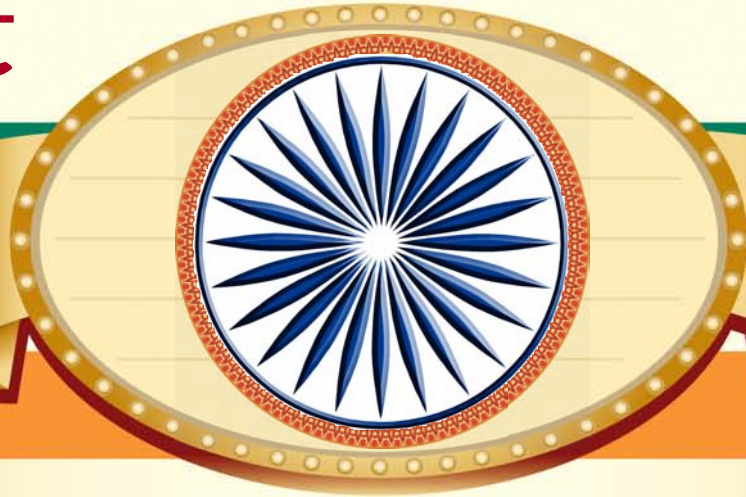


इंटरनेट

मानक



### Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

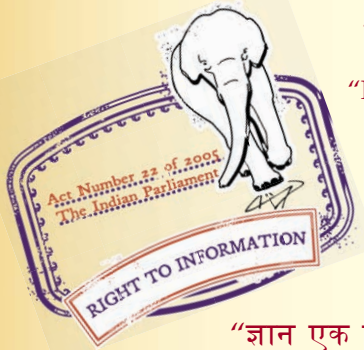
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 14276 (1995): Cement bonded 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 14276 : 1995

Reaffirmed 2009

भारतीय मानक

सीमेंट बद्ध पार्टिकल बोर्ड — विशिष्ट

*Indian Standard*

**CEMENT BONDED PARTICLE BOARDS —  
SPECIFICATION**

ICS 79-060-20

© BIS 1995

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

October 1995

Price Group 4

**AMENDMENT NO. 1 FEBRUARY 2005  
TO  
IS 14276 : 1995 CEMENT BONDED PARTICLE  
BOARDS — SPECIFICATION**

( Page 2, clause 8.2, second sentence ) — Substitute the following for the existing:

'The moisture content of individual test specimen shall not vary from the mean moisture content by more than  $\pm 3$  percent (absolute)'

( Page 2, clause 8.5 ) — Delete.

[ Page 2, Table 1, Sl No. (v) and (vi) ] — Substitute the following for the existing:

Sl No.	Property	Requirement	
v)	Modulus of rupture ( <i>M<sub>r</sub></i> ), N/mm <sup>2</sup>		
	Dry condition	9 (Average)	7.5 (minimum Individual)
	*Wet condition	5.5 (Average)	4.8 (minimum Individual)
vi)	Modulus of elasticity ( <i>M<sub>e</sub></i> ), N/mm <sup>2</sup>		
	Dry condition	3 000 (Average)	2 700 (minimum Individual)
	*Wet condition	2 200 (Average)	1 900 (minimum Individual)

[ Page 3, clause 9.2.1(f) ] — Substitute the following for the existing:

'Three test specimens each for dry and wet condition from each sample conforming to dimensions as specified in IS 2380 (Part 4) : 1977.'

( Page 4, clause 10.7 ) — Substitute the following for the existing:

**'10.7 Test for Modulus of Rupture**

The average and minimum individual values of modulus of rupture in dry and wet condition (see Table 1) shall be determined for specimens prescribed in 9.2.1(e) in accordance with IS 2380 (Part 4) 1977 and shall comply with the requirements specified in Sl No (v) of Table 1'

**Amend No. 1 to IS 14276 : 1995**

*( Page 4, clause 10.8 ) — Substitute the following for the existing*

**10.8 Test for Modulus of Elasticity**

The average and minimum individual values of modulus of elasticity in dry and wet condition (*see* Table 1) shall be determined for specimens prescribed in 9.2.1(f) in accordance with IS 2380 (Part 4) 1977 and shall comply with the requirements specified in Sl No (vi) of Table 1 '

**AMENDMENT NO. 2 AUGUST 2005  
TO  
IS 14276 : 1995 CEMENT BONDED  
PARTICLE BOARDS — SPECIFICATION**

[ *Page 2, clause 8.4 (see also Amendment No. 1)* ] — Insert the following new clause after 8.4

**8.5 Workability**

The boards shall not crack or split when drilled, sawed or nailed perpendicular to surface. For nailing perpendicular to surface a pre-bore of 0.8 times the diameter of the nail shaft shall be made.'

( CED 20 )

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*Reprography Unit, BIS, New Delhi, India*

**AMENDMENT NO. 3 JUNE 2009**  
**TO**  
**IS 14276 : 1995 CEMENT BONDED**  
**PARTICLE BOARDS — SPECIFICATION**

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

‘Cement conforming to IS 8112 : 1989 or IS 12269 : 1987 shall be used.’

*(Page 5, Annex A)* — Insert the following at the end:

‘IS 12269 : 1987 Specification for 53 grade ordinary Portland cement’

(CED 20)

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Reprography Unit, BIS, New Delhi, India

## FOREWORD

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

Cement bonded particle board, which is now being manufactured in our country, is made from a mixture of wood particles and cement. This standard is now formulated to provide necessary guidance to the manufacturers and users of this product.

In the formulation of this standard, considerable assistance has been derived from the following standards:

ISO 8335 : 1987 'Cement -- bonded particle boards — Boards of Portland or equivalent cement reinforced with fibrous wood particles', issued by International Organization for Standardization.

BS 5669 Part 4 : 1989 'Particle board : Part 4 Specification for cement bonded particle board', issued by British Standards Institute.

The committee responsible for the preparation of this standard is given at Annex B

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*

## CEMENT BONDED PARTICLE BOARDS — SPECIFICATION

### 1 SCOPE

**1.1** This standard covers the requirements of cement bonded wood particle boards.

**1.2** This standard does not cover particle boards bonded with synthetic resin adhesives.

### 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 Particle

Distinct particle or fraction of wood or other lignocellulosic material produced mechanically for use as the aggregate for a particle board. This may be in the form of flake, granule, shaving splinter and sliver as stated below.

#### 3.3 Flake

Specially made thin particle, with the grain of the wood essentially parallel to the surface of the flake, prepared with the cutