



PRODUCT MANUAL FOR STRUCTURAL PLYWOOD ACCORDING TO IS 10701 : 2012

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence 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 licence/certificate.

1.	Product	:	IS 10701 : 2012
	Title	:	STRUCTURAL PLYWOOD
	No. of Amendments	:	NIL
2.	Sampling Guidelines:		
a)	Raw material	:	a) Timber – Clause 4.1 of IS 10701: 2012 b) Face and Core Veneers, Cross-bands - Clause 7.1 of IS 10701: 2012 b) Adhesive (BWP grade) - IS 848
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	a) Structural Plywood – 2 sheets b) Face and Core veneers, Cross-bands – 2 sheets of suitable size for identification of species (Clause 4.1 of IS 10701) and Thickness, Uniformity in thickness and Moisture content (Clause 7.1 of IS 10701) c) Resin – 5 liters
3.	List of Test Equipment	:	Please refer ANNEX – B
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – C
5.	Possible tests in a day	:	Please refer ANNEX – D
6.	Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 10701: 2012 with the following scope:		
	Name of the product	:	Structural Plywood
	Size	:	Thickness upto and including --- mm

ANNEX A**Grouping Guidelines**

1. Structural plywood covered under IS 10701: 2012 are classified as given below:

(a) **Dimensions of plywood:**

Length x Width	Length x Width
2400 mm x 1200 mm	2400 mm x 900 mm
2100 mm x 1200 mm	2100 mm x 900 mm
1800 mm x 1200 mm	1800 mm x 900 mm
1500 mm x 1200 mm	1500 mm x 900 mm
1200 mm x 1200 mm	1200 mm x 900 mm
900 mm x 900 mm	

(b) **Thickness:**

3, 4, 5, 6, 9, 12, 16, 19 and 25 mm

(c) Any dimensions (length, width and thickness) as agreed to between the manufacturer and the purchaser are also permitted.

2. For manufacturing Structural plywood of higher thickness, manufacturing capacity and infrastructure required is more critical than plywood with less thickness.

3. Considering the above, following grouping guidelines is developed for GoL/CSoL:

- One sample of Structural Plywood of any size of highest thickness shall be tested for all requirements to cover Structural Plywood of all sizes, with thickness upto and including the thickness tested.

4. The Firm shall declare the varieties of structural plywood they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the manufacturer.

5. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

ANNEX B**List of Test Equipment***Major test equipment essentially required to test as per the Indian Standard*

Sr. No.	Tests used in with Clause Reference	Test Equipment
1	Adhesive (Clause 4.2) Plywood (Clause 5)	<ul style="list-style-type: none"> - Sample preparation hot press with veneers as required - Thermostatically controlled water bath - Hot air oven - Knife - pH meter - Distilled water - Glass sheet - Grinding mill - Test sieves 450 micron - Glass flask - Moisture Meter (Digital) - Viscosity Cups B-4 Cup /B-6 Cup - Hydrometer
2	Dimensions and tolerance, Thickness, Squareness and Edge Straightness (Clause 8)	<ul style="list-style-type: none"> - Measuring Tape - Steel Scale - Micro Meter - Vernier Calliper - Squareness Gauge - Straight Edge - Feeler Gauge - Try Square
3	Moisture content Clause 11.2)	<ul style="list-style-type: none"> - Hot air oven - Weighing balance
4	Glue Shear Strength in Dry State (Clause 11.3)	<ul style="list-style-type: none"> - Universal Testing Machine - Temperature and Humidity controlled Chamber - Steel Scale
5	Resistance to Water (Clause 11.4)	<ul style="list-style-type: none"> - Hot Water Bath - Thermometer - Universal Testing Machine - Temperature and Humidity controlled Chamber - Stout Table - Knife for testing plywood for adhesion of plies
6	Resistance to Micro- Organisms (Clause 11.5)	<ul style="list-style-type: none"> - Enameled Mycological Tray covered with glass sheet (Sucrose / Saw Dust) - Universal Testing Machine - BOD incubator - Temperature and Humidity controlled Chamber - Fungi with spores

7	Tensile Strength (Clause 11.6)	<ul style="list-style-type: none"> - Universal Testing Machine - Temperature and Humidity controlled Chamber - Weighing Machine - Protractor - Vernier calliper - Micrometer
8	Compressive Strength (Clause 11.7.1)	<ul style="list-style-type: none"> - Universal Testing Machine with suitable supports and load being applied through a spherical bearing block preferably of the suspended, self-aligning type. - Compress meter - Temperature and Humidity controlled Chamber
9	Panel Shear Strength (Clause 11.7.1)	<ul style="list-style-type: none"> - Apparatus made by special steel loading block, articulate with rollers and pins as per design given in IS 1734 (Part 13) - Universal Testing Machine with suitable supports and load being applied through a spherical bearing block preferably of the suspended, self-aligning type. - Temperature and Humidity controlled Chamber - Weighing Machine
10	Plate Shear Strength (Clause 11.7.1)	<ul style="list-style-type: none"> - Attachment Fixture as per design given in IS 1734 (Part 14) - Universal Testing Machine with suitable supports and load being applied through a spherical bearing block preferably of the suspended, self-aligning type. - Temperature and Humidity controlled Chamber - Weighing Machine
11	Rolling shear strength (Clause 11.7.1)	<ul style="list-style-type: none"> - Testing machine wedge action grips and movable head - Universal Testing Machine - Temperature and Humidity controlled Chamber - Weighing Machine
12	Bending Strength Modulus of Elasticity and Modulus of Rapture) (Clause 11.7.1)	<ul style="list-style-type: none"> - Tensile Testing Machine attached with MOE and MOR attachments and 100 mm. dial gauge - Temperature and Humidity controlled Chamber

