IS 14588 (1999): Bamboo mat veneer composite for general purposes -Specification [CED 20: Wood and other Lignocellulosic products]

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REAFFIRMED 2009

IS 14588 : 1999

भारतीय मानक

सामान्य कार्यों के लिए विनियर कंपोजिट बांस की चटाई - विशिष्टि

Indian Standard

BAMBOO MAT-VENEER COMPOSITE FOR GENERAL PURPOSES — SPECIFICATION

ICS 19.060.20

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

February 1999

Price Group 4

AMENDMENT NO. 1 FEBRUARY 2005
TO
IS 14588 : 1999 BOMBOO MAT-VENEER COMPOSITE FOR GENERAL PURPOSES — SPECIFICATION

(*Page* 2, *clause* **6.2**) — Substitute the following for the existing clause:

'**6.2** The bamboo mat-veneer composites shall be of following dimensions:

2 440 mm × 1 220 mm
2 140 mm × 1 220 mm
2 140 mm × 920 mm
1 840 mm × 1 220 mm
1 840 mm × 920 mm

(*Page* 2, *clause* **6.3**) — Add the following Note below clause **6.3**:

'NOTE — Any other dimensions (length, width and thickness) as agreed to between the manufacturer and the purchaser may also be used.'

(*Page* 2, *clause* **6.4**) — Add the following Note at the end of the clause:

NOTE — Edge straightness and squareness shall be tested as per Annex C.

(*Page* 3, *clause* **9.5.3**) — Add the following new clause at the end:

9.6 Modulus of Rupture (MOR) and Modulus of Elasticity (MOE)

Three test specimens for MOR and MOE from each sample may be drawn as specified in IS 1734 (Part 11) : 1983. Modulus of rupture and modulus of elasticity shall be determined for each test specimen in accordance with the method prescribed in IS 1734 (Part 11) and the average and minimum individual values shall not be less than the values given in Table 1.

Table 1 Average and Minimum Individual Values of Modulus of Elasticity (MOE) and Modulus of Rupture MOR)

	MOE (N/mm^2)	MOR (N/mm^2)
Average	3 000	30
Minimum Individual	2 700	27

Amend No. 1 to IS 14588 : 1999

(*Page* 4, *Annex* A) — Add the following at the appropriate place:

IS 1734 (Part 11) : 1983	Methods of test for plywood : Part 11 Determination of static bending strength

(*Page* 5, *Annex* B) — Insert the following Annex C after Annex B:

'**ANNEX C**
(*Clause* **6.4**)

METHOD OF TEST FOR EDGE STRAIGHTNESS AND SQUARENESS

C-1 PROCEDURE FOR EDGE STRAIGHTNESS

C-1.1 The straightness of the edges and ends of plywood shall be verified against a straight edge not less than the full length of the plywood. If the edge on the end of the plywood is convex, it shall be held against the straight edge in such a way as to give approximately equal gap at each end. The largest gap between the straight edge and the edge shall be measured to the nearest millimetre and recorded.

C-2 PROCEDURE FOR SQUARENESS

C-2.1 The squareness of plywood shall be checked with a 1 200 mm × 1 200 mm square, by applying one arm of the square to the plywood. The maximum width of the gap shall be recorded.'

(*Page* 6, *Annexes* C *and* D) — Rename 'Annex C and Annex D' as 'Annex D and Annex E' respectively.

(*Foreword, para* 5) — Rename 'Annex D' as 'Annex E'.

(*Page* 3, *clauses* **9.3.3, 9.4.3** *and* **9.5.3**) — Substitute the reference 'Annex D' *for* 'Annex C' in these clauses.

(CED 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 AUGUST 2005
TO
IS 14588 : 1999 BAMBOO MAT-VENEER COMPOSITE FOR GENERAL PURPOSES — SPECIFICATION

(*Page* 3, *clause* **9.3.3**) — Delete.

(*Page* 3, *clause* **9.4.3**) — Delete.

(*Page* 3, *clause* **9.5.3**) — Delete.

[*Page* 6, *Annex* D (*see also Amendment No.* 1)] — Delete the Annex and rename the subsequent Annex as 'Annex D'.

(CED 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 DECEMBER 2008
TO
IS 14588 : 1999 BAMBOO MAT-VENEER COMPOSITE FOR GENERAL PURPOSES — SPECIFICATION

[*Second cover page, Foreword* (*see also Amendment No.* 1)] — Insert the following after the third para as a separate para:

'A scheme of labelling environment friendly products to be known as Eco-Mark has been introduced at the instance of the Ministry of Environment and Forests (MoEF), Government of India. The Eco-Mark shall be administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolution No. 71 dated 21 February 1991 and Resolution No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for Eco-Mark, it shall also carry the Standard Mark of the BIS besides meeting additional environment friendly requirements. For this purpose, the Standard Mark of BIS would be a single mark being a combination of the ISI Mark and the Eco logo. Requirements to be satisfied for a product to qualify for the BIS Standard Mark for Eco friendliness will be optional. Manufacturing units will be free to opt for ISI Mark alone also.

The Eco-Mark criteria is based on the Gazette Notification No. 170 dated 18 May 1996 for Wood Substitutes as Environment Friendly Products published in the Gazette of the Government of India.'

(*Page* 1, *clause* **4.3**) — Insert the following at the end of the clause:

'For Eco-Mark, only wood from sources other than natural forests such as wood from rubber, coconut, cashew, industrial and social forestry plantations, etc, and shade trees from tea and coffee estates shall be used for the manufacture of veneers. Bamboo mats shall be made from bamboo from sources other than natural forests.'

[*Page* 3, *clause* **9.5.3** (*see also Amendment No.* 1)] — Insert the following new clause at the end and renumber the subsequent clauses:

'**10 ADDITIONAL REQUIREMENTS FOR ECO-MARK**

10.1 General Requirements

10.1.1 The bamboo mat veneer composites shall conform to the requirements of quality specified in this standard.

10.1.2 The manufacturer shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the provisions of *Water (Prevention and Control of Pollution) Act*, 1974 and *Air (Prevention and Control of Pollution) Act*, 1981 and *Water (Prevention and Control of Pollution) Act*, 1977 along with the authorization, if required under the *Environment (Protection) Act*, 1986 while applying for Eco-Mark appropriate with enforced Rules and Regulations of forest department.

10.2 Specific Requirements

The bamboo mat veneer composites shall conform to the specific requirements given for Eco-Mark under relevant clauses of the standard.

NOTE — The manufacturer shall provide documentary evidence by way of certificate or declaration to Bureau of Indian Standards while applying for Eco-Mark.'

[*Page* 3, *clause* **10.1** (*renumbered as* **11.1**)] — Insert the following matter under the clause:

'e) The criteria for which the bamboo mat veneer composite has been labelled as Eco-Mark.'

(CED 20)

Reprography Unit, BIS, New Delhi, India

Wood Products Sectional Committee, CED 20

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Wood Products Sectional Committee had been approved by the Civil Engineering Division Council.

Bamboo mat-veneer composite is manufactured with a combination of bamboo mat and veneer.

In the present scenario, where availability of conventional timber has been reduced to considerable extent, this bamboo mat-veneer composite is expected to find extensive use in future. This standard has been formulated to guide the manufacturers and users of bamboo mat-veneer composite.

In the preparation of this standard, considerable assistance has been rendered by Indian Plywood Industries Research and Training Institute, Bangalore.

The composition of the technical committee responsible for the formulation of this standard is given at Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test of analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BAMBOO MAT-VENEER COMPOSITE FOR GENERAL PURPOSES — SPECIFICATION

1 SCOPE

This standard covers the method of manufacture and the requirements of bamboo mat-veneer composites for general purposes.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

3.1 For the purposes of this standard, the definitions given in IS 707, IS 6874 and IS 13958 and the following shall apply.

