



PRODUCT MANUAL FOR LAMINATED VENEER LUMBER ACCORDING TO IS 14616: 1999

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 license/certificate.

1.	Product	:	IS 14616: 1999
	Title	:	Laminated Veneer Lumber
	No. of Amendments	:	4
2.	Sampling Guidelines:		
a)	Raw material	:	a) Veneers – Clause 4.1 of IS 14616: 1999 b) Adhesive – BWP grade of IS 848 c) Preservatives – Clause 4.3 of IS 14616: 1999
b)	Grouping guidelines	:	Laminated Veneer Lumber (LVL) of maximum size (i.e. length, width and thickness) intended to be covered in the licence shall be tested to cover LVL of all sizes upto and including the size tested.
c)	Sample Size	:	Laminated Veneer Lumber – 1 No Veneer – 300 mm x 300 mm Adhesive – 5 litre
3.	List of Test Equipment	:	Please refer ANNEX – A
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – B
5.	Possible tests in a day:		
	(i) Dimensions (Clause 4.1.2 and 6) (ii) Adhesions of plies in the dry state Clause 8.2.2) (iii) Strength Tests (Clause 8.2.3)		
6.	Scope of the Licence:		
	Licence is granted to use Standard Mark as per IS 14616:1999 with the following scope:		
	Name of the Product	Laminated Veneer Lumber (LVL)	
	Size		

ANNEX A**List of Test Equipment***Major test equipments required to test as per Indian Standard*

Sl No	Tests used in with clause reference	Test equipment
1	Veneers (Clause 4.1)	(a) Vernier caliper (b) Micrometer
2	Adhesives (Clause 4.2)	(a) Sample preparation -hot press with veneers (b) Thermostatically controlled water bath (c) Hot air oven (d) Knife (e) pH meter (f) Distilled water (g) Glass sheet (h) Grinding mill (i) Test sieves 450 micron (j) Glass flask.
3	Retention of preservatives (Clause 4.3.3)	(a) Mortar with pestle (b) Hot plate (c) Muffle furnace (d) Chrome Azurol-S (e) Sodium acetate (f) Diphenyl carbazide (g) Isopropyl alcohol (h) Distilled water (i) Ammonium molybdate (j) Nitric acid (k) Sieves (l) Sulphuric Acid (m) Silver Nitrate (n) Hydrogen peroxide (o) Potassium permanganate (p) Potassium Bromate (q) Potassium per sulphate (r) Methyl Orange (s) Kjelahal flask (t) Benzidine dihydrochloride (u) Acetic acid (v) Stannous chloride (w) Hydrochloric acid (x) Turmeric powder (y) Ethyl alcohol (z) Salicylic acid

4	<p>Manufacture (Clause 5) Moisture content (Clause 8.2.1)</p>	<p>(a) Moisture meter (b) Hot air oven (c) Weighing balance (d) Vernier calliper</p>
5	<p>Dimensions (Clause 6) Workmanship and Finish (Clause 7)</p>	<p>(a) Vernier calipers, (b) Micrometer (c) Measuring tape (d) Straight Edge and Feeler Gauge (e) Aluminum Right Angle</p>
6	<p>Adhesion of plies (Clause 8.2.2)</p>	<p>(a) Humidity Chamber (b) Stout Table (c) Knife (d) Hot plate and Bowl for Boiling water or Hot water bath (e) Enamel Tray and perishable saw dust (f) Hygrometer (g) Spores/mold fungi, Cane Sugar (h) Glass sheet (i) Desiccator</p>
7	<p>Strength Tests - Nail and Screw Holding Capacity (Clause 8.2.3)</p> <ul style="list-style-type: none"> a) Modulus of rupture b) Modulus of elasticity c) Compressive strength parallel to grain d) Compressive strength perpendicular to grain <ul style="list-style-type: none"> - Parallel to laminae - Perpendicular to laminae e) Horizontal shear strength <ul style="list-style-type: none"> - Parallel to grain - Perpendicular to grain f) Tensile strength parallel to grain g) Nail and screw holding power <ul style="list-style-type: none"> - Edge - Face h) Thickness swelling in 2 h water soaking 	<p>(a) Universal Testing Machine with fixtures for MOR, MOE, Compression test, shear strength test, Tensile Test, nail and screw holding power test attachment as per IS 1708 (Part 6, 8, 9, 11, 12 and 15) :1986 (b) Conditioning chamber to maintain temperature of 27 ± 2 °C and relative humidity 65 ± 5 % (c) Compressometer (d) Vernier caliper (e) Water bath (f) Nail (2.50 mm dia x 50 mm long) (g) Screw no 8 of length 50 mm</p>

8	Swelling in Water (Clause 8.2.4)	a) Humidity Chamber b) Thermostatically controlled water bath c) Specimen holder with dial gauge (as per Fig.1 of IS 2380 (Part 17) :1977
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The above list is indicative only and may not be treated as exhaustive

ANNEX B

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.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

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 14616: 1999.

4. CONTROL UNIT – All Laminated Veneer Lumber (LVL) of similar construction and manufactured under similar conditions of manufacturing with same batch of adhesive in a continuous production schedule shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control submitted by the manufacturer 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 2.0 above.

5.1 All the production which conforms to the Indian Standards 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	MATERIALS						
4.1,5.1	Veneer	4.1 ,5.1	IS 14616	R	One	Each lot of same thickness	-
4.2	Adhesives	4.2	IS 14616 IS 848	S	One	Each/Kettle manufactured inhouse/each batch received	No testing is required if the material is ISI Marked or accompanied with a test certificate.
4.3	Preservatives	4.3	IS 14616 IS 401	S	One	Each consignment	
4.3.3	Retention of preservatives	4.3.3	IS 14616 IS 401	R	One	Each lot processed at a time	-
6	Dimensions	6	IS 14616	R	Each LVL	-	-
7	Workmanship and Finish	7	IS 14616	R	Each LVL	-	-
8	TESTS						
8.2.1	Moisture Content	8.2.1	IS 14616 IS 1734 (Part 1)	R	Two	Each Control Unit	-

8.2.2	Adhesion of Piles						
	In the dry state	8.2.2	IS 14616 IS 1734 (Part 5)	R	Two	Each Control Unit	-
	After boiling in water for 72 h followed by cooling in water at room temperature	8.2.2	IS 14616 IS 1734 (Part 5)	R	Two	Each Control Unit	-
	After subjecting to attack by micro organism	8.2.2, Annex B	IS 14616 IS 1734 (Part 5)	R	Two	Each Control Unit	-
8.2.3	Strength Test	8.2.3, Table 1	IS 14616 IS 1708 (Part 6, 8, 9, 11, 12 ,15)	R	Two	Each Control Unit	-
8.2.4	Swelling in water Test	8.2.4	IS 14616 IS 2380 (Part 17)	R	Two	Each Control Unit	-

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.