13	Wet Bending Strength (Clause 11.8)	<ul style="list-style-type: none"> - Thermostatically controlled water bath - Hot air oven - Universal Testing Machine with MOE and MOR arrangement with dial gauge for measurement of deflection. - Temperature and Humidity controlled Chamber
14	Retention of Preservative (Clause 11.9)	<ul style="list-style-type: none"> - Mortar with pestle - Hot plate - Muffle furnace - Various glassware - Chemical as per IS 2753 (Part 1) and IS 2753 (Part 2)
15	General Laboratory Equipment	<ul style="list-style-type: none"> - Dry and Wet Bulb Thermometer - Hygrometer - AC Machine - Weighing Machine

The above list is indicative only and may not be treated as exhaustive

ANNEX C

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirements of IS 10701: 2012

4. CONTROL UNIT – All plywood boards of similar construction and type pressed under similar conditions continuously with same mix of adhesive shall constitute a control unit (Plywood Boards in which the arrangement of veneers is similar as regards thickness and species of timber on both sides of central ply shall be considered to be of similar construction).

5. LEVELS OF CONTROL – The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

6. REJECTIONS – 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

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4	Material						
	Timber	4.1, Annex B	IS 10701	R	One	Each species in a consignment	Further testing is not required if received with test certificate.
	Adhesive	4.2	IS 10701 IS 848	S	One	Each consignment or lot manufactured in reaction kettle at a time	Further testing is not required if received with test certificate or ISI marked.
5	Plywood	5	IS 10701 848	R	One	Each lot produced form a batch of resin	-
6	Treatment	6	IS 10701 IS 5539	R	-	Each board	-
7	Manufacture						
7.1	Veneers	7.1, Table 1	IS 10701	R	5	Every hour per machine (for inhouse production)	In case of failure in any requirement, complete lot shall be checked and only passing samples shall be accepted.
					50	Each consignment (If received)	
7.2	Construction details	7.2.1,7.3, 7.3.1, 7.4	IS 10701	R	Each	Each control unit	
8	Dimensions and tolerance	8.1, 8.3	IS 10701	R	10	Each control unit	-
	Thickness	8.2, 8.3					

9	Workmanship and finish	9.1, 9.2, 8.3	IS 10701	R	All	Each control unit	-
11.2	Moisture content	11.2	IS 10701 IS 1734 (Part 1)	R	Two	Each control unit	-
11.3	Glue adhesion in dry state	11.3, Table 2	IS 10701 IS 1734 (Part 4)	R	Two	Each control unit	-
11.4	Resistance to water test	11.4, 11.4.1 or 11.4.2, Annex D, Table 2	IS 10701 IS 1734 (Part 6) IS 1734 (Part 4)	R	Two	Each control unit	-
11.5	Resistance to Micro-Organism	11.5, Table 2	IS 10701 IS 1734 (Part 7)	R	One	Once in a month	#
11.6	Tensile strength	11.6, Table 3	IS 10701 IS 1734 (Part 9)	R	One	Once in a month	#
11.7	Structural properties of plywood						
11.7.1	Compressive Strength	11.7.1, Table 3	IS 10701 IS 1734 (Part 10)	R	One	Once in a month	#
11.7.1	Bending Strength (Modulus of Rapture and Modulus of elasticity)	11.7.1, Table 3	IS 10701 IS 1734 (Part 11)	R	One	Once in a month	#
11.7.1	Panel Shear Strength	11.7.1, Table 3	IS 10701 IS 1734 (Part 11)	R	One	Once in a month	#
11.7.1	Plate Shear Strength (Modulus of Rigidity)	11.7.1, Table 3	IS 10701 IS 1734 (Part 14)	R	One	Once in a month	#

11.7.1	Rolling Shear Strength	11.7.1, Annex E, Table 3	IS 10701	R	One	Once in a month	#
11.8	Wet Bending Strength	11.8, Table 4	IS 10701 IS 1734 (Part 11)	R	One	Once in a month	#
11.9	Retention of preservative	11.9	IS 10701 IS 2753 (Part 1 and Part 2)	R	One	Once in a month	#

Samples for these tests shall be drawn in rotation so that all sizes produced during a period of one year shall be tested for these tests.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX D

Possible Tests in a day

- i) Dimensions and Tolerances, Thickness (Cl 8)
- ii) Workmanship and finish (Clause 9)
- iii) Glue Shear Strength in Dry State (Cl 11.3)
- iv) Modulus of Elasticity and Modulus of Rupture (Cl 11.7.1)