3.2 Bamboo Mat-Veneer Composite

Panel manufactured with a combination of bamboo mat and veneer. Bamboo mat can be either as outer skins or as core/cross-bands. However, the composite panel shall be a balanced construction on either side of central ply.

4 MATERIALS

4.1 Bamboo

Any suitable species of bamboo may be used for making bamboo mat-veneer composite.

4.2 Adhesive

Adhesive for bonding bamboo mat and veneer shall be of phenolic type conforming to BWR type specified in IS 848.

4.3 Veneer

Any species of timber may be used for manufacture of veneers. However, a list of species is given in Annex B for guidance.

5 MANUFACTURE

5.1 Bamboo Mats

Bamboo mats required for the manufacture of bamboo mat-veneer composite shall be woven from slivers of uniform thickness and width. Thickness of slivers shall be in the range of 0.5 to 0.6 mm and width shall be in the range of 5 to 15 mm. Care shall be taken to exclude the slivers with epidermal layer.

5.1.1 *Prophylactic Treatment*

The bamboo mats used for the manufacture of bamboo mat-veneer composite shall be free from borer infections. However if transport and/or storage is inevitable, bamboo mats shall be given prophylactic treatment as per Group 9 in Table 2 of IS 401.

5.2 Veneer

Veneer shall be either rotary cut or sliced. The veneers shall be sufficiently smooth to permit an even spread of adhesive. The quality requirement of veneers shall conform to the requirements given in Table 1 of IS 303. However, the maximum number of categories of defects permitted on the surface of the veneer used for faces shall be restricted to the requirements laid down in Table 2 of IS 303. Treatment as specified in **5.2.1** shall be given at the veneer stage.

5.2.1 *Treatment*

Veneers of non-durable species and sapwood of all species shall be soaked in 1.25 percent solution of boric acid or 1.0 percent solution of borax at a temperature of 85-90°C for a period of 10-40 minutes depending upon the thickness of the veneers or the veneers shall be dipped in 2.0 percent solution of boric acid or 3 percent borax solution for 2 min and block stacked at least for 2 h. Alternatively, the veneers shall be soaked at the ambient temperature in a mixture of 0.5 percent solution of Sodium pentachlorophenate and 1.5 percent of borax in water for a period of 2 min and then stacked for at least half an hour before drying.

5.3 Thickness

The thickness of all veneers shall be uniform within a tolerance of 5 percent.

5.4 Joints in Veneers

Veneers that require to be joined to form a ply shall be spliced before assembly. All joints shall be cut square. In assembly, joints in veneers running in the same direction, shall be staggered.

5.5 Permissible Defects

5.5.1 Gaps in cores and crossbands may be permitted except for 3 ply, provided the width of the gap does

not exceed 2 mm in case of 5 kg or more, and much gaps, if more than one, shall be spaced not less than 80 mm away from each other and are staggered not less than 50 mm away as between ply, the next ply having the same grain direction.

5.5.2 Splits in cores and crossbands may be permitted to an extent of 2 per core or crossbands.

5.5.3 Overlap shall not be permitted.

5.6 Application of Adhesive

Bamboo mats shall be applied with the adhesive either by soaking or by spreading using mechanical spreader. However, veneers shall be coated with the adhesive using mechanical spreader.

5.7 Conditioning of Adhesive Coated Bamboo Mats/ Veneers

Adhesive coated mats/veneers shall be allowed sufficient length of open assembly time and/or passed through a band dryer at a temperature ranging between 80° to 90°C to bring down the moisture content of adhesive coated mats/veneers to 8 to 12 percent.

5.8 Assembly

Adhesive coated and conditioned mats shall be assembled between two aluminium caul plates whose surfaces are coated with releasing agent. Care shall be taken to ensure that (a) on either side of the central ply same species and thickness is used to get balanced construction, (b) the grain direction of the outermost veneer from the centre ply shall be along the larger dimension of the panel, and (c) when two veneers are used adjacent to each other the grain direction of the veneers shall be at right angles to each other.

