

भारतीय मानक

IS 14587 : 2025

Indian Standard

मध्यम घनत्व की लकड़ी और अन्य
लिग्नोसेल्यूलोसिक सामग्री के
पूर्व-लेमिनेटेड रेशा बोर्ड — विशिष्टि

(दूसरा पुनरीक्षण)

Prelaminated Medium Density Fibre
Boards of Wood and Other
Lignocellulosic Materials —
Specification

(Second Revision)

ICS 79.060.20

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Wood and Other Lignocellulosic Products Sectional Committee, CED 20

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wood and Other Lignocellulosic Products Sectional Committee had been approved by the Civil Engineering Division Council.

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. Each grade of prelaminated MDF board consists of four types, Type 1, Type 2, Type 3 and Type 4 depending upon the abrasion resistance of the prelaminated surface. Type 1 is useful for flooring application. Type 2 is useful for horizontal applications like cash counters and restaurant table tops. Type 3 is useful for normal horizontal applications like office table tops and domestic furniture tops. Type 4 is useful for vertical applications like panelling and partitioning and for false ceilings.

This standard also gives requirements of formaldehyde content and formaldehyde emission. Both formaldehyde content and emission are specified under Class E_1 and Class E_2 . Class E_1 is more stringent than Class E_2 .

This standard was first published in 1998 and subsequently revised in 2023. In this revision, the following major changes have been done:

- a) In line with the revision of Indian Standard on medium density fibre boards, prelaminated medium density fibre boards have also been classified based on service conditions;
- b) Requirements have been modified against each classification of the prelaminated medium density fibre board; and
- c) Marking clause has been modified.

The composition of the Committee responsible for the revision of this standard is given in [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 : 2022 'Rules for rounding off numerical values (*second revision*)'. 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 BOARDS OF WOOD AND OTHER LIGNOCELLULOSIC MATERIALS — SPECIFICATION

(Second Revision)

1 SCOPE

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

1.2 This standard does not cover the surface requirements of MDF boards with any overlays other than those mentioned in this standard.

NOTE — The requirements for the MDF board used as base material in the manufacturing of any further overlaid MDF boards are given in the material clause of this standard.

2 REFERENCES

The standards listed in [Annex A](#) contain provisions which through reference in the 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 edition of these standards.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 707 shall apply.

4 CLASSIFICATIONS

4.1 Prelaminated medium density fibre (MDF) board shall be classified in four grades as per [Table 1](#). Based on the surface abrasion characteristics, each grade shall be further classified in four types as given in [Table 1](#).

4.2 Formaldehyde Classes

Also, based on formaldehyded content and emission values, each grade prelaminated MDF board shall be further classified in two classes as follows:

- a) Formaldehyde Class, E_1 ; and
- b) Formaldehyde Class, E_2 .

5 MATERIALS

5.1 Medium Density Fibre (MDF) Board

Medium density fibre (MDF) board used for the manufacture of prelaminated MDF board shall conform to IS 12406.

5.2 Impregnated Base Paper

Printed or plain coloured absorbent base paper having a weight of 60 g/m² to 140 g/m² impregnated in a suitable synthetic resin and dried to a volatile content between 4 percent to 8 percent shall be used for prelamination on both surfaces of MDF board.

5.3 Impregnated Overlay

An absorbent tissue paper having a weight of 18 g/m² to 40 g/m² impregnated in a suitable synthetic resin and dried to a volatile content between 4 percent to 8 percent, shall be used for prelamination on both surfaces of MDF board.

6 MANUFACTURE

6.1 Medium density fibre board having a dense, compact, homogenous construction with a suitable smooth surface is used for making prelaminated MDF 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 MDF board.

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

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Table 1 Classification of Prelaminated Medium Density Fibre (MDF) Board

(Clause [4.1](#))

Sl No.	Prelaminated MDF Board Grade	Surface Type
(1)	(2)	(3)
i)	Regular (REG) Grade	Type 1
		Type 2
		Type 3
		Type 4
ii)	Moisture Resistance (MR) Grade	Type 1
		Type 2
		Type 3
		Type 4
iii)	High Moisture Resistance General Purpose (HMR-GP) Grade	Type 1
		Type 2
		Type 3
		Type 4
iv)	High Moisture Resistance Furniture (HMR-FN)Grade	Type 1
		Type 2
		Type 3
		Type 4

6.2 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 prelaminated MDF board depends on the surface of caul plates used. Common surface finishes include glossy, matt textured (soft, suede, wood pore, and leather), etc.

