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मानक

IS 14587 (1998): Prelaminated medium density fibre board

-Specification [CED 20: Wood and other Lignocellulosic products]



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भारतीय मानक मध्यम घनत्व के पूर्व–लेमिनेटिड फाइबर बोर्ड — विशिष्टि

Indian Standard PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

ICS 79.060.20

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

September 1998

Price Group 6

AMENDMENT NO. 1 DECEMBER 1999 TO IS 14587 : 1998 PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

[Page 4, Table 1, Sl No. (1.8)] — Substitute the following for the existing:

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¹1.8 Abrasion resistance (Min), in number of revolutions:

a)	Туре І	1 000	1 000
b)	Туре II	450	450
c)	Type III	250	250
d)	Type IV	75	75'

(CED 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 AUGUST 2000 TO IS 14587 : 1998 PRELAMINATED MEDIUM DENSITY FIBRE BROAD — SPECIFICATION

(Page 2, clause 8) - Substitute 'IS 12406' for 'IS 12049'.

(Page 5, Annex A) — Delete the following:

'IS 12049 : 1987 Dimensions and tolerances relating to wood based panels'.

(CED 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 MARCH 2005 TO IS 14587 : 1998 PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

[Page 2, 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 each for MOR and MOE from each sample as specified in IS 2380 (Part 4)

(Page 3, clause 10.6) — Substitute the following for the existing:

'10.6 Test for Modulus of Rupture and Modulus of Elasticity

The modulus of rupture and modulus of elasticity shall be determined for each test specimen in accordance with the method prescribed in IS 2380 (Part 4) and the average and minimum individual values shall not be less than the requirements laid down in items 1.4 and 1.5 of Table 1.'

(Page 4, clause 11.1) — Insert the following after 11.1(d):

'e) One side laminated (OSL) or both side laminated (BSL).'

Amend No. 3 to IS 14587 : 1998

[Page 4, Table 1 (see also Amendment No. 1)] — Substitute the following for the existing table:

Properties	Requir	Requirements		
	Grade I	Grade II		
1.1 Density variation (Max), percent	±10	±10		
1.2 Water absorption (Max), percent:				
a) 2h	6	9		
b) 24 h	12	18		
1.3 Thickness swelling (Max), percent, 2 h	4	7		
1.4 Modulus of rupture (Min), N/mm ² :				
a) Up to 20 mm thickness:	1			
Average	28	28		
Minimum individual	25	25		
b) Above 20 mm thickness:				
Average	25	25		
Minimum individual	22	22		
1.5 Modulus of elasticity, N/mm ² :				
a) Up to 20 mm thickness:				
Average	2 800	2 800		
Minimum individual	2 500	2 500		
b) Above 20 mm thickness:				
Average	2 500	2 500		
Minimum individual	2 300	2 300		
1.6 Tensile strength perpendicular to surface, N/mm ² :				
a) Up to 20 mm thickness:	0.9	0.8		
Average	0.8	0.7		
Minimum individual				
b) Above 20 mm thickness:	0.8	0.7		
Average	0.7	0.6		
Minimum individual				

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

1.7 Tensile strength perpendicular to surface,		
N/mm ² :		
a) After cyclic test 1)	1	1
Average	0.45	_
Minimum individual	0.40	
b) After accelerated water resistance ²⁾		
Average	0.20	-
Minimum individual	0.30	-
	0.23	
1.8 Screw withdrawal strength (Min), N:	1.600	1.500
a) race	1 500	1 500
b) Eage	1 250	1 250
1.9 Abrasion resistance (Min), in number of		
revolutions	1	
a) Type I	1 000	1 000
b) Type II	450	450
c) Type III	250	250
	1 /5	/5
"Cyclic Test — Specimens are immersed in water	at 27 ± 2°C for a perio	d of 72 h, followed by
drying in air at $27 \pm 2^{\circ}$ C for 24 h and then heating in	dry air at 70°C for 72 h	. Three such cycles are
to be followed and the specimens are tested for tens	le strength perpendicula	r to the surface.
" Accelerated Water Resistance Test Specimens	are immersed in water a	t 27 \pm 2°C and water is
brought to boiling and kept at boiling temperature to	or 2 n. Specimens are	then cooled in water to
$2/\pm 2$ C and tested for tensile strength perpendicul	ar to the surface.	

