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मानक



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Mazdoor Kisan Shakti Sangathan

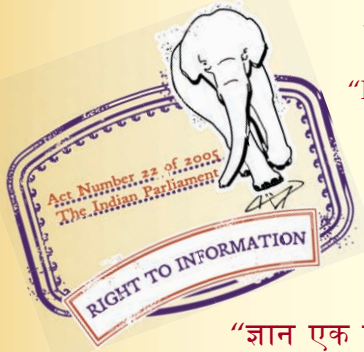
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

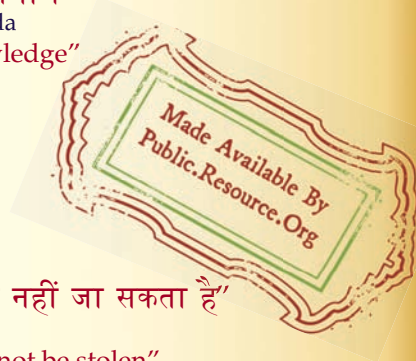
IS 12823 (1990): Wood Products - Prelaminated Particle Boards - Specification [CED 20: Wood and other Lignocellulosic products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”





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IS 12823 : 1990  
(Reaffirmed 2009)

भारतीय मानक  
लकड़ी के उत्पाद – पूर्वपरतकृत पार्टिकल बोर्ड – विशिष्टि

*Indian Standard*

**WOOD PRODUCTS - PRELAMINATED  
PARTICLE BOARDS - SPECIFICATION**

Third Reprint OCTOBER 2007  
{Incorporating Amendment No 1 and Including Amendment Nos 2,3,4, 5.6 & 7}

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

June 1990

Price Group 5 + Gr 2

**AMENDMENT NO. 2 JUNE 1994**  
**TO**  
**IS 12823 : 1990 WOOD PRODUCTS — PRELAMINATED**  
**PARTICLE BOARDS — SPECIFICATION**

( *Second cover page, third para* ) — Substitute the following for the existing para

'This standard classifies a prelaminated particle board into two grades, namely, Grade I and Grade II. Each grade consists of four types, Type I, Type II, Type III and Type IV depending upon the abrasion resistance of the prelaminated surface. Type I is useful for flooring applications. Type II is useful for horizontal applications like cash counters and restaurant table tops. Type III is useful for normal horizontal applications like office table tops and domestic furniture tops. Type IV is useful for vertical applications like panelling and partitioning, and for false ceilings.'

( *Page 1, clause 4.3* ) — Substitute the following for the existing clause

'4.3 The grades and types of prelaminated particle boards shall be represented by the symbols as follows

<i>Grade and Type</i>		<i>Designation</i>
Grade I	Type I	PLB — 11
	Type II	PLB — 12
	Type III	PLB — 13
	Type IV	PLB — 14
Grade II	Type I	PLB — 21
	Type II	PLB — 22
	Type III	PLB — 23
	Type IV	PLB — 24

[ *Page 3, clause 9.2(h)* ] — Substitute 'IS 2380 (Part 14) : 1977' for 'IS 2380 (Part 4) : 1977'

[ *Page 4, Table 1, Sl No (viii)* ] — Substitute the following for the existing matter:

(viii) Abrasion resistance (*Min*) in number of revolutions

a) Type I	1 000	1 000
b) Type II	450	450
c) Type III	250	250
d) Type IV	75	75

**Gr 1**

( Page 5 Annex A ) – Insert the following matter

<i>IS No</i>	<i>Title</i>
1500 : 1983	Method for Brinell hardness test for metallic materials ( <i>second revision</i> )
3400 (Part 2) : 1980	Methods of test for vulcanized rubbers Part 2 Hardness ( <i>first revision</i> )

( Pages 5, 6 and 7 Annex B ) – Substitute the following for the existing Annex B

## **‘ANNEX B**

( *Clause 10.10* )

### **METHOD OF TEST FOR DETERMINING SURFACE ABRASION RESISTANCE**

#### **B-1 PRINCIPLE**

The test measures the ability of the decorative surface of the sheet under test to resist abrasive wear-through to the sublayer. Abrasion is achieved by rotating a specimen in contact with a pair of loaded cylindrical wheels covered with abrasive paper. The wheels are positioned so that their cylindrical faces are equidistant from the specimen's axis of rotation but not tangential to it. As they are turned by the rotating specimen, they abrade an annular track on the specimen's surface. The number of revolutions of the specimen required to cause a defined degree of abrasion is used as measure of resistance to surface wear.

#### **B-2 MATERIALS**

##### **B-2.1 Calibration Plates of Rolled Zinc Sheet**

Calibration plates of rolled zinc plate shall have a thickness of  $0.8 \pm 0.1$  mm and a Brinell hardness of  $48 \pm 2$  when tested in accordance with IS 1500 : 1983 except that the ball diameter shall be 5 mm and the load 360 N.

##### **B-2.2 Abrasive Paper Strips**

Abrasive paper strips shall be of 12.7 mm width and about 160 mm length, having the following composition:

- a) paper of grammage  $70 \text{ g/m}^2$  to  $100 \text{ g/m}^2$
- b) powdered aluminium oxide having a particle size such that it will pass through a sieve of aperture  $100 \mu\text{m}$  and remain on a sieve having an aperture of  $63 \mu\text{m}$  and
- c) adhesive backing (optional)

### **B-2.3 Double-Sided Adhesive Tape**

Double sided adhesive tape shall be required only if the abrasive paper has no adhesive backing

## **B-3 APPARATUS**

### **B-3.1 Testing Machine**

The testing machine shall be consisting of the items given in **B-3.1.1** to **B-3.1.5** (see Fig 1)

#### **B-3.1.1 Specimen Holder**

The specimen holder shall be in the form of a disc (7) which rotates in a horizontal plane at a frequency of 58 rev/min to 62 rev/min and to which the test specimen (6) can be clamped flat (4/5)

#### **B-3.1.2 Abrasive Wheels (3)**

Abrasive wheels shall be two cylindrical rubber-covered wheels of 12.7 mm width and 50 mm diameter which rotate freely about a common axis. The curved surface of the wheels to a depth of 6 mm, shall be of rubber (2) of hardness 50 to 55 TRHD when tested according to IS 3400 (Part 2) 1980. The inside faces of the wheels shall be 20 mm to 55 mm apart, and their common axis shall be 20 mm from the vertical axis of the specimen holder. The wheels shall be positioned symmetrically in a plane containing the axis of the specimen holder.

#### **B-3.1.3 Holding and Lifting Device (8)**

Holding and lifting device for the abrasive wheels, shall be so constructed that each wheel exerts a force of  $5.4 \pm 0.2 \text{ N}$  on the test specimen.