8 DIMENSIONS AND TOLERANCES

8.1 Any dimensions (length and width) as agreed to between the manufacturer and the purchaser may be used and shall be declared by the manufacturer. The dimensions shall be measured as per IS 2380 (Part 2). Prevailing dimensions (length × width) of prelaminated MDF boards are as given below:

Length, mm : 5 490, 4 880, 3 660, 3 050, 2 745, 2 440, 2 135, 1 830, 1 525, 1 220, 1 000 and 915

Width, mm : 1 830, 1525, 1220, 1 000, 915, 610 and 305

8.2 Thickness

The thickness of the prelaminated MDF board shall be 2.5 mm, 4 mm, 6 mm, 9 mm, 12 mm, 15 mm, 18 mm, 22 mm, 25 mm, 30 mm, 35 mm, 40 mm and 45 mm.

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

8.3 Squareness and Edge Straightness

Edge straightness and squareness shall be measured as per IS 2380 (Part 2).

8.4 Tolerances

The tolerances on the dimensions of finished prelaminated MDF boards shall be as given in [Table 2](#).

9 REQUIREMENTS

9.1 The prelaminated MDF boards shall conform to the requirements given in [Table 3](#) to [Table 9](#), as per the respective grades.

9.2 The method of preparation and conditioning of specimens for tests shall be as specified in IS 2380 (Part 1). The test specimens shall be cut out from portions 150 mm away from the edges for the tests as mentioned in [9](#).

9.2.1 Three number of test specimens shall be taken for each of the tests for density, moisture content, thickness swelling, internal bond, internal bond (after

cyclic test or boil test), modulus of elasticity, modulus of rupture and screw withdrawal test. However, for formaldehyde content and steady-state formaldehyde emission test, specimens shall be taken as per IS 13745 and IS/ISO 12460 (Part 1) respectively.

9.2.2 For the abrasion resistance test, resistance to steam/water, resistance to crack, resistance to cigarette burn, and resistance to stain, the number of samples shall be taken as given in their respective test methods are given in [Annex B](#) to [Annex F](#) of this standard.

Table 2 Requirements for Dimensions

(Clause [8.4](#))

SI No.	Properties	Tolerance
(1)	(2)	(3)
i)	Length,	± 5 mm/m
ii)	Width	± 5 mm/m
iii)	Thickness	± 0.3 mm
iv)	Squareness, <i>Max</i>	2 mm/m or 0.2 percent
v)	Edge straightness, <i>Max</i>	2 mm/m or 0.2 percent

Table 3 Requirements for Density and Moisture Content

(Clause [9.1](#))

SI No.	Properties	Requirements	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Density, kg/m ³	600 – 900	IS 2380 (Part 3)
ii)	Variation from mean density, percent	± 10	
iii)	Moisture content, percent	5 – 15	

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Table 4 Requirements for Regular (REG) Grade Prelaminated MDF Board

(Clause [9.1](#))

Sl No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		≤ 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Modulus of rupture (MoR), N/mm², <i>Min</i>	23	23	23	23	22	20	18	17	15	IS 2380 (Part 4)
ii)	Modulus of elasticity (MoE), N/mm², <i>Min</i>	2 700	2 700	2 700	2 700	2 500	2 200	2 100	1 900	1 700	
iii)	Internal bond strength, N/mm², <i>Min</i>	0.65	0.65	0.65	0.65	0.60	0.55	0.55	0.50	0.50	IS 2380 (Part 5)
iv)	24 h thickness swelling (due to general absorption), percent, <i>Max</i>	45	35	30	17	15	12	10	8	6	IS 2380 (Part 17)
v)	Screw withdrawal strength (face), N, <i>Min</i>	1 250									IS 2380 (Part14)
vi)	Screw withdrawal strength (edge), N, <i>Min</i>	—					700				