Amend No. 3 to IS 14587 : 1998

(CED 20)

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Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 4 AUGUST 2005

TO

IS 14587 : 1998 PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

(Second cover page, Foreword) — Insert the following matter after fourth 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 *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 BIS Standard Mark for Eco friendliness will be optional. Manufacturing units will be free to opt for ISI Mark alone also.

The 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 5.1) — Insert the following at the end of the clause:

'For ECO Mark, the medium density fibre board shall also confirm to the requirement of ECO Mark specified in IS 12406.'

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

'11 OPTIONAL REQUIREMENT FOR ECO MARK

11.1 General Requirement

11.1.1 Prelaminated medium density fibre board shall confirm to the requirement of quality and performance as specified in this standard.

Amend No. 4 to IS 14587 : 1998

11.1.2 The manufacturer shall produce to BIS environment consent clearance from 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 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.

11.2 Specific Requirement

Prelaminated medium density fibre board shall confirm to the specific requirement 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 Standarda, while applying for ECO Mark.'

[Page 4, clause 11.1 (renumbered 12.1)] — Insert the following at the end of the clause:

'e) The criteria for which the prelaminated medium density fibre board has been labelled as ECO Mark.'

(CED 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 5 SEPTEMBER 2006 TO IS 14587 : 1998 PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

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

(CED 20)

Reprography Unit, BIS, New Delhi, India

FOREWROD

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.

As the prelaminated medium density fibre boards are being manufactured and extensively used in our country, the need for this standard was felt to guide the manufacturers and the users. Prelaminated medium density fibre board is a medium density fibre board laminated on both surfaces by synthetic resin impregnated base papers with or without impregnated overlay under the influence of heat and pressure.

This standard classifies a prelaminated medium density fibre board into two grades, namely, Grade I and Grade II for use in humid and dry locations respectively. 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 application. 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.

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

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

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

PRELAMINATED MEDIUM DENSITY FIBRE BOARD — SPECIFICATION

1 SCOPE

This standard covers the requirement of prelaminated medium density fibre board for general purposes and also for special applications.

2 REFERENCES

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

3.2 Prelaminated Medium Density Fibre Board

A medium density fibre board laminated on both surfaces by synthetic resin impregnated base papers with or without impregnated overlay under the influence of heat and pressure.

3.3 Base Paper

A printed or plain coloured absorbant paper normally having a weight of 60-140 g/m^2 .

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 absorbant tissue paper having a weight of $18-40 \text{ g/m}^2$.

3.6 Impregnated Overlay

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

4 GRADES AND TYPES

4.1 Prelaminated medium density fibre board shall be of two grades, namely Grade I and Grade II corresponding to IS 12406.

4.2 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 1.8 of Table 1.

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

Grade and Type			Designation
Grade	I	Type I Type II Type III Type IV	PLMDF - 11 PLMDF - 12 PLMDF - 13 PLMDF - 14
Grade	II	Type I Type II Type III Type IV	PLMDF - 21 PLMDF - 22 PLMDF - 23 PLMDF - 24

5 MATERIALS

5.1 Medium Density Fibre Board

Synthetic resin bonded medium density fibre board used for the manufacture of prelaminated medium density fibre board shall conform to IS 12406.

5.2 Impregnated Base Paper

Printed or plain coloured absorbant base paper having a weight of 60-140 g/m^2 impregnated in a suitable synthetics resin and dried to a volatile content of 4-8 percent shall be used for prelamination on both surfaces of medium density fibre board.

5.3 Impregnated Overlay

An absorbant tissue paper having a weight of 18-40 g/m² impregnated in 'a suitable synthetic resin and dried to a volatile content of 4-8 percent, shall be used for prelaminations on both surfaces of medium density fibre board.