#### **B-3.1.4 Revolution Counter**

#### **B-3.1.5 Suction Device**

Suction device shall be so fitted that two nozzles are over the abraded section of the specimen under test. One nozzle shall be situated between the wheels the

Abrade the zinc plate for a further 500 revolutions, then wipe it clean and reweigh it to the nearest 1 mg. Its loss in mass shall be  $130 \pm 20$  mg.

Any batch of abrasive paper which causes a loss in mass of the zinc plate outside this permitted range shall not be used for testing

### **B-6.3 Abrasion of Test Specimen**

Perform the test immediately after removal of the test specimen and calibrated abrasive paper from the preconditioning atmosphere

Prepare sufficient abrasive wheels for the test using previously unused abrasive paper. Fit two wheels to the machine and set the revolution counter to zero.

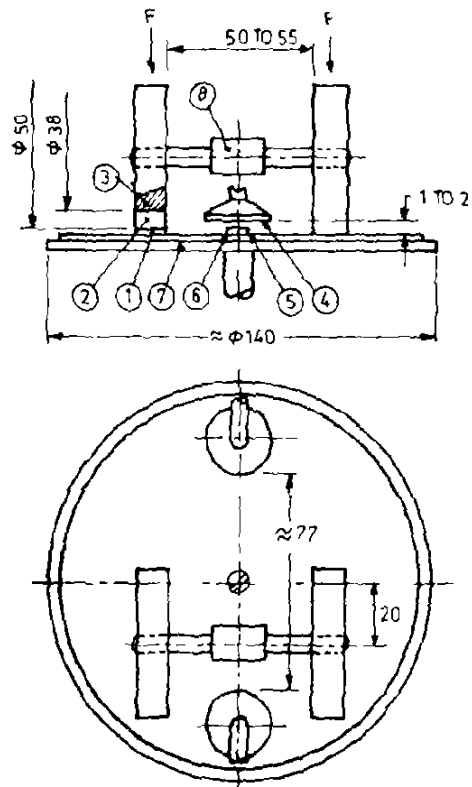
Clamp the specimen in the holder, ensuring that its surface is flat. Lower the abrasive wheels on to the specimen, operate the suction device and allow the specimen to rotate. Examine the specimen for wear after each 25 revolutions and examine the abrasive paper for clogging with abraded particles. Replace the abrasive paper if becomes clogged, or after 500 revolutions, whichever happens first. Continue the test in this way until the final wear point is reached, that is, till the particle board surface is visible in 95 percent of the abraded area. Record the number of revolutions withstood by the specimen to reach the final point.

### **B-7 EXPRESSION OF RESULTS**

The wear resistance, expressed in revolutions, for each specimen shall be half the number of revolutions recorded for the final wear point.

The wear resistance of the sample under test shall be the average of the values obtained on the three test specimens, rounded to the nearest 25 revolutions.





All dimensions in millimetres

FIG. 1 TYPE OF APPARATUS FOR MEASURING ABRASION RESISTANCE

(CED 20)

**AMENDMENT NO. 3 MAY 2000**  
**TO**  
**IS 12823 : 1990 WOOD PRODUCTS — PRELAMINATED**  
**PARTICLE BOARDS — SPECIFICATION**

[ *First cover page and page 1 (see also Amendments No. 1 and 2)* ] —  
Substitute the following for the existing title:

**‘PRELAMINATED PARTICLE BOARDS FROM**  
**WOOD AND OTHER LIGNOCELLULOSIC**  
**MATERIAL — SPECIFICATION’**

( *Second cover page, Foreword* ) — Insert the following after fourth 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 (MEF), 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 included in the relevant published Indian Standards through an amendment. These requirements will be optional; manufacturing units will be free to opt for ISI Mark alone also.

The amendment pertaining to Eco 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 Government of India.’

( *Page 1, clause 3.2, second line* ) — Insert ‘with or without impregnated overlay’ between the words ‘base papers’ and ‘under the influence.’

( *Page 1, clause 4.2* ) — Substitute the following matter for the existing.

‘Each of the grades specified in 4.1 shall be of four types, namely, Type I, II, III and IV classified by the surface abrasion characteristics specified in item (viii) of Table 1.’

**Amend No. 3 to IS 12823 : 1990**

( *Page 1, clause 5.1, first sentence* ) — Substitute the following for the existing:

'Synthetic resin bonded flat pressed three layer or multi layer or graded particle board used for the manufacture of prelaminate particle board shall conform to IS 3087:1985.'

( *Page 1, clause 5.1* ) — Insert the following at the end of the clause:

'For ECO Mark, the particle board shall also conform to the requirements of ECO Mark specified in IS 3087:1985.'

( *Page 1, clause 5.3* ) — Insert the following at the end of the clause:

'shall be used for the manufacture of prelaminate particle board '

( *Page 1, clause 5.4* ) — Delete.

( *Page 2, clause 6.1, second para, seventh line* ) — Substitute 'press' for 'dress'.

( *Page 2, clause 6.2* ) — Delete.

( *Page 2, clause 7.1* ) — Insert the following in the beginning of the clause :

'The finish of the lamination shall be of uniform nature.'

( *Page 2, clause 7.1, last sentence* ) — Delete.

[ *Page 3, clause 9.2(j)* ] — Substitute 'about 130 mm diameter or a square of about 120 mm with its corners rounded to give a diagonal of about 130 mm' for '100 mm × 50 mm'.

( *Page 4, clause 10.14* ) — Insert the following new clauses after 10.14 and renumber the subsequent clauses:

**\*11 OPTIONAL REQUIREMENTS FOR ECO MARK**

**11.1 General Requirements**

**11.1.1 Prelaminate particle board shall conform to the requirements of quality and performance as specified in this standard.**

**Amend No. 3 to IS 12823 : 1990**

**11.1.2** The manufacturer shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the provisions of the *Water (Prevention and Control of Pollution) Act, 1974* and *Air (Prevention and Control of Pollution) Act, 1981* and *Water (Prevention and Control of Pollution) Cess Act, 1977* alongwith the authorization, if required under the *Environment (Protection) Act, 1986*, while applying for ECO Mark appropriate with enforced rules and regulations of Forest Department.

**11.2 Specific Requirements**

The particle board 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 4, renumbered clause 12.1* ) — Insert the following matter under the clause:

'e) The criteria for which the prelamated particle board has been labelled as ECO Mark.'

