



उत्पाद मैनुअल
आई एस 3513 (भाग 1) : 1989 के अनुसार रेसिन ट्रीटेड कंप्रेसड वुड लेमिनेट्स
कम्प्रेगस - विद्युत उद्देश्य के लिए

दस्तावेज संख्या – पीएम/आईएस 3513 (भाग 1)/1/दिसंबर 2022

भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिश्रिता की सुसंगतता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसी द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस प्रमाणीकरण लाइसेंस/प्रमाणपत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज का उपयोग किया जा सकता है।

PRODUCT MANUAL FOR
RESIN TREATED COMPRESSED WOOD LAMINATES
(COMPREGS) FOR ELECTRICAL PURPOSES
ACCORDING TO IS 3513 (PART 1): 1989

Document No.- PM/ IS 3513 (Pt 1)/1/Dec 20222

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.

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1.	Product	:	IS 3513 (Part 1): 1989
	Title	:	Resin treated Compressed Wood Laminates (Compregs) - For Electrical Purposes
	No. of Amendments	:	3
2.	Sampling Guidelines:		
a)	Raw material	:	a) Timber – Clause 5.1 of IS 3513 (Part 1) b) Synthetic Resins – IS 848 c) Solvents – Clause 5.3 of IS 3513 (Part 1) d) Varnishes – Clause 5.4 of IS 3513 (Part 1)
b)	Grouping guidelines	:	Please refer ANNEX - A
c)	Sample Size	:	a) Compregs – 1 full sheet b) Face and Core veneers – 2 sheets each c) Resin – 5 litres e) Varnish – 3 x 500 ml d) Solvents – 3 x 500ml
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:		
	(i) Thickness of veneers (Clause 5.1.1) (ii) Dimensions and Thickness (Clause 7) (iii) Workmanship and Finish (Clause 9)		
6.	Scope of the Licence:	:	Please refer ANNEX – D

ANNEX – A**Grouping Guidelines**

1. IS 3513 (Part 1): 1989 covers Resin Treated Compressed Wood Laminates (Compregs) for electrical purposes which are categorized as given below:

a) Types: I, II, III, IV, V and VI

b) Dimension of boards (in mm):

i) Length (mm): 2400, 2100, 1800, 1500, 1200, 900 and 600

ii) Width (mm): 1200, 900, 600, 300 and 150

(Any other dimension i. e. length and width as agreed to between the manufacturer and the purchaser are permitted.)

iii) Thickness (mm): 3, 4, 5, 6, 8, 12, 16, 20, 25, 32, 40, 50, 60 and 70

c) Dimensions of rods:

Length (mm)	1500	1200	900	600
Diameter (mm)	8 to 50	3 to 50	50 to 80	6 to 40

(Compreg rod of longer length and intermediate or greater diameter are permitted as per purchaser requirements)

2. Thickness of Compregs are grouped as given below considering the press capacity:

Group	Group -I	Group -II	Group -III
Thickness (in mm)	3, 4, 5, 6, 8, 12, 16, 20, 25	32, 40, 50	60, 70

3. Diameter of Compreg Rods are grouped as given below:

Group	Group -I	Group -II
Diameter of rod	Upto and including 40 mm	Above 40 mm

4. Manufacturing of compregs of higher thickness/diameter are more critical than the manufacturing of compregs of lower thickness/diameter. Length and width manufacturing capability depends on the manufacturing capacity of the plant.
5. Considering the above, following grouping guidelines is developed for GoL/CSoL:
- a) One sample of compreg board of any length and width and of maximum thickness from each thickness group and type shall be tested for all requirements to cover

- compreg boards of all length and width for thickness upto and including the thickness tested for the particular type.
- b) One sample of compreg rod of any length and diameter from each diameter group and type shall be tested for all requirements to cover compreg rods of all lengths and diameter covered in that group for the particular type.
 - c) Each Type of board/rod shall be tested to included that particular type of board/rod tested in the scope of licence.
 - d) Any additional special sizes/shapes [Clause 7.3 of IS 3513 (Part 1): 1989] as per requirements of purchaser may also be covered in the scope of licence subject to compliance to requirements of dimensions. In such cases the scope shall be restricted to the maximum dimensions i.e thickness (in case of board) or diameter (in case of rod) already covered in scope of the licence.
6. The Firm shall declare the varieties they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
7. 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 required to test as per the Indian Standard*

Sl. No.	Tests used in with Clause Reference	Test Equipment
	Dimension and Tolerances (Clause 7)	- Measuring Tape, Straight edge, Steel Scale - Micrometer, Vernier caliper - Squareness gauge/ Tri-square - Feeler Gauges
	Specific Gravity [Clause 8.1, Table 1 (Sl No. 1)]	- Weighing balance - Vernier calliper - Mercury volumeter
	Moisture content and Volatile Matter [Clause 8.1, Table 1 (Sl No. 2)]	- Hot Air Oven with Temperature control - Electronic Balance - Conditioning chamber with temperature and Humidity controller of 27 ± 2 °C and 65 ± 5 % - Moisture meter (For routine check)
	Water absorption [Clause 8.1, Table 1 (Sl No. 3)]	- Cutter - Arrangement to control water temp at 27 °C - Blotting paper - Weighing balance
	Sporadic working temp [Clause 8.1, Table 1 (Sl No. 4)]	
	Tensile Strength, Static bending Strength, Shear Strength [Clause 8.3, Table 3 (Sl No. 1, 2 and 4)]	- Tensile Testing Machine with load display, variable speed with MOR & MOE, attachment with AC drive - Conditioning chamber to maintain temperature of 27 ± 2 °C and relative humidity 65 ± 5 %
	Compressive Strength [Clause 8.3, Table 3 (Sl No.3)]	- Compression testing machine or any other suitable machine - Compressometer - Vernier calliper - Conditioning chamber with temperature and Humidity controller of 27 ± 2 °C and 65 ± 5 %
	Hardness Rockwell H-Scale [Clause 8.2, Table 2 (Sl No. 5)]	- Rockwell Hardness Testing Machine as per clause 5 of IS 1586 (Part 1): 2018
	Impact test [Clause 8.2, Table 2 (Sl No. 6)]	- Impact Testing Machine – Pendulum (Izod) type as per clause 9.4 of IS 1998: 1962
	Insulation resistance after immersion	- Test equipment as per IS 2259