6 MANUFACTURE

6.1 Medium density fibre board having a dense, compact, homogenous construction with super smooth surface is used for making prelaminated medium density fibre boards. Impregnated base papers rich in synthetic resin are placed on either side of the medium density fibre 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 the medium density fibre board.

The top surface of impregnated paper comes in contact with special surfaced chromium plates or steel caul

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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 press in multidaylight type. Care shall 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.

7 FINISH

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.

8 DIMENSIONS AND TOLERANCES

Dimensions and tolerances shall conform to IS 12049.

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 medium density fibre 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 of prelaminated medium density fibre boards selected from it.

9.1.2 The number of prelaminated medium density fibre boards to be selected from a lot shall be as follows:

Lot Size N	Number of Prelaminated Medium Density Fibre		
	Boards to be Selected		
	n		
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 medium density fibre boards shall be selected at random (see IS 4905). In order to ensure randomness of selection, all the

prelaminated medium density fibre boards in the lot may be arranged in a serial order and every rth prelaminated medium density fibre 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 in 9.1.2.1, when tested as specified in IS 2380 (Part 2) 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 prelaminated medium density fibre 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).

a) For Determination of Density

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

c) For Water Absorption Test

Three test specimens of size $300 \text{ mm} \times 300 \text{ mm}$ in full thickness of board from each sample.

d) For Swelling in Water Test

Three test specimens of size $200 \text{ mm} \times 100 \text{ mm}$ 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).
- 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 Surface After Ageing Test Three test specimens of size 50 mm × 50 mm in full thickness of board from each sample.
- h) For Determination of Screw Withdrawal Strength

Three test specimens from each sample of size as specified in IS 2360 (Part 14).

j) For Determining the Resistance to Abrasion Three test specimens of size about 130 mm diameter or a square of about 120 mm with its earners rounded to give a diagonal of about 130 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 $200 \text{ mm} \times 100 \text{ mm}$ 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 specifications, 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 the method prescribed in IS 2380(Part 3), and the average value shall be between 500 and 900 kg/m³ 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 the method prescribed in IS 2380 (Part 3) 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) and the average value

shall not exceed the limits specified in Item 1.2 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) for 2 hours soaking in water and the average value shall not exceed the limits specified in item 1.3 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) and the average value shall not be less than the requirement laid down in Item 1.4 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) and the average value shall not be less than the values specified in 1.5 of Table 1.

10.8 Test for Tensile Strength Perpendicular to Surface After Ageing

Tensile strength perpendicular to surface shall be determined for each test specimen in accordance with the method prescribed in IS 2380 (Part 5) after subjecting the specimens to the ageing test, namely, cyclic test or accelerated water resistance test as prescribed in Table 1. The average value shall not be less than the values specified in item 1.6 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). The average value shall not be less than the values specified in item 1.7 of Table 1.

10.10 Test for Surface 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 1.8 of Table 1.

10.11 Test for Resistance to Steam

The resistance to steam shall be determined for each test specimen in accordance with the 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 Resistance to Crack

The resistance to crack shall be determined to each

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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

The 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

The 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 medium density fibre board

shall be legibly and indelibly marked on any of its edges with the following:

- a) Name of the manufacturer or trade-mark,
- b) Grade and type of prelaminated medium density fibre board,
- c) Thickness, and
- d) Batch number and year of manufacture.

11.2 BIS Certification Marking

The prelaminated medium density fibre boards may also be marked with the Standard Mark.

11.2.1 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.