( *Page 5, Annex A* ) — Delete 'IS 220:1972 Ferro-gallo tannate fountain pen ink (0.1 percent iron content) (*second revision*)', 'IS 222:1977 Ink, fluid for general purposes (*second revision*)', 'IS 245:1970 Trichloroethylene, technical (*second revision*)', 'IS 323:1959 Rectified spint device (*revised*)', 'IS 789:1971 Ink, drawing, water proof, black (*first revision*)', 'IS 1061 1982 Disinfectant fluids, black and white (*third revision*)', 'IS 1070:1977 Water for general laboratory use (*second revision*)', 'IS 1440:1980 Ink, metal, stamp, black (*first revision*)', 'IS 1459:1974 Kerosines (*second revision*)', 'IS 1585:1960 Motor gasolines 79 octane', and 'IS 2796:1971 Motor gasolines (*first revision*)'.

( *Page 9, Annex E* ) — Substitute the following for the existing title:

**'METHOD OF TEST FOR DETERMINING RESISTANCE TO CIGARETTE BURN'**

( *Page 9, Annex F* ) — Substitute the following title for the existing title :

**'METHOD OF TEST FOR DETERMINING RESISTANCE TO STAIN'**

**Amend No. 3 to IS 12823 : 1990**

( *Page 9, clause F-3* ) — Substitute the following for the existing clause:

**F-3 STAINING MATERIALS**

**F-3.1** Coffee and acetic acid solution (10 percent concentration) are the staining materials to be used on the prelaminated particle board.'

( *Page 10, clause F-4.1, third line* ) — Delete the following matter:

'excepting those for ... ..... 200 mm square.'

( *Page 10, clause F-5.1* ) — Delete.

( *Page 10, clause F-5.2* ) — Renumber the clause as **F-5.1** and substitute the following title for the existing:

**F-5.1 Resistance to Staining'**

( CED 20 )

**AMENDMENT NO. 4 JULY 2002**  
**TO**  
**IS 12823 : 1990 WOOD PRODUCTS — PRELAMINATED**  
**PARTICLE BOARDS — SPECIFICATION**

*( Page 1, clause 5.1, line 5 )* — Delete the following

'Moreover, the board should have a steep density gradient across its thickness so as to make both the top and bottom surfaces dense and compact '

( CED 20 )

**AMENDMENT NO. 5 FEBRUARY 2005  
TO  
IS 12823 : 1990 WOOD PRODUCTS —  
PRELAMINATED PARTICLE BOARDS —  
SPECIFICATION**

( Page 2, clause 8 ) — Substitute the following for the existing

**8 DIMENSIONS AND TOLERANCES**

**8.1 Dimensions of prelaminated particle boards shall be as follows**

<i>Length</i>	The length of prelaminated particle boards shall be 4 8, 3 6, 3 0, 2 7, 2 4, 2 1 1 8, 1 5, 1 2, 1 0 and 0 9 metres
<i>Width</i>	The width of prelaminated particle boards shall be 1 8, 1 5, 1 2, 1 0, 0 9, 0 6 and 0 45 metres
<i>Thickness</i>	The thickness of prelaminated particle boards shall be 6, 9, 12, 15, 20, 25, 30, 35, 40 and 45 metres

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

**8.2 Tolerances**

Tolerances on the nominal sizes of finished boards shall be as given below

<i>Dimension</i>	<i>Tolerance</i>
Length	+6 -0 mm
Width	+3 -0 mm
Thickness	5 percent
Edge straightness	2 mm per 1 000 mm or 0 2 percent
Squareness	2 mm per 1 000 mm or 0 2 percent

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

**Amend No. 5 to IS 12823 : 1990**

[ Page 3 clause 9.2 (c) ] Substitute the following for the existing

- e) For Determination of Modulus of Rupture (MOR) and Modulus of Elasticity (MOE)

Three test specimens from each sample as specified in IS 2380 (Part 4) 1977

( Page 3 clause 10.6 ) Substitute the following for the existing

**10.6 Test for Modulus of Rupture (MOR) and Modulus of Elasticity (MOE)**

MOR and MOE shall be determined for each test specimen in accordance with the method prescribed in IS 2380 (Part 4) 1977 and the average and minimum individual values shall not be less than the requirements laid down at Sl No. (iv) of Table 1

( Page 4 Table 1 Sl No. (iv) ) - Substitute the following for the existing

	Grade I	Grade II
(iv) a) Modulus of rupture ( <i>M<sub>m</sub></i> ) N/mm		
Average	15	11
Min. Individual	13	10
b) Modulus of elasticity ( <i>M<sub>m</sub></i> ) N/mm	2 500	2 500
Average	2 200	2 200
Min. Individual	—	—

( Page 5 Annex A ) Delete IS 12049 1987 Dimensions and tolerances relating to wood based panel materials and insert the following Annex B at the end of Annex A

**ANNEX B**  
( Clause 8.2 )

**METHOD OF TEST FOR EDGE STRAIGHTNESS AND SQUARENESS**

**B-1 PROCEDURE FOR EDGE STRAIGHTNESS**

**B-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.



Amend No. 5 to IS 12823 : 1990

**B-2 PROCEDURE FOR SQUARENESS**

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

( Page 5, Annex B ) — Rename Annex B as Annex C and the subsequent Annexes accordingly.

( CED 20 )

**AMENDMENT NO. 6 JUNE 2006  
TO  
IS 12823 : 1990 WOOD PRODUCTS  
PRELAMINATED PARTICLE BOARDS  
SPECIFICATION**

*[ Page 2, clause 8.1 (see also Amendment No. 5) ] — Substitute mm for meters as the unit of thickness*

( CED 20 )

**AMENDMENT NO. 7 SEPTEMBER 2006**  
**TO**  
**IS 12823 : 1990 WOOD PRODUCTS — PRELAMINATED**  
**PARTICLE BOARDS — SPECIFICATION**

[Page 4, clause 11, Title (see also Amendment No 3)] — Substitute  
'ADDITIONAL' for 'OPTIONAL'

( CED 20 )

## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 12 February 1990, after the draft finalized by the Wood Products Sectional Committee had been approved by the Civil Engineering Division Council.

As the prelaminated particle boards were being manufactured and used extensively, the need for this standard was felt for guiding the manufacturers and the users. Prelaminated particle board is a particle board laminated on both surfaces by synthetic resin impregnated base papers under the influence of heat and pressure; or with finished foils under the influence of pressure or pressure and heat depending upon the type of binder used.

This standard classifies a prelaminated particle board into two grades, namely, Grade I and Grade II. Each grade consists of three types, that is, Type I, Type II, Type III depending upon the abrasion resistance of the prelaminated surface. Type I is useful for horizontal applications like flooring, cash-counters, restaurant table tops. Type II is useful for normal horizontal applications like office table tops, domestic furniture tops. Type III is useful for vertical applications like panelling, partitioning and for false ceilings.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

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 or 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***WOOD PRODUCTS — PRELAMINATED  
PARTICLE BOARDS — SPECIFICATION****1 SCOPE**

1.1 This standard covers the requirement of prelaminated particle boards for general purpose and also for special applications.