5.9 Hot Pressing

Assembly of the adhesive coated mats/veneers shall be hot pressed at not less than 140°C at a specific pressure of 1.5 N/mm^2. Hot pressing time shall depend on the thickness of the board.

5.10 Preservative Treatment

5.10.1 For bamboo mat-veneer composite, preservative treatment shall be done by incorporating the preservatives like boron (Octoborate or tetraborate) into the resin before soaking/spreading bamboo mats/veneers with adhesive as the case may be. The preservative becomes non-leachable during hot pressing.

5.10.2 Alternatively, the manufactured composite boards shall be treated with non-leachable type preservative such as CCA, CCB, or ACC as per IS 12120.

6 DIMENSIONS AND TOLERANCES

6.1 The dimensions of bamboo mat-veneer composite shall be specified in the following order. The first dimension shall represent the length, the second width and the third thickness.

6.2 The dimensions of bamboo mat-veneer composite shall be as given for plywood in IS 12049.

NOTE — Any other dimension as agreed to between the manufacturer and the purchaser may be used.

6.3 Thickness of bamboo veneer composites shall be 3.0 mm, 4.0 mm, 6.0 mm, 9.0 mm, 12.0 mm, 15.0 mm, 22.0 mm, and 25.0 mm.

6.4 Tolerances

The following tolerances on the nominal sizes of finished composite boards shall be permissible:

	Dimension	*Tolerance*
a)	Length	+ 6 mm – 0 mm
b)	Width	+ 3 mm – 0 mm
c)	Thickness	
	Less than 6.0 mm	±10 percent
	6.0 mm and above	± 5 percent
d)	Squareness	2 mm per 1 000 mm
e)	Edge straightness	2 mm per 1 000 mm

7 WORKMANSHIP AND FINISH

7.1 The bamboo mat-veneer composite shall be of uniform thickness within the tolerance limit specified in 6.4.

7.2 When bamboo mats are used for faces of the composite, the surface shall be reasonably smooth and uniform in colour.

8 SAMPLING

The method of drawing representative samples and the criteria for conformity shall be as prescribed in IS 7638 for BWR grade plywood for general purposes (IS 303).

9 TESTS

9.1 Test Specimen

9.1.1 Specimens in full thickness shall be cut from different positions of the board selected under 8:

a) For boards with bamboo mats as faces, specimens shall be prepared in accordance with IS 1734 (Part 4); and

b) For boards of other construction, size of 50 mm × 50 mm in full thickness.

9.2 Specimens cut from boards shall be subjected to the tests for bond strength. Bond strength of boards with bamboo mats as faces shall be deemed satisfactory if the requirements specified in **9.3** are complied with. Bond strength of boards of other constructions shall be deemed satisfactory if the requirements specified either in **9.4** or **9.5** are complied with.

9.3 Glue Sheer Strength Test

9.3.1 *Glue Sheer Strength Test in Dry State*

Six test specimens, when prepared and tested in accordance with IS 1734 (Part 4), shall give an average and individual glue shear strength value of not less than 1 350 N and 1 100 N respectively.

9.3.2 *Water Resistance Test*

Six test specimens prepared in accordance with IS 1734 (Part 4) shall be subjected to boiling in water for a period of 8 h and when tested in wet condition in accordance with IS 1734 (Part 4) shall give an average and individual glue sheer strength value of not less than 1 000 N and 800 N respectively.

9.3.3 *Mycological Test*

Six test specimens prepared in accordance with IS 1734 (Part 4) shall be subjected to attack by micro-organism as per the method described in Annex C and then tested as per IS 1734 (Part 4) shall give an average and individual glue shear strength value of not less than 1 000 N and 800 N respectively.

9.4 Internal Bond Strength Test

9.4.1 *Internal Bond Strength in Dry State*

Six test specimens prepared as per **9.1.1**(b) when tested in accordance with IS 2380 (Part 5) shall give an average and individual value of not less than 1.5 N/mm^2 and 1.2 N/mm^2 respectively. Failing loads of specimens with material failure only, shall be taken for the purposes of averaging.

