 samples shall fail

5.3.4	Boil and Bake Tests	7.1.1, 7.1.2	IS 17004	R	-do-	Each Control Unit	All samples shall pass. In case of any single failure, draw another 3 samples from the lot and repeat the test. None of these 3 samples shall fail.
5.3.5	Fracture and adhesion test	6.2.2	-do-	R	Three Samples	Each Control Unit	All samples shall pass. In case of any single failure, draw another 3 samples from the lot and repeat the test. None of these 3 samples shall fail.
5.3.6	Defects in the Central Area	5.3.6.7	IS 2553 (Pt- 1): 2018	R	Three Samples	Each Control Unit	All samples shall pass. In case of any single failure, draw another 3 samples from the lot and repeat the test. None of these 3 samples shall fail.
5.3.7	Humidity Test (optional)	7.2	IS 17004	S	As agreed between manufacturer And purchaser		
5.3.8	Resistance to Human Impact Test	6.4	IS 17004	R	2 Samples	Each Control Unit	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.
5.3.9	Working on Glass after lamination	5.3.9	IS 2553 (Pt-1) :2018	R	5 percent but not less than 5 pieces	Each Control Unit	