1.2 This standard does not cover veneered particle boards.

**2 REFERENCES**

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

**3 TERMINOLOGY**

3.1 For the purpose of this standard, the following definitions shall apply, and for definitions other than those given below, reference may be made to IS 707 : 1976.

**3.2 Prelaminated Particle Board**

A particle board laminated on both surfaces by synthetic resin impregnated base papers under the influence of heat and pressure or with finished foils under the influence of pressure or pressure and heat depending upon the type of binder used.

**3.3 Base Paper**

A printed or plain coloured absorbent paper normally having a weight of 60-140 g/m<sup>2</sup>.

**3.4 Impregnated Base Paper**

A base paper, printed or plain coloured, impregnated in any suitable synthetic resin and dried to a volatile content of 4 to 8 percent.

**3.5 Overlay Paper**

A highly absorbent tissue paper having a weight of 18-40 g/m<sup>2</sup>.

**3.6 Impregnated Overlay**

An overlay paper impregnated in any suitable synthetic resin and dried to a volatile content of 4 to 8 percent.

**3.7 Finished Foil**

Synthetic resin based surfacing film having a weight of 40 to 100 g/m<sup>2</sup>.

**4 GRADES AND TYPES**

4.1 Prelaminated particle boards shall be of two grades, namely, Grade I and II corresponding to IS 3087 : 1985.

4.2 Each of the grades specified in 4.1 shall be of three types, namely, Types I, II and III classified by the surface abrasion characteristics specified in item ( viii ) of Table 1.

4.3 The grades and types of prelaminated particle boards shall be represented by symbols as follows:

<i>Grade and Type</i>		<i>Designation</i>
Grade I	Type I	PLB — 11
	Type II	PLB — 12
	Type III	PLB — 13
Grade II	Type I	PLB — 21
	Type II	PLB — 22
	Type III	PLB — 23

**5 MATERIALS****5.1 Particle Board**

Synthetic resin bonded flat pressed three layer, multilayer and graded particle board defined in IS 3087 : 1985 having superfine surface shall be used for production of prelaminated particle board. Moreover, the board should have a steep density gradient across its thickness so as to make both the top and bottom surfaces dense and compact.

**5.2 Impregnated Base Paper**

Printed or plain coloured absorbent base paper having a weight of 60-140 g/m<sup>2</sup> impregnated in a suitable synthetic resin and dried to a volatile content of 4-8 percent shall be used for prelamination on both surfaces of particle board.

**5.3 Impregnated Overlay**

An absorbent tissue paper having a weight of 18-40 g/m<sup>2</sup> impregnated in a suitable synthetic resin and dried to a volatile content of 4-8 percent.

**5.4 Finished Foil**

Synthetic resin based surfacing film having a weight of 40-100 g/m<sup>2</sup> with one of the faces fully finished.

**6 MANUFACTURE**

**6.1** Particle boards having superfine and closed surface with high face strength and steep density gradient across the thickness is used for making prelaminated particle boards. Impregnated base papers rich in synthetic resin are placed on either side of the particle board and the assembly is taken inside a short cycle single opening lamination press or a multidaylight press. Under heat and pressure the resin flows and forms a permanent bond with particle board.

The top surface of impregnated paper comes in contact with special surfaced chromium plates or steel caul plates and takes the impression of surface finish of these cauls. Hot boards are extracted out of the short cycle press and cooled in air, whereas cooling of boards is done inside the dress in multidaylight type. Care should be taken to keep cycle times low in the press to avoid heat penetration to the centre of the board edge.

**6.1.1** The impregnated overlay paper may be used by placing it over the impregnated base paper (IBP) on one surface while using a normal IBP on the other surface and pressed under the influence of heat and pressure. The impregnated overlay becomes transparent after pressing. Such boards are used for high surface abrasion applications.

**6.2** In case of finished foil particle board, the finished foil is pasted on both surfaces of particle board after spreading a suitable synthetic glue on board surface and passing the assembly in a roller press or a flat press under the influence of pressure and/or heat depending on the type of binder used.

**7 FINISH**

**7.1** The finish of the paper overlaid board depends on the surface of caul plates used. Common surface finishes in use are glossy, matt textured (soft, swede, wood pore and leather), etc. The surface finish of the foil finished boards depends on the original finish of the foil used.

**8 DIMENSIONS AND TOLERANCES**

**8.1** Dimensions and tolerances shall conform to IS 12049 : 1987.

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

**9 SAMPLING AND INSPECTION**

**9.1 Scale of Sampling**

**9.1.1 Lot**

In any consignment, all the prelaminated particle boards of the same grade, type and dimensions,

and manufactured under similar conditions of production, shall be grouped together to constitute a lot.

**9.1.1.1** The conformity of a lot, to the requirements of this specification shall be ascertained on the basis of tests on prelaminated particle boards selected from it.

**9.1.2** The number of prelaminated particle boards to be selected from a lot shall be in accordance with the following Table:

Lot Size	Number of Prelaminated Particle Boards to be Selected
<i>N</i>	<i>n</i>
Up to 50	2
51 to 100	3
101 to 200	4
201 to 300	5
301 to 500	7
501 and above	10

**9.1.2.1** These prelaminated particle boards shall be selected at random ( see IS 4905 : 1968 ). In order to ensure randomness of selection, all the prelaminated particle boards in the lot may be arranged in a serial order and every *r*th prelaminated particle board may be selected till the required number is obtained, *r* being the integral part of *N/n*, where *N* is the lot size and *n* is the sample size.

**9.1.3** All boards selected as given in 9.1.2.1, when tested as specified in IS 2380 ( Part 2 ) : 1977 for length, width, thickness, edge straightness and squareness, shall comply with the requirements specified under 8.

**9.2 Test Specimens and Number of Tests**

From each of the particle board selected as in 9.1.2.1, following test specimens shall be cut out from portions 150 mm away from the edges for tests as specified in 10 and conditioned as specified in IS 2380 ( Part 1 ) : 1977.

a) *For Determination of Density*

Three test specimens 75 mm wide and 150 mm long, in full thickness of material from each sample. Other sizes of specimens may be used when deemed necessary.

b) *For Determination of Moisture Content*

Three test specimens 75 mm wide and 150 mm long, in full thickness of material from each sample. Smaller specimens may be used when deemed necessary.