9.4.2 *Internal Bond Strength in Wet State*

Six test specimens prepared as per **9.1.1**(b) shall be subjected to boiling in water for a period of 8 h and dried in ambient conditions till the specimens attain a moisture content of 10 to 12 percent. The dried specimens when tested in accordance with IS 2380 (Part 5) shall give an average and individual value of not less than 1.2 N/mm^2 and 0.9 N/mm^2 respectively. Failing loads of specimens with material failure only, shall be taken for the purposes of averaging.

9.4.3 *Mycological Test*

Six test specimens prepared as per **9.1.1**(b) shall be subjected to attack by micro-organisms as per the method described in Annex C and then tested as per IS 2380 (Part 5) shall given an average and individual value of not less than 1.2 N/mm^2 and 0.9 N/mm^2 respectively. Failing loads of specimens with material failure only, shall be taken for the purposes of averaging.

9.5 Surface Strength Test (Alternate Test)

9.5.1 *Surface Strength Test in Dry State*

Six test specimens prepared as per **9.1.1**(b) when tested in accordance with IS 2380 (Part 22) shall given an average and individual value of not less than 9.0 N/mm^2 and 7.0 N/mm^2 respectively. Failing load of specimens with material failure only, shall be taken for the purpose of averaging.

9.5.2 *Surface Strength Test in Wet State*

Six test specimens prepared as per **9.1.1**(b) shall be subjected to boiling in water for a period of 8 h and dried in ambient conditions till the specimens attain a moisture content of 10 to 12 percent. The dried specimens when tested in accordance with IS 2380 (Part 22) shall give an average and individual value of not less than 7.0 N/mm^2 and 5.0 N/mm^2 respectively. Failing load of specimens with material failure only, shall be taken for the purposes of averaging.

9.5.3 *Mycological Test*

Six test specimens prepared as per **9.1.1**(b) shall be subjected to attack by micro-organisms as per the method described in Annex C and then tested as per IS 2380 (Part 22) shall give an average and individual value of not less than 7.0 N/mm^2 and 5.0 N/mm^2 respectively. Failing loads of specimens with material failure only, shall be taken for the purposes of averaging.

10 MARKING

10.1 Each bamboo mat-veneer composite shall be legibly and indelibly marked or stamped with the following:

a) Identification of the source of manufacture,

b) Year of manufacture,

c) Batch No., and

d) Thickness.

10.2 BIS Certification Marking

The bamboo mat-veneer composite may also be marked with the Standard Mark.

10.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
303 : 1989	Specification for plywood for general purposes (*third revision*)
401 : 1982	Code of practice for preservation of timber (*third revision*)
707 : 1976	Glossary of terms relating to timber technology and utilization (*second revision*)
848 : 1974	Specification for synthetic resin adhesives for plywood (phenolic and aminoplastic) (*first revision*)
1734 (Part 4) : 1983	Methods of test for plywood: Part 4 Determination of glue shear strength (*second revision*)
2380 (Part 5) : 1977	Method of test for wood particle boards and boards from other lignocellulosic materials: Part 5 Determination of tensile strength perpendicular to surface (*first revision*)
2380 (Part 22) : 1981	Methods of test for wood particle boards and boards from other lignocellulosic materials: Part 22 Determination of surface glueability test
6874 : 1973	Methods of tests for round bamboos
7638 : 1986	Methods of sampling for plywood, fibre hardboards, insulation boards and particle boards (*first revision*)
12049 : 1987	Dimensions and tolerances relating to wood based panel materials
12120 : 1987	Code of practice for preservation of plywood and other panel products
13958 : 1994	Specification for bamboo mat board for general purposes

ANNEX B

(*Clause* 4.3)

TIMBER SPECIES OF VENEER

NOTE — Species of timber to be treated (*see* 5.2.1) are indicated by dagger (†).