Table 1 Physical and Mechanical Properties

(Clauses	10.2,	10.4,	10.5,	10.6,	10.7,	10.8,	10.9	and	10.10)
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Properties	Requirements		
	Grade 1	Grade II	
1.1 Density variation (Max), percent	±10	±10	
1.2 Water absorption (Max), percent:			
a) 2 hours	6	9	
b) 24 hours	12	18	
1.3 Thickness swelling (Max), percent, 2 hours	4	7	
1.4 Modulus of rupture (Min), N/mm ² :			
a) Up to 20 mm thickness	28	28	
b) Above 20 mm thickness	25	25	
1.5 Tensile strength perpendicular to surface (Min), N/mm ² :			
a) Up to 20 mm thickness	0.8	0.7	
b) Above 20 mm thickness	0.7	0.6	
1.6 Tensile strength perpendicular to surface (Min), N/mm ² :			
a) After cyclic test ¹⁾	0.4		
b) After accelerated water resistance test ²⁾	0.25	-	
1.7 Screw withdrawal strength (Min), N:			
Face	1 500	1 500	
Edge	1 250	1 250	
1.8 Abrasion resistance (Min), in number of revolutions:			
a) Type I	450	450	
b) Type II	250	250	
c) Type III	80	80	
d) Type IV	75	75	

¹⁾Cyclic Test — Specimens are immersed in water at 27 \pm 2°C for a period of 72 hours, followed by drying in air at 27 \pm 2°C for 24 hours and then heating in dry air at 70°C for 72 hours. Three such cycles are to be followed and then specimens are tested for tensile strength perpendicular to the surface.

³Accelerated Water Resistance Test — Specimens are immensed in water at $27 \pm 2^{\circ}$ C and water is brought to boiling and kept at boiling temperature for 2 hours. Specimens are then cooled in water to $27 \pm 2^{\circ}$ C and tested for tensile strength perpendicular to the surface.

ANNEX A (Clause 2) LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
324 : 1959	Ordinary denatured spirit (revised)	(Part 5): 1977	Determination of tensile strength
707 : 1 976	Glossary of terms applicable to timber technology and utilization (second revision)		perpendicular to surface (first revision)
1500 : 1983	Method for Brinell hardness test for metallic materials (second	(Part 14): 1977	Screw and nail withdrawal test (first revision)
	revision)	(Part 16): 1977	Determination of water absorption
2380	Methods of test for wood particle		(first revision)
	lignocellulosic materials	(Part 17): 1977	Determination of swelling in water (first revision)
(Part 1): 1977	Preparation and conditioning of test specimens (first revision)	3400 (Part 2) · 1995	Methods of test for vulcanized
(Part 2): 1977	Accuracy of dimensions of boards (first revision)	(1 at 2) . 1775	revision)
(Part 3): 1977	Determination of moisture content	4905 : 1968	Methods for random sampling
	density (first revision)	12049 : 1987	Dimensions and tolerances relating
(Part 4) : 1977	Determination of static bending strength (modulus of runture and		to wood based panel materials
	modulus of elasticity in bending) (first revision)	12406 : 1988	Specification for medium density fibre boards for general purposes

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 a 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 ± 0.1 mm and a Brinell hardness of 48 ± 2 BHN when tested in accordance with IS 1500 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 g/m^2 to 100 g/m^2 ;
- b) Powdered aluminium oxide having a particle size that it will pass through a sieve of aperture 100 μm and remain on a sieve having an aperture of 63 μm; 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).

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B-3.1.2 Abrasive Wheels (3)

Abrasive wheels shall be two cylindrical rubbercovered 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). The inside faces of the wheels shall be 50 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 ± 0.2 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 other diametrically opposite. The centres of the nozzles shall be 77 mm apart and 1 mm to 2 mm from the surface of the test specimen. When the nozzles are closed, there shall be a vacuum of 1.5×10^{-3} N/mm² to 1.6×10^{-3} N/mm².



FIG. 1 TYPE OF APPARATUS FOR MEASURING ABRASION RESISTANCE

B-3.2 Conditioning Chamber

Conditioning chamber shall be capable of maintaining a standard atmosphere of $27 \pm 2^{\circ}$ C and relative humidity of 65 ± 5 percent.

B-4 TEST SPECIMENS

Each test specimen shall be a piece of the sheet under test, shaped to fit the type of clamping device used. It will usually be a disc of diameter about 130 mm, or a square of about 120 mm with its corners rounded to give a diagonal of about 130 mm and it will usually have a hole of diameter 6 mm in its centre. Three specimens shall be prepared.