Table 5 Requirements for Moisture Resistance (MR) Grade Prelaminated MDF Board

(Clause 9.1)

Sl No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		≤ 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Modulus of rupture (MoR), N/mm², <i>Min</i>	27	27	27	27	26	24	22	17	15	IS 2380 (Part 4)
ii)	Modulus of elasticity (MoE), N/mm², <i>Min</i>	2 700	2 700	2 700	2 700	2 500	2 400	2 300	2 200	2 000	
iii)	Internal bond strength, N/mm², <i>Min</i>	0.70	0.70	0.70	0.70	0.65	0.65	0.60	0.55	0.50	IS 2380 (Part 5)
iv)	24 h thickness swelling (due to general absorption), percent, <i>Max</i>	35	30	18	12	10	8	7	7	6	IS 2380 (Part 17)
v)	Screw withdrawal strength (face), N, <i>Min</i>	1 250									IS 2380 (Part 14)
vi)	Screw withdrawal strength (edge), N, <i>Min</i>	—					850				
vii)	Moisture resistance:										
	a) Option 1: Cyclic test 1) Internal bond strength, N/mm², <i>Min</i> OR	0.35	0.35	0.35	0.30	0.25	0.20	0.15	0.10	0.10	IS 2380 (Part 5) See Note 1

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Table 5 ([Concluded](#))

Sl No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		≤ 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	b) Option 2: Boil test 1) Internal bond strength, N/mm², <i>Min</i>	0.20	0.20	0.18	0.15	0.15	0.12	0.12	0.10	0.10	IS 2380 (Part 5) See Note 2

Table 6 Requirements for High Moisture Resistance General Purpose (HMR-GP) Grade Prelaminated MDF Board

(Clause [9.1](#))

Sl No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		≤ 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Modulus of rupture (MoR), N/mm², <i>Min</i>	28	28	27	27	26	24	23	21	19	IS 2380 (Part 4)
ii)	Modulus of elasticity (MoE) , N/mm², <i>Min</i>	2 800	2 800	2 700	2 700	2 500	2 400	2 300	2 000	1 900	
iii)	Internal bond strength, N/mm², <i>Min</i>	0.70	0.70	0.70	0.70	0.65	0.65	0.60	0.55	0.50	IS 2380 (Part 5)

Table 6 (*Concluded*)

Sl No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		≤ 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
iv)	24 h thickness swelling (due to general absorption), percent, <i>Max</i>	20	16	14	11	9	7	6	5	5	IS 2380 (Part 17)
v)	Screw withdrawal strength (face), N, <i>Min</i>	1 250									IS 2380 (Part 14)
vi)	Screw withdrawal strength (edge), N, <i>Min</i>	—					850				
vii)	Moisture resistance:										
	a) Option 1: Cyclic test 1) Internal bond strength, N/mm ² , <i>Min</i> OR	0.45	0.42	0.40	0.35	0.30	0.25	0.20	0.18	0.15	IS 2380 (Part 5) See Note 1
	b) Option 2: Boil test 1) Internal bond strength, N/mm ² , <i>Min</i>	0.25	0.22	0.20	0.20	0.18	0.15	0.12	0.12	0.10	IS 2380 (Part 5) See Note 2

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Table 7 Requirements for High Moisture Resistance Furniture (HMR-FN) Grade Prelaminated MDF Board

(Clause [9.1](#))

SI No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		Up to 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Modulus of rupture (MoR), N/mm², <i>Min</i>	34	32	30	30	28	26	23	21	20	IS 2380 (Part 4)
ii)	Modulus of elasticity (MoE) , N/mm², <i>Min</i>	2 800	2 700	2 600	2 500	2 400	2 400	1 800	1 800	1 700	
iii)	Internal bond strength, N/mm², <i>Min</i>	0.70	0.70	0.70	0.70	0.65	0.60	0.55	0.50	0.45	IS 2380 (Part 5)
iv)	24 h thickness swelling (due to general absorption), percent, <i>Max</i>	15	14	12	10	7	5	4	4	4	IS 2380 (Part17)
v)	Screw withdrawal strength (face), N, <i>Min</i>	1 250									IS 2380 (Part 14)
vi)	Screw withdrawal strength (edge), N, <i>Min</i>	—					850				
vii)	Moisture resistance:										
	a) Option 1: Cyclic test 1) Internal bond strength, N/mm², <i>Min</i> OR	0.50	0.45	0.40	0.35	0.35	0.30	0.25	0.22	0.20	IS 2380 (Part 5) See Note 1