- c) *For Water Absorption Test*  
Three test specimens of size 300 mm × 300 mm in full thickness of board from each sample.
- d) *For Swelling in Water Test*  
Three test specimens of size 200 mm × 100 mm in full thickness of board from each sample.
- e) *For Determination of Modulus of Rupture*  
Three test specimens from each sample as specified in IS 2380 ( Part 4 ) : 1977.
- f) *For Determination of Tensile Strength Perpendicular to Surface*  
Three test specimens of size 50 mm × 50 mm in full thickness of board from each sample.
- g) *For Determination of Tensile Strength Perpendicular to the Surface After Ageing Test*  
Three test specimens of size 50 mm × 50 mm in full thickness of the board from each sample
- h) *For Determination of Screw Withdrawal Strength*  
Three test specimens from each sample of size as specified in IS 2380 ( Part 4 ) : 1977.
- j) *For Determining the Resistance to Abrasion*  
Three test specimens of size 100 mm × 50 mm in full thickness of board from each sample.
- k) *For Determining the Resistance to Steam*  
Three test specimens of size 100 mm × 100 mm in full thickness of board from each sample.
- m) *For Determining the Resistance to Crack*  
Three test specimens of size 100 mm × 100 mm in full thickness of board from each sample.
- n) *For Determining the Resistance to Cigarette Burn*  
Three test specimens of size 200 mm × 100 mm in full thickness of board from each sample.
- p) *For Determining the Resistance to Stain*  
Three test specimens of size 75 mm × 25 mm in full thickness of board from each sample.

### 9.3 Criteria for Conformity

A lot shall be considered as conforming to the requirements of the specification, if no group of test specimens for any of the characteristics fails to meet the conditions as prescribed in 8 and 10.

9.3.1 In case of a failure, double samples shall be taken from the lot for testing. The lot shall be considered to have passed if all these samples conform to the specified requirements.

### 10 TESTING OF SAMPLES

10.1 The test specimens shall be tested as given in 10.2 to 10.14 and shall conform to the requirements as prescribed in respective clauses.

#### 10.2 Test for Density

The density of the board shall be determined for each test specimen in accordance with method prescribed in IS 2380 ( Part 3 ) : 1977, and the average value shall be between 500 and 900 kg/m<sup>3</sup> and the variations in the board shall comply with the requirements specified in Table 1.

#### 10.3 Test for Moisture Content

The moisture content for each test specimen shall be determined in accordance with method prescribed in IS 2380 ( Part 3 ) : 1977 and the average value shall lie between 5 percent and 15 percent.

#### 10.4 Test for Water Absorption

The water absorption shall be determined for each test specimen in accordance with the method prescribed in IS 2380 ( Part 16 ) : 1977 and the average value shall not exceed the limits specified in item (ii) of Table 1.

#### 10.5 Test for Swelling in Water

The swelling in thickness shall be determined for each test specimen in accordance with the method prescribed in IS 2380 ( Part 17 ) : 1977 for 2 hours soaking in water and average value shall not exceed the limit specified in item (iii) of Table 1.

#### 10.6 Test for Modulus of Rupture

The modulus of rupture shall be determined for each test specimen in accordance with the method prescribed in IS 2380 ( Part 4 ) : 1977 and the average value shall not be less than the requirement laid down in item (iv) of Table 1

#### 10.7 Test for Tensile Strength Perpendicular to Surface

Tensile strength perpendicular to surface shall be determined for each test specimen in accordance with the method prescribed in IS 2380 ( Part 5 ) : 1977 and the average value shall not be less than the values prescribed in item (v) of Table 1.

**Table 1 Physical and Mechanical Properties**  
( Clauses 10.2, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9,  
and 10.10 )

Properties	Flat Pressed Three Layer, Multilayer and Graded	
	Grade I	Grade II
i) Density variation ( Max ), percent	±10	±10
ii) Water absorption ( Max ), percent:		
a) 2 hours	7.0	15.0
b) 24 hours	15.0	30.0
iii) Thickness swelling ( Max ), percent, 2 hours	5.0	8.0
iv) Modulus of rupture ( Min ), N/mm <sup>2</sup> :		
a) Up to 20 mm thickness	15.0	11.0
b) Above 20 mm thickness	12.5	11.0
v) Tensile strength perpendicular to surface ( Min ), N/mm <sup>2</sup> :		
a) Up to 20 mm thickness	0.45	0.3
b) Above 20 mm thickness	0.4	0.3
vi) Tensile strength perpendicular to surface ( Min ), N/mm <sup>2</sup> :		
a) After cyclic test*	0.2	—
b) After accelerated water resistance test†	0.15	—
vii) Screw withdrawal strength ( Min ), N:		
a) Face	1 250	1 250
b) Edge	850	750
viii) Abrasion resistance ( Min ) in number of revolutions:		
a) Type I	450	450
b) Type II	250	250
c) Type III	80	80

**\*Cyclic Test**

Specimens are immersed in water at  $27 \pm 2^\circ\text{C}$  for a period of 72 hours, followed by drying in air at  $27 \pm 2^\circ\text{C}$  for 24 hours and then heating in dry air at  $70^\circ\text{C}$  for 72 hours. Three such cycles are to be followed and then specimens are tested for tensile strength perpendicular to the surface.

**†Accelerated Water Resistance Test**

Specimens are immersed in water at  $27 \pm 2^\circ\text{C}$  and water is brought to boiling and kept at boiling temperature for two hours. Specimens are then cooled in water to  $27 \pm 2^\circ\text{C}$  and tested for tensile strength perpendicular to the surface.

**10.8 Test for Tensile Strength Perpendicular to Surface after Ageing**

Test tensile strength perpendicular to surface shall be determined for each test specimen in accordance with the method prescribed in IS 2380 ( Part 5 ) : 1977, after subjecting the specimens to the ageing tests, namely, cyclic test or accelerated water

resistance test as prescribed in Table 1. The average value shall not be less than the values prescribed in item ( vi ) of Table 1.

**10.9 Test for Screw Withdrawal Strength**

The screw withdrawal strength shall be determined for each test specimen as prescribed in IS 2380 ( Part 14 ) : 1977. The average value shall not be less than the values prescribed in item ( vii ) of Table 1.

**10.10 Test for Abrasion Resistance**

The abrasion resistance shall be determined for each test specimen in accordance with the method prescribed in Annex B and shall comply with the requirements specified in item ( viii ) of Table 1.

**10.11 Test for Resistance to Steam**

The resistance to steam shall be determined for each test specimen in accordance with method prescribed in Annex C and the specimen shall not show any sign of blister, delamination or change in surface finish. There may be slight colour change in dark colours/patterns.