B-5 PREPARATION OF TEST SPECIMENS AND ABRASIVE PAPER

Clean the surface of the test specimens with an organic solvent which is immiscible with water, for example, trichloroethane. Precondition the test specimens and the abrasive strips for at least 72 h in the conditioning atmosphere (see B-3.2) before testing.

B-6 PROCEDURE

B-6.1 Preparation of Abrasive Wheels

Bond a strip of preconditioned abrasive paper (see **B-2.2**) to each of the rubber-covered wheels using either the adhesive backing, if present, or the double-sided adhesive tape (see **B-2.3**), in such a way that the cylindrical surface is completely covered, but without any overlapping of the abrasive paper (see Fig. 1).

B-6.2 Calibration of Abrasive Paper

Prepare two abrasive wheels with unused strips of abrasive paper from the batch to be used for testing (see B-6.1).

Clamp a zinc plate (see B-2.1) in the specimen holder (see B-3.1.1), operate the suction device (see B-3.1.5), and abrade the zinc plate for 500 revolutions. Wipe the zinc plate clean and weigh to the nearest 1 mg. Replace the abrasive paper on the wheels with unused strips from the same batch, clamp the same zinc plate in the specimen holder, lower the abrasive wheels and operate the suction device. 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 fibre 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.

ANNEX C

(Clause 10.11)

METHOD OF DETERMINING SURFACE RESISTANCE TO STEAM

C-0 GENERAL

This test determines the surface resistance of prelaminated medium density fibre board against contact with steam atmospheric pressure.

C-1 NUMBER OF TEST PIECES

Three specimens shall be used for each test.

C-2 SPECIMEN SIZE

Specimen of size $100 \text{ mm} \times 100 \text{ mm}$ in full thickness shall be used.

C-3 PREPARATION OF SAMPLE

The test specimen shall be cut to 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 \times 200 mm minimum.

C-4.2 Glass Conical Flask, 250 ml.

C-4.3 A Holding Clamp

C-5 PREPARATION OF APPARATUS

Place the conical flask filled with water up to 100 cc on the hot plate. Cover the mouth of the conical flask with the specimens 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 sometime water will start boiling. Note the time and continuously heat for a total period of one hour. Steam will come in contact with the board surface and escape into the atmosphere.

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

ANNEX D

(Clause 10.12)

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

D-0 GENERAL

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

D-1 NUMBER OF TEST PIECES

Three specimens shall be used for each test.

D-2 SPECIMEN SIZE

Specimen of size $100 \text{ mm} \times 100 \text{ mm}$ in full thickness of the board.

D-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.

D-4 APPARATUS

Electric oven of suitable size having temperature range of 50-150°C.

D-5 PROCEDURE

Keep the temperature stabilized at $70 \pm 2^{\circ}$ C. Keep the specimens in the oven. Remove the specimens after 24 hours duration and observe of cracks on the lamination surface.

Then maintain a temperature of 100 ± 2 °C and keep 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 RESISTANCE TO CIGARETTE BURN

E-0 GENERAL

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

E-1 NUMBER OF SAMPLES

Three specimens shall be taken for the test.

E-2 SPECIMEN SIZE

Specimen of size 200 mm × 100 mm in full

thickness of the board.

E-3 PROCEDURE

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 RESISTANCE TO STAIN

F-0 GENERAL

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

F-1 OUTLINE OF THE METHOD

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

Glass covers, one for each staining material to prevent evaporation.

NOTE --- Watch glasses are suitable for this purpose.

F-3 STAINING MATERIALS

Coffee and acetic acid solution (10 percent concentration) are the staining materials to be used on the prelaminated medium density fibre board.

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.

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

F-5 PROCEDURE

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). Allow the specimens to dry. After one hour place the specimens in horizontal position under overhead white fluorescent light having an intensity of 800 to 1 100 lumens/m². Exclude light from other sources. View the specimens at an angle of approximately 90" to the specimens where the staining agent is specifically applied. If any staining or discolouration is noticed attempt to remove it by gently rubbing with a mile domestic abrasive cleaner. Allow the specimens to dry and examine them again under conditions mentioned above.

F-6 EVALUATION

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

ANNEX G

(Foreword)

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