Sl No.	*Trade Name*	*Botanical Name*	*Abbreviation*
1.	Aini	*Artocarpus hirsutus*	AIN
2.	†Alder	*Alnus nitida*	ALD
3.	†Alder	*Alnus* spp.	ALD
4.	Amari	*Amoora* spp.	AMA
5.	†Amra	*Spondias* spp.	AMR
6.	Arjun	*Terminalia arjuna*	ARJ
7.	†Bahera	*Terminalia bellerica*	BAH
8.	†Banati	*Lophopetalum wightianum*	BAN
9.	†Birch	*Betula*, spp.	BIR
10.	Bonsum	*Phoebe*, spp.	BON
11.	†Carallia	*Carallia brachiata* (Syn. *Carallia integerrima*)	CAR
12.	Champ	*Machelia* spp.	CHM
13.	Chaplash	*Artocarpus Chaplasha*	CHP
14.	†Chatian	*Alstonia scholaris*	CHT
15.	Chikrassy	*Chukrasia tabularis*	CHI
16.	†Chilauni	*Schima wallichii*	CHL
17.	Cinnamon	*Cinnamomum cecicodaphne*	CIN
18.	†Debdaru	*Polyalthia* spp.	DEB
19.	†Dhup	*Canarium* spp.	DHU
20.	†Didu	*Salmalia insignis*	DID
21.	†Dillenia	*Dillenia* spp.	DIL
22.	Ebony	*Diospyros* spp.	EBO
23.	Elm	*Ulmus wallichiana*	ELM
24.	Gamari	*Gmelina arborea*	GAM
25.	†Garuga	*Garuga pinnata*	GAU
26.	†Gokul	*Ailanthus grandis*	GOK
27.	Gurjan	*Dipterocarpus* spp.	GUR
28.	†Gutel	*Trewia nudiflora*	GUT
29.	Haldu	*Adina cordifolia*	HAL
30.	Hathipaila	*Pterospermum acerifolium*	HAT
31.	†Hollock	*Terminalia myriocarpa*	HOL
32.	Hollong	*Dipterocarpus macrocarpus*	HON
33.	Indian Oak	*Quercus semecarpifolia*	IOA
34.	Indian Oak	*Quercus dilatata*	IOA
35.	Indian Oak	*Quercus serrata*	IOA