	[Clause 8.2, Table 2 (Sl No. 1)]	
	Volume and surface resistivity ohm-em [Clause 8.2, Table 2 (Sl No. 2)]	- Test equipment as per IS 3396
	Flatwise electric strenath in oil at 90 ± 2 °C [Clause 8.2, Table 2 (Sl No. 3)]	- Test equipment as per IS 1998
	Edgewise electric strenlth in oil at 90°C [Clause 8.2, Table 2 (Sl No. 4)]	- Test equipment as per IS 1998
	Power Factor [Clause 8.2, Table 2 (Sl No. 5)]	- Test equipment as per IS 1998
	Comparative tracking index (or varnished components [Clause 8.2, Table 2 (Sl No. 6)]	- Test equipment as per IS 2824
8	Resin Testing (Cl.5.2)	- Moisture Meter (Digital) - Viscosity Cups B-4 Cup /B-6 Cup - Hydrometer - Thermometer - IS Sieve - pH Meter

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.

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 requirement of IS 3513 (Part 1): 1989

4. CONTROL UNIT – All Compregs of same type and dimensions manufactured from similar material and same batch of adhesive under similar conditions of manufacturing in a day shall constitute a control unit.

(Compregs in which the arrangement of veneers is similar as regards to thickness and species of timber for face plies 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 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 Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
5	Materials						
	Timber	5.1	IS 3515 (Part 1)	R	One	Each consignment	Further testing is not required, if received with test certificate or ISI marked.
	Synthetic Resin	5.2	IS 3515 (Part 1) IS 848	R	One	Each kettle processed at a time/ Each batch received	
	Solvents	5.3	IS 3515 (Part 1) IS 324	R	One	Each consignment	
	Varnishes	5.4	IS 3515 (Part 1) IS 524 IS 525	R	One	Each consignment	
7	Dimension and Tolerances						
	Boards	7.1	IS 3515 (Part 1)	R	Ten compreg	Each control unit	-
	Rods	7.2	IS 3515 (Part 1)	R	Ten compreg	Each control unit	-
8	Physical and Mechanical properties						
8.1, Table 1	Physical properties						
1	Specific Gravity	8.1, Table 1	IS 3515 (Part 1) IS 1708 (Part 2)	R	One	Each control unit	-

2	Moisture content and volatile matter	8.1, Table 1	IS 3515 (Part 1) IS 1708 (Part 1)	R	One	Each control unit	-
3	Water absorption	8.1, Table 1	IS 3515 (Part 1) IS 3513 (part 4)	R	One	Each control unit	-
4	Sporadic working temperature	8.1, Table 1	IS 3515 (Part 1) IS 3513 (part 4)	R	One	Each control unit	-
8.2 & table 2	Electrical Properties						
1	Insulation resistance after in water	8.2, Table 2	IS 3515 (Part 1) IS 2259	R	One	Each control unit	-
2	Volume and surface resistivity	8.2, Table 2	IS 3515 (Part 1) IS 3396	R	One	Each control unit	-
3	Flatwise electric strength in oil	8.2, Table 2	IS 3515 (Part 1) IS 1998	R	One	Each control unit	-
4	Edgewise electric strength in oil	8.2, Table 2	IS 3515 (Part 1) IS 1998	R	One	Each control unit	-
5	Power factor	8.2, Table 2	IS 3515 (Part 1) IS 1998	R	One	Each control unit	-
6	Comparative tracking index for varnished components	8.2, Table 2	IS 3515 (Part 1) IS 2824	R	One	Each control unit	-
7	Clause 8.2.1 of IS 3513 (part 1)	8.2.1	IS 3515 (Part 1)	R	One	Each control unit	-
8.2 Table 2	Mechanical Properties						
1	Tensile Strength	8.2, Table 2	IS 3515 (Part 1) IS 1734 (Part 9)	R	One	Each control unit	-

2	Static Bending Strength	8.2, Table 2	IS 3515 (Part 1) IS 1998	R	One	Each control unit	-
3	Compressive Strength a) Parallel to laminae b) Perpendicular to laminae		IS 3515 (Part 1) IS 1708 (Part 8 and 9)	R	One	Each control unit	-
4	Shear Strength a) Parallel to grain and laminae (edgewise) b) Perpendicular to grain and perpendicular to laminae (flatwise)		IS 3515 (Part 1) IS 1708 (Part 11)	R	One	Each control unit	-
5	Hardness (Rockwell H Scale)		IS 3515 (Part 1) IS 1586	R	One	Each control unit	-
6	Impact strength (unnotched sample) a) Perpendicular to laminae b) Parallel to laminae		IS 3515 (Part 1) IS 1998	R	One	Each control unit	-
9	Workmanship and Finish	9.1, 9.2	IS 3515 (Part 1)	R	Each compreg board	-	-

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**Scope of the Licence**

“Licence is granted to use Standard Mark as per IS 3513 (Part 1):1989 with the following scope:	
Name of the product	Resin Treated Compressed Wood Laminates (Compregs) – For Electrical Purposes
Type	I/II/III/IV/V/VI
Thickness of Board	--- mm upto and including --- mm
Diameter of Rod	--- mm upto and including --- mm