**10.12 Test for Crack Resistance**

Crack resistance shall be determined for each test specimen in accordance with the method prescribed in Annex D and the specimen shall not show any sign of cracks or delamination.

**10.13 Test for Resistance to Cigarette Burn**

Resistance to cigarette burn shall be determined for each test specimen in accordance with the method prescribed in Annex E and the specimen shall not leave any mark or stain on the specimen after cleaning with water or solvent.

**10.14 Test for Resistance to Stain**

Resistance to stain shall be determined for each test specimen in accordance with the method prescribed in Annex F and the specimen shall not leave any stain on the specimen after cleaning with water, solvent or detergent.

**11 MARKING**

11.1 Each prelaminated particle board shall be legibly and indelibly marked on any of its edges with the following:

- Indication of the source of manufacture,
- Grade and Type of prelaminated particle board,
- Thickness, and
- Batch number and year of manufacture.



## ANNEX A

( Clause 2.1 )

## LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
220 : 1972	Ferro-gallo tannate fountain pen ink ( 0.1 percent iron content ) ( <i>second revision</i> )	( Part 2 ) : 1977	Accuracy of dimensions of boards ( <i>first revision</i> )
222 : 1977	Ink, fluid for general purposes ( <i>second revision</i> )	( Part 3 ) : 1977	Determination of moisture content and density ( <i>first revision</i> )
245 : 1970	Trichloroethylene, technical ( <i>second revision</i> )	( Part 4 ) : 1977	Determination of static bending strength ( modulus of rupture and modulus of elasticity in bending ) ( <i>first revision</i> )
323 : 1959	Rectified spirit device ( <i>revised</i> )	( Part 5 ) : 1977	Determination of tensile strength perpendicular to surface ( <i>first revision</i> )
324 : 1959	Ordinary denatured spirit ( <i>revised</i> )	( Part 14 ) : 1977	Screw and nail withdrawal test ( <i>first revision</i> )
707 : 1976	Glossary of terms applicable to timber technology and utilization ( <i>second revision</i> )	( Part 16 ) : 1977	Determination of water absorption ( <i>first revision</i> )
789 : 1971	Ink, drawing, waterproof, black ( <i>first revision</i> )	( Part 17 ) : 1977	Determination of swelling in water ( <i>first revision</i> )
1061 : 1982	Disinfectant fluids, black and white ( <i>third revision</i> )	2794 : 1979	Truing tools, single diamond ( <i>first revision</i> )
1070 : 1977	Water for general laboratory use ( <i>second revision</i> )	2796 : 1971	Motor gasolines ( <i>first revision</i> )
1440 : 1980	Ink, metal, stamp, black ( <i>first revision</i> )	3087 : 1985	Wood particle boards ( medium density ) for general purposes ( <i>first revision</i> )
1459 : 1974	Kerosines ( <i>second revision</i> )	4905 : 1968	Methods for random sampling
1585 : 1960	Motor gasoline 79 octane	12049 : 1987	Dimensions and tolerances relating to wood based panel materials
2380	Methods of test for wood particle boards and boards from other lignocellulosic materials ( <i>first revision</i> ):		
( Part 1 ) : 1977	Preparation and conditioning of test specimens ( <i>first revision</i> )		

## ANNEX B

( Clause 10.10 )

## METHOD OF TEST FOR DETERMINING SURFACE ABRASION RESISTANCE

## B-0 GENERAL

**B-0.1** This method of test determines the ability of the surface of a prelaminated particle board to maintain its original design and colour under abrasive wear. In this test, specimens of the laminate and pieces of a reference sheet are alternately rubbed, mechanically with the same abrasive wheels. The relative amounts of rubbing that produce the same visual effect provide a measure which is designated as 'Wear Resistance'.

## B-1 NUMBER OF TEST SPECIMENS

**B-1.1** Five specimens shall be used for the test.

## B-2 FORM OF TEST SPECIMEN

**B-2.1** Specimens 160 mm long and 50 mm wide shall be cut from the sheet to be tested.

## B-3 REFERENCE SHEET

**B-3.1** The reference sheet shall be one of series of PLB complying with this specification of nominal

thickness of 1.5 mm, bearing a gravure printed pattern and held in the form of reference sheet samples. The first of these sheets shall be deemed to have a wear resistance of 500 revolutions. Subsequent sheets shall be calibrated as described in B-12 for sub-reference sheet.

**B-4 REFERENCE SHEET SAMPLES**

**B-4.1** The reference sheet samples shall consist of pieces of material 100 mm long and 50 mm wide cut from the reference sheet.

**B-5 PREPARATION OF TEST SPECIMEN AND REFERENCE PIECE**

**B-5.1** The test specimen and the reference piece shall respectively be prepared by machining a test sample and a reference sheet sample to a shape such that the test specimen and the reference piece placed side by side can conveniently be clamped in the holder as described in B-8.3.

**B-5.2** A notch shall be provided to accommodate the central spindle.

**B-5.3** When necessary to minimize the step at the joint it is permissible to chamfer the meeting edges.

**B-6 APPARATUS**

**B-6.1** That produces wear successively in different directions on the same annular surface area of the combined test specimen and reference piece. It comprises a circular turntable on which the combined test specimen and reference piece are clamped. It is capable of being rotated in a horizontal plane at a uniform speed of 60 to 65 rev/min. In addition, the wear testing machine comprises a pair of pivoted arms having two freely rotatable vertical test wheels which can be lowered to make contact with the surface of the combined test specimen and reference piece. The axes of the test wheels are coincident and the test wheels when lowered to make contact with the top surface of the combined test specimen and reference piece, touch the combined test specimen and reference piece at positions equidistant from the centre of the turntable but not diametrically opposite. A weight is attached to each pivoted arm so that each wheel exerts a force of 500 g on the combined test specimen and reference piece.

**B-6.2** Strips, 12.7 mm wide of suitable abrasive paper.

**B-6.3** Adhesive Tape, 12.7 mm wide with adhesive on both sides

**B-6.4** Means of removing abrasion dust from the surface of the combined test specimen and reference piece like jets of air or suction.

**B-7 PREPARATION OF APPARATUS**

**B-7.1** The apparatus shall be set up with the '500 g' plugs in place. The test wheels shall be placed on the spindles and fastened in position. If air jets are used, they shall be directed at the points where the centres of the abrasive surfaces meet the specimen. If suction is used, it shall be applied at the two points on the abraded track midway between the abrasive wheels.

**B-8 PROCEDURE**

**B-8.1** The test shall be carried out in an atmosphere maintained at  $27 \pm 5^\circ\text{C}$

**B-8.2** If necessary, clean the surfaces of the test specimen and the reference piece with denatured spirit ( see IS 324 : 1959 ) to remove any foreign substance.