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Table 7 (*Concluded*)

SI No.	Properties	Requirements (Average)									Method of Test, Ref to
		Nominal Thickness (mm)									
		Up to 2.5	> 2.5 to ≤ 4.0	> 4.0 to ≤ 6.0	> 6.0 to ≤ 9.0	> 9.0 to ≤ 12.0	> 12.0 to ≤ 19.0	> 19.0 to ≤ 30.0	> 30.0 to ≤ 45.0	> 45.0	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	b) Option 2: Boil test 1) Internal bond strength, N/mm ² , <i>Min</i>	0.30	0.28	0.25	0.22	0.22	0.20	0.20	0.18	0.15	IS 2380 (Part 5) See Note 2

NOTE — For [Table 5](#) to [Table 7](#), procedure for cyclic test and boil test shall be as follows:

1 Cyclic test — Specimens are immersed in water at 27 °C ± 2 °C for a period of 72 h, followed by drying in air at 27 °C ± 2 °C for 24 h and then heating in dry air at 70 °C ± 2 °C for 72 h. Three such cycles shall be followed and then the specimens are tested for internal bond strength; and

2 Boil test (accelerated water resistance test) — Specimens are immersed in water at 27 °C ± 2 °C and water is brought to boiling and kept at boiling temperature for 2 h. After 120 min ± 5 min remove the test pieces and immerse them in water at 27 °C ± 2 °C for 60 min ± 5 min. The test pieces shall have their faces vertical and be separated from each other and from the sides and the bottom of the water bath by at least 15 mm. Remove the test pieces from the water, dry them with a paper towel and place them, with their faces horizontal, in the drying oven at 70 °C ± 2 °C for 960 min ± 15 min. Remove the test pieces from the oven, allow them to cool to approximately room temperature and bond the loading blocks to the faces (if the surfaces of the test pieces are rough or uneven, they may be smoothed before bonding to the blocks by rubbing on a piece of abrasive paper which is held on a flat surface) and then tested for internal bond strength.

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Table 8 Requirements of Prelaminated MDF Board Surface Characteristics

(Clause [9.1](#))

Sl No.	Properties	Requirements	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Abrasion resistance in number of revolutions, <i>Min</i> :		
	a) Type 1	1 000	} Annex B
	b) Type 2	450	
	c) Type 3	250	
	d) Type 4	75	
ii)	Resistance to steam/water vapours	No blister, delamination or change in surface finish	Annex C
iii)	Resistance to crack	No sign of crack or delamination	Annex D
iv)	Resistance to a cigarette burn	No mark or stain on the specimen after cleaning with water or solvent	Annex E
v)	Resistance to stain	No stain on the specimen after cleaning with solvent or detergent	Annex F

Table 9 Requirements for Formaldehyde Content and Steady-State Formaldehyde Emission

(Clause [9.1](#))

Sl No.	Properties	Requirements	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Formaldehyde content F_c , mg/100 g for oven dry board	For Formaldehyde Class, E_1 : $F_c \leq 8$ For Formaldehyde Class, E_2 : $8 < F_c \leq 30$	} IS 13745
ii)	Steady-state formaldehyde emission, F_c , mg/m ³ (optional test)	For Formaldehyde Class, E_1 : $F_c \leq 0.124$ For Formaldehyde Class, E_2 : $F_c > 0.124$	

10 SAMPLING AND CRITERIA FOR CONFORMITY

10.1 Sampling

10.1.1 Lot

In any consignment, all the prelaminated MDF boards of same classification, type, formaldehyde class, dimensions, and manufactured under similar conditions of production shall be grouped together to constitute a lot.

10.1.2 The conformity of a lot, to the requirements of this standard, shall be ascertained on the basis of tests on prelaminated MDF boards selected from it.