Sl No.	Trade Name	Botanical Name	Abbreviation
36.	Jaman	*Syzygium* spp.	JAM
37.	†Jhingan	*Lannea coromandelica* (Syn. *Lannea gandis*)	JHI
38.	Jutili	*Altingia excelsa*	JUT
39.	†Kadam	*Anthocephalus cadamba*	KAD
40.	†Kanju	*Holoptelea integrifolia*	KAN
41.	†Karani	*Cullenia losayroana* (Syn. *cullenia excelsa*)	KAR
42.	Kathal	*Artocarpus heterophyllus*	KAT
43.	Kindal	*Terminalia paniculata*	KIN
44.	Kokko	*Albizia lebbeck*	KOK
45.	†Lampati	*Duabanga grandiflora*	LAP
46.	Laurel	*Terminalia tomentosa*	LAU
47.	†Litsa	*Liteasa polyantha*	LIT
48.	†Machilus	*Machilus* spp.	MAC
49.	Mahogany	*Swietenia* spp.	MAG
50.	†Maina	*Teterameles nudiflora*	MAI
51.	Makai	*Shorea assamica*	MAK
52.	†Mango	*Mangifera indica*	MAN
53.	Maple	*Acer* spp.	MAP
54.	Menudito	*Enterolobium* spp. (Exotic)	MEN (ENT)
55.	Mullilam	*Fagara budrunga* (Syn. *Zanthoxylum rhetsa*)	MUI
56.	†Mundani	*Acrocarpus fraxinifolius*	MUN
57.	†Narikel	*Pterygota alata*	NAR
58.	Neem	*Azadirachta indica*	NEE
59.	Nodunari	*Mansonia* spp.	NED
60.	Pali	*Palaquium ellipticum*	PAL
61.	Persian Lilach	*Melia azadarach*	PLI
62.	†Piney	*Kingiodendron pinnatum* (Syn. *Hardwickia pinnata*)	PIN
63.	Pitraj	*Aphanamixis polystachya*	PIT
64.	Poon	*Colopyllum* spp.	POO
65	Poplar	*Populus ciliata*	POP
66.	Poplar	*Populus deltoides*	POP
67.	†Pula	*Kydia calycina*	PUL
68.	Pussur	*Xylocarpus molluccensis*	PUS
69.	Pyinma	*Lagerstroemia hypoleuca*	PYI
70.	Red Bombwe	*Planchonia valida* (Syn. *Planchonia andamanica*)	RBO
71.	†Red Dhup	*Parishia insignis*	RDH
72.	Rosewood	*Dalbergia latifolia*	ROS
73.	†Salai	*Boswellia serrata*	SAA
74.	Satinwood	*Chloroxylon swietenia*	SAT
75.	Seleng	*Sapium baccatum*	SEL
76.	†Semul	*Salmolia malabrica*	SEM
77.	†Silver Oak	*Grevillea robusta*	SOA
78.	Sissoo	*Dalbergia sissoo*	SIS
79.	Teak	*Tectona grandis*	TEA
80.	Toon	*Cedrela* spp.	TOO
81.	†Udal	*Firmiana villosa* (Syn. *Sterculia villosa*)	UDA
82.	Uriam	*Bischofia javanica*	URI
83.	†Vellapine	*Vateria Indica*	VEL
84.	†Walnut	*Juglans* spp.	WAL
85.	†White Bombwe (badam)	*Terminalia procera*	WBO
86.	White Cedar	*Dysoxylum malabricum*	WCE
87.	†White Chuglam	*Terminalia bialata* (Sapwood)	WCH

ANNEX C

(Clauses 9.3.3, 9.4.3 and 9.5.3)

MYCOLOGICAL TEST

C-1 OBJECT

This test is intended to evaluate the resistance of glue line to attack by micro-organisms.

C-2 PROCEDURE

C-2.1 A flat rectangular dish of enamelled iron, glass or porcelain (such as a photographic developing dish) of a minimum depth of 50 mm, shall be filled to a depth of about 25 mm with a layer of sawdust obtained from the sapwood of perishable timber like semul (*Bombax ceiba*) in its natural condition. The sawdust shall have previously been moistened with water containing 15 g of sucrose (normally sugar may be used; but if not available, 30 g of commercial malt extract may be substituted) to a litre of water so that it is saturated with moisture, but not so wet that free water is squeezed out of it by hand pressure. To attain this condition with dry sawdust, it is usually necessary to add three times its mass of water.

C-2.2 The sawdust shall then be charged with spores of the commonly occurring wood destroying fungi and loosely compacted. The test specimens shall be pressed down into it so that their upper surfaces are level with the top of the sawdust layer.

C-2.3 The dish shall then be covered with a sheet of glass and the edges of the dish sealed against the glass with modelling clay or a similar suitable material so that the atmosphere round the test specimens shall remain saturated with water vapour.

C-2.4 The dish and the contents shall be maintained at a temperature of 27 ± 2°C for a period of three weeks, after which the test pieces shall be removed, washed in water and allowed to dry to a moisture content of 10 to 12 percent in ambient conditions.

ANNEX D

(Foreword)

COMMITTEE COMPOSITION

Wood Products Sectional Committee, CED 20

Chairman	*Representing*
SHRI V. SIVANANDA	Indian Plywood Industries Research and Training Institute, Bangalore
Members	
SHRI B. S. ASWATHANARAYANA	Indian Plywood Industries Research and Training Institute, Bangalore
SHRI P. D. AGARWAL	Public Works Department, Uttar Pradesh
SHRI V. S. SINGH (*Alternate*)	
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SHRI T. K. DAS (*Alternate*)	
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Amendments Issued Since Publication

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Printed at Simco Printing Press, Delhi, India