**B-8.3** Place a test specimen and a reference piece, without any prior conditioning, side by side on the turntable on either side of the central spindle. The positioning on the turntable shall be such that when the clamping ring is screwed firmly down, a close fitting stepless joint is obtained at the mating edges of the reference piece and the test specimen. Ignore the wear in that region. In some cases where the test specimen and the reference piece markedly differ in thickness, it may be necessary to insert a piece of paper or other thin material underneath the thinner one to obtain a stepless joint of the pieces.

**B-8.4** Clamp the test specimen and the reference piece on to the turntable using the centre hold-down nut and washer and the rimmed specimen holder. It is important that they are clamped flat to ensure contact across the face of the abrasive wheels. Lower the abrasive wheels on to the surface of the test specimen and the reference piece. Turn on the air or suction and start the abrading machine. Note the end points, that is, the number of revolutions to the nearest ten of the turntable at which:

- a) about half of the printed pattern has been erased from the reference piece and test specimen, in case of printed designs.
- b) about half of the decorative colour has been creased from the reference piece and test specimen, in case of plain colours.

**B-9 CALCULATION**

**B-9.1** Calculate the wear resistance of the test specimen as follows.

$$\text{Wear resistance of test specimen} = \frac{\text{Wear resistance of reference sheet} \times \text{No. of revolutions at end point for test specimen}}{\text{No. of revolutions at end point for reference piece}}$$

**B-9.2** The wear resistance of the sheet under test shall be the mean wear resistance of the five test specimens.

#### **B-10 METHOD OF TESTING PLAIN COLOURED MATERIALS**

**B-10.1** In most instances, the wear resistance of plain coloured laminates is considerably greater than the wear resistance of laminates with a gravure print. To avoid difficulties due to the large difference in end points between the test specimens and the reference piece, the following modified procedure may be used to determine the wear resistance of plain colours.

##### **B-10.1.1 Number of Test Specimens**

Three plain colour specimens shall be tested.

##### **B-10.1.2 Preparation of Plain Colour Test Specimen and Reference Piece**

The plain colour test specimen and the reference piece shall be prepared as described in B-2, B-3, B-4 and B-5.

##### **B-10.1.3 Procedure**

Test the plain colour test specimen and the reference piece by the procedure described in B-8. Stop the test when the end point for the reference piece is reached, and note the number of revolutions of the turntable. Then replace the worn reference piece on turntable by another unworn reference piece to form a new composite test piece with the abraded plain colour specimen, and renew the abrasive paper on the wheels. Re-commence the test and repeat the above procedure. It may prove necessary for more than one replacement of the reference piece and the abrasive paper to be made before the end point for the plain colour specimen is reached.

##### **B-10.1.4 Calculation**

$$\text{Wear resistance of plain colour test} = (N-1)R + \frac{(R \times P)}{S}$$

where

$N$  = number of reference pieces used in testing one test specimen ( in practice  $N = 2$  or  $3$  ),

$R$  = wear resistance of reference sheet,

$P$  = number of revolutions with  $N$ th reference piece to the end point for the plain colour specimen, and

$S$  = number of revolutions with  $N$ th reference to its end point.

**B-10.1.4.1** The wear resistance of the sheet under test shall be mean wear resistance of the three test specimens.

#### **B-11 ALTERNATIVE PROOF TEST FOR PLAIN COLOURS ONLY**

**B-11.1** For the purpose of determining whether, the sheet complies with the specified requirements for wear resistance, it shall suffice if each test is continued until the test specimen has been subjected to a number of revolutions equal to:

$$\frac{XZ}{Y}$$

where

$X$  = the specified limit,

$Z$  = the number of revolutions to reach the end point for the reference piece when tested together with the plain colour specimen, and

$Y$  = the wear resistance sheet.

**B-11.1.1** Three specimens shall be tested.

#### **B-12 CALIBRATION OF SUB-REFERENCE SHEETS**

**B-12.1** Where abrasion tests by this method are to be carried out frequently, it is permissible for test houses to calibrate their own sub-reference sheet from reference sheet samples referred to in B-3.1 and use this sub-reference sheet in tests. This calibration shall be carried out by determining the wear resistance of the sub-reference sheet in the same manner as described in B-8 and B-9 except that to minimize errors due to variability within the reference and sub-reference sheets, it is recommended that the wear resistance of the sub-reference sheets, be derived from the mean of twenty determinations. All samples cut from the sub-reference sheet shall be assumed to have this mean value. In cases of dispute, however, the test shall be carried out in direct comparison with the reference sheet samples.

#### **B-13 FACTORS AFFECTING ACCURACY**

**B-13.1** The variability of replicate tests is unaffected by any variability in the abrasive paper and is governed by:

- a) the variability between the reference pieces,
- b) the variability between the test specimens, and
- c) the precision in judging an equal degree of wear on both the reference piece and the test specimen.

## ANNEX C

( Clause 10.11 )

### METHOD OF DETERMINING SURFACE RESISTANCE TO STEAM

#### C-0 GENERAL

**C-0.1** This test determines the surface resistance of prelaminated particle board against contact with steam atmospheric pressure.

#### C-1 NUMBER OF TEST PIECES

**C-1.1** Three specimens shall be used for each test.

#### C-2 SPECIMEN SIZE

**C-2.1** Specimens of size 100 mm × 100 mm × thickness shall be used.

#### C-3 PREPARATION OF SAMPLE

The test specimen shall be cut in the required size from the sample board, 150 mm away from the corner of the edge. The specimens selected shall have compact edges with no loose core particles.

#### C-4 APPARATUS

This test requires very simple apparatus.

**C-4.1** Electric hot plate of size 200 mm diameter or 200 mm × 200 mm minimum

**C-4.2** Glass Conical Flask, 250 ml.

**C-4.3** A Holding Clamp

#### C-5 PREPARATION OF APPARATUS

**C-5.1** Place conical flask filled with water up to 100 cc on the hot plate. Cover the mouth of conical flask with the specimen such that the surface to be tested shall face downwards. Put the clamp to secure specimen from falling down.

#### C-6 PROCEDURE

**C-6.1** Start heating the water in the flask by putting on the electric heater. After some time water will start boiling. Note the time and continuously heat for a total period of 1 hour. Steam will come in contact with the board surface and escape into atmosphere.

**C-6.2** Observe the surface of the specimen closely and note down remarks in the register.

## ANNEX D

( Clause 10.12 )

### METHOD OF TEST FOR DETERMINING RESISTANCE TO CRACKING OF LAMINATION UNDER HEAT

#### D-0 GENERAL

**D-0.1** This test determines the surface resistance to cracking when the specimen is subjected to a temperature of 70-100°C for a definite time.