10.1.3 These prelaminated MDF boards shall be selected at random (*see* IS 4905 for reference). For method of sampling refer IS 7638.

10.2 Criteria for Conformity

10.2.1 All the prelaminated MDF boards selected in accordance with [10.1.3](#) shall be measured for length, width, thickness, edge straightness, and squareness tests. These dimensions shall comply with the requirements specified in [8](#), before proceeding with further testing.

10.2.2 If all the boards in [10.2.1](#) are found to be conforming, then from each of the prelaminated MDF boards, the test specimens shall be cut out from 150 mm away from the edges for the tests mentioned in [9](#).

10.2.3 A lot shall be considered as conforming to the requirements of this standard, if all the samples and test specimens pass the conditions as prescribed in [8](#) and [9](#).

10.2.4 If any sample fails to conform to the requirements, further samples shall be taken from the lot, double in number, and the lot shall be considered to have passed, if these samples conform to the requirements prescribed.

11 MARKING

11.1 Each prelaminated MDF board shall be legibly marked with the following particulars, either by direct printing or by an adhesive label.

- a) Manufacturer's name and initials or recognized trade mark, if any;
- b) Grade, type and formaldehyde class of prelaminated MDF board;
- c) Nominal dimensions (length, width and thickness);
- d) Batch number; and
- e) Date of manufacture.

11.2 In the case of prelaminated MDF boards supplied in bundles to other manufacturers and not supplied in the retail market, the marking may be done on the bundles/packages. In such cases, whenever required, the traceability of the prelaminated MDF boards to the original manufacturer, along with the batch number of the product, shall be ensured.

11.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

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ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

IS No.	Title	IS No.	Title
IS 707 : 2011	Timber technology and utilization of wood, bamboo and cane — Glossary of terms (<i>third revision</i>)	IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (<i>first revision</i>)
IS 2380	Methods of test for wood particle boards and boards from other ligno-cellulosic materials:	IS 13745 : 2020	Method for determination of formaldehyde content in wood-based panels by extraction method called perforator method (<i>first revision</i>)
(Part 1) : 1977	Preparation and conditioning of test specimens (<i>first revision</i>)	IS 1500 (Part 4) : 2019/ISO 6506-4 : 2014	Metallic materials — Brinell hardness test: Part 4 Table of hardness values (<i>fifth revision</i>)
(Part 2) : 1977	Accuracy of dimensions of boards (<i>first revision</i>)	IS 3400 (Part 2/ Sec 2) : 2023/ ISO 48-2 : 2018	Methods of test for rubber, vulcanized or thermoplastic: Part 2 Determination of hardness, Section 2 Hardness between 10 IRHD and 100 IRHD (<i>fifth revision</i>)
(Part 3) : 1977	Determination of moisture content and density (<i>first revision</i>)	IS/ISO 12460 (Part 1) : 2007	Wood-based panels — Determination of formaldehyde release: Part 1 Formaldehyde emission by the 1-cubic metre chamber method
(Part 4) : 1977	Determination of static bending strength (modulus of rupture and modulus of elasticity in bending) (<i>first revision</i>)		
(Part 5) : 1977	Determination of tensile strength perpendicular to surface (<i>first revision</i>)		
(Part 14) : 1977	Screw and nail withdrawal test (<i>first revision</i>)		
(Part 17) : 1977	Determination of swelling in water (<i>first revision</i>)		

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ANNEX B

(Clause 9.2.2 and Table 8)

METHOD OF TEST FOR DETERMINING SURFACE ABRASION RESISTANCE

B-1 The test measures the ability of the decorative surface of the sheet under test to resist abrasive wear-through to the sub-layer. 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 plates shall have a thickness of $0.8 \text{ mm} \pm 0.1 \text{ mm}$ and a brinell hardness of $48 \text{ BHN} \pm 2 \text{ BHN}$ when tested in accordance with IS 1500 (Part 4) except that the ball diameter shall be 5 mm and the load 360 N.

B-2.2 Abrasive Paper Stripes

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

- Paper of grammage 70 g/m^2 to 100 g/m^2 ;
- Powdered aluminium oxide having a particle size 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
- 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

which rotates in a horizontal plane at a frequency of 58 rev/min to 62 rev/min and to which the test specimen can be clamped flat.

B-3.1.2 Abrasive Wheel

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 of hardness 50 IRHD to 55 IRHD when tested according to IS 3400 (Part 2/Sec 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

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

B-3.1.4 Revolution Counter

B-3.1.5 Suction Device

The 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 centers 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 $1.5 \times 10^{-3} \text{ N/mm}^2$ to $1.6 \times 10^{-3} \text{ N/mm}^2$.

B-3.2 Conditioning Chamber

The conditioning chamber shall be capable of maintaining a standard atmosphere of $27^\circ\text{C} \pm 2^\circ\text{C}$ and relative humidity of 65 percent $\pm$ 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 a diameter of 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.

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B-5 PREPARATION OF TEST SPECIMENS AND ABRASIVE PAPER

Clean the surface of the test specimens with an organic solvent that 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,

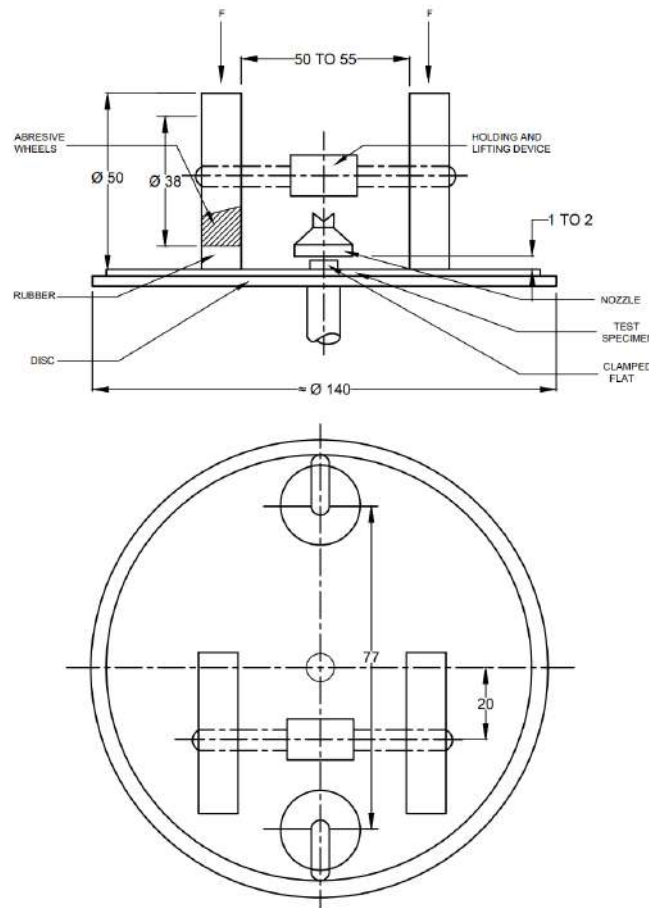
lower the abrasive wheels and operate the suction device. Abrade the zinc plate for a further 500 revolutions, then wipe it clean and reweigh it to the nearest 1 mg. Its loss in mass shall be $130 \text{ mg} \pm 20 \text{ mg}$.

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 onto the specimen, operate the suction device, and allow the specimen to rotate. Examine the specimen for wear after every 25 revolutions and examine the abrasive paper for clogging with abraded particles. Replace the abrasive paper if it 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.



All dimensions in millimetres.

FIG. 1 TYPE OF APPARATUS FOR MEASURING ABRASION RESISTANCE

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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

([Table 8](#))

METHOD OF DETERMINING SURFACE RESISTANCE TO STEAM

C-1 GENERAL

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

C-2 NUMBER OF TEST PIECES

Three specimens shall be used for each test.

C-3 SPECIMEN SIZE

Specimen of size 100 mm x 100 mm in full thickness of board shall be used.

C-4 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-5 APPARATUS

C-5.1 Electric hot plate of minimum size 200 mm

diameter or 200 mm x 200 mm.

C-5.2 Glass Conical Flask — 250 ml

C-5.3 Holding Clamp

C-6 PREPARATION OF APPARATUS

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

C-7 PROCEDURE

C-7.1 Start heating the water in the flask by putting on the electric heater. After some time, the water will start boiling. Note the time and continuously heat for a total period of 1 h. Steam will come in contact with the board surface and escape into the atmosphere.

C-7.2 Observe the surface of the specimen closely and note down the remarks.

ANNEX D

([Table 8](#))

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

D-1 GENERAL

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

D-2 NUMBER OF TEST PIECES

Three specimens shall be used for each test.

D-3 SPECIMEN SIZE

Specimen of size 100 mm x 100 mm in full thickness of the board shall be used.

D-4 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 edge with no loose core particles.

D-5 APPARATUS

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

D-6 PROCEDURE

D-6.1 Keep the specimens in the oven, and ensure the temperature of the oven is stabilized at 70 °C ± 2 °C. After a duration of 24 h, remove the specimens and observe for cracks on the lamination surface.

D-6.2 Then, maintain the oven temperature at 100 °C ± 2 °C and place the fresh specimens inside. Remove them after 2 h and observe for surface cracks and blemishes.

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ANNEX E

(Table 8)

METHOD OF TEST FOR DETERMINING RESISTANCE TO CIGARETTE BURN

E-1 GENERAL

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

E-2 NUMBER OF SAMPLES

Three specimens shall be taken for the test.

E-3 SPECIMEN SIZE

Specimen of size 200 mm x 100 mm in full thickness of the board shall be used.

E-4 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 have lapsed. This could be checked by a stopwatch. Clean the area with water or a suitable solvent of LR grade like ethanol, acetone, etc and allow the specimen to dry and then observe if any blister has formed or the surface colour got changed.

ANNEX F

(Table 8)

METHOD OF TEST FOR DETERMINING RESISTANCE TO STAIN

F-1 GENERAL

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

F-2 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 is examined for the staining produced.

F-3 APPARATUS

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

NOTE — Watch glasses are suitable for this purpose.

F-4 STAINING MATERIALS

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

F-5 TEST SPECIMENS

F-5.1 Specimens to be cut from the sheet to be tested shall be 75 mm long and 25 mm wide.

F-5.2 The number of specimens for the sheet shall

be equal to twice the number of staining materials selected for the test.

F-6 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 h. Wash each specimen with water containing a suitable wetting agent and then with denatured spirit. Allow the specimens to dry. After 1 h place the specimens in a horizontal position under overhead white fluorescent light having an intensity of 800 lumen/m² to 1 100 lumen/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 discoloration is noticed, attempt to remove it by gently rubbing with a file of domestic abrasive cleaner. Allow the specimens to dry and examine them again under the conditions mentioned above.

F-7 EVALUATION

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

ANNEX G

(Foreword)

COMMITTEE COMPOSITION

Wood and Other Lignocellulosic Products Sectional Committee, CED 20

<i>Organization</i>	<i>Representative(s)</i>
Institute of Wood Science & Technology, Bengaluru	SHRI RAJESH S. KALLAJE (Chairperson)
Association of Furniture Manufacturers and Traders India, Mumbai	SHRI RAJESH CHHABRIA SHRI DHANESH BHATIA (<i>Alternate I</i>) SHRI AMIT VAZE (<i>Alternate II</i>)
Balaji Action Buildwell, New Delhi	SHRI RAJESHWAR NAIR SHRI VIVEK JAIN (<i>Alternate I</i>) SHRI RISHABH JAIN (<i>Alternate II</i>)
Bamboo Society of India, Bengaluru	SHRI PUNATI SRIDHAR DR S. R. SHUKLA (<i>Alternate I</i>) DR JAGADISH VENGALA (<i>Alternate II</i>)
Central Public Works Department, New Delhi	SHRI PREM MOHAN SHRI DINESH KUMAR UJJANIA (<i>Alternate</i>)
Central Institute of Coir Technology, Bengaluru	DR O. L. SHANMUGASUNDARAM SHRIMATI SUMY SEBASTIAN (<i>Alternate</i>)
Century Plyboard India Ltd, Kolkata	SHRI AJAY BALDAWA SHRI JAGANNATH DAS (<i>Alternate</i>)
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Member Secretary
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SCIENTIST 'D'/JOINT DIRECTOR
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