#### D-1 NUMBER OF TEST PIECES

**D-1.1** Three specimens shall be used for each test.

#### D-2 SPECIMEN SIZE

**D-2.1** Specimen of size 100 mm × 100 mm × thickness of the board shall be used.

#### D-3 PREPARATION OF SAMPLE

**D-3.1** The test specimen shall be cut in the required size from the sample board, 150 mm

away from the corner or edge. The specimens selected shall have compact edges with no loose core particles.

#### D-4 APPARATUS

**D-4.1** Electric oven of suitable size having temperature of 50-150°C.

#### D-5 PROCEDURE

**D-5.1** Keep the temperature stabilized at 70 ± 2°C. Introduce the specimens in the oven. Remove the specimens after 24 hours duration and observe for cracks on the lamination surface.

Then maintain a temperature of 100 ± 2°C and introduce the fresh specimens. Remove them after 2 hours and observe for surface cracks and blemishes

## ANNEX E

( Clause 10.13 )

## METHOD OF TEST FOR DETERMINING CIGARETTE BURN

## E-0 GENERAL

This test is introduced to check the effect of leaving a glowing cigarette on the lamination surface.

## E-1 NUMBER OF SAMPLES

E-1.1 Three specimens shall be taken for test.

## E-2 SPECIMEN SIZE

E-2.1 Specimen of size 200 mm × 100 mm ×

thickness of the board could be taken.

## E-3 PROCEDURE

E-3.1 Place a glowing cigarette horizontally on the specimen. Keep it for 60 s and remove it from the specimen as soon as 60 s are lapsed. This could be checked by a stop watch. Clean the area with water or a suitable solvent and observe if any blister has formed or the surface colour got changed.

## ANNEX F

( Clause 10.14 )

## METHOD OF TEST FOR DETERMINING STAIN

## F-0 GENERAL

F-0.1 This test determines effect of staining materials on the lamination surface.

## F-1 OUTLINE OF THE METHOD

F-1.1 Different staining materials are applied to separate test specimens of the decorative laminates, covered suitably and allowed to remain in contact for a specified period. The staining agent is washed off, cleaned with a domestic abrasive cleaner and the surface examined for the staining produced.

## F-2 APPARATUS

F-2.1 Glass Covers, one for each staining material to prevent evaporation.

NOTE — Watch glasses are suitable for this purpose.

## F-3 STAINING MATERIALS

F-3.1 Depending upon the specific applications of the decorative laminate, selection from the list of the staining agents given below shall be made. The number of staining materials as well as their concentration shall be mutually agreed to between the purchaser and the supplier.

## F-3.1.1 Artificial Perspiration

Prepared by dissolving the following in 500 ml of rectified spirit ( see IS 323 : 1959 ) and 500 ml of distilled water ( see IS 1070 : 1977 ).

Sodium chloride	.....	28 g
Urea	.....	4 g
Lactic acid	.....	16 g

F-3.1.2 *Blood, human.*

F-3.1.3 *Citric Acid Solution, 10 percent ( w/v ).*

F-3.1.4 *Coffee*

Coffee shall be made by pouring boiling water on the ground coffee ( 80 g coffee/l of water ) in a hot vessel stirring occasionally and decanting from the ground coffee after infusion for 5 minutes.

F-3.1.5 *Cooking Fat*

Any cooking oil or hydrogenated fat with ground turmeric powder 10 percent w/v at 80°C.

F-3.1.6 *Disinfectant Fluids, see IS 1061 : 1982.*

F-3.1.7 *Gasoline, see IS 2796 : 1977.*

F-3.1.8 *Ink, see IS 220 : 1972, IS 222 : 1962 or IS 789 : 1971 and IS 1440 : 1980.*

NOTE — Ball pan ink may also be used for this purpose.

F-3.1.9 *Rectified Spirit, see IS 324 : 1959.*

F-3.1.10 *Iodine Solution, 10 percent w/v* dissolve 6 g of potassium iodine and 10 g of iodine in water and add sufficient ethyl alcohol ( 90 percent ) to produce 1 000 ml.

F-3.1.11 *Kerosine, see IS 1459 : 1974.*

F-3.1.12 *Milk or LASSI ( Buttermilk )*

F-3.1.13 *Silver Nitrate Solution, 1 percent w/v*

F-3.1.14 *Sodium Hydroxide Solution, 10 percent w/v.*

**IS 12823 : 1990**

**F-3.1.15 Tea**

Tea shall be made by pouring boiling water on to tea ( 9 g of tea per litre of water ) in a hot vessel, stirring occasionally and decanting from the leaves after infusion for 5 minutes

**F-3.1.16 Wax Crayon, tailors' chalk.**

**F-3.1.17 Lubricating Oil/Grease**

**F-4 TEST SPECIMENS**

**F-4.1** Specimens to be cut from the sheet to be tested shall be 75 mm long and 25 mm wide excepting those for the test with artificial perspiration in which case the specimens shall be 200 mm square.

**F-4.2** The number of specimens for sheet shall be equal to twice the number of staining agents selected for test.

**F-5 PROCEDURE**

**F-5.1 Resistance to Staining with Artificial Perspiration**

Clear two specimens with trichloroethylene ( see IS 245 : 1970 ) and apply artificial perspiration over them with cotton wool. Rub the soaked cotton wool against the surface giving a minimum of 1500 strokes.

NOTE — One stroke shall mean starting from the point A. While rubbing, going to a point B and

coming back to A; the distance between A and B being 10 cm approximately.

**F-5.2 Resistance to Staining with other Agents**

Apply each staining material to two test specimens at room temperature. Cover one of the two test specimens with a glass cover and allow them to stand for 24 hours. Wash each specimen with water containing a suitable wetting agent and then with denatured spirit ( see IS 324 : 1959 ). Allow the specimens to dry. After one hour place the specimens in a horizontal position under overhead white fluorescent light having an intensity of 800 to 1 100 lumens/m<sup>2</sup>. Exclude light from other sources. View the specimens at an angle of approximately 90° to the surface and examine any discoloration on the surface of the specimens where the staining agent is specifically applied. If any staining or discoloration is noticed attempt to remove it by light rubbing with a mild domestic abrasive cleaner. Allow the specimens to dry and examine them again under conditions mentioned above.

**F-6 EVALUATION**

**F-6.1** The material shall be deemed to have passed test if no specimen shows blistering, staining or discoloration when finally examined. Specimen on which stains are removable by light rubbing with soap and water, or a mild abrasive domestic cleaner shall be considered acceptable.

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### Amendments Issued Since Publication

Amend No	Date of Issue	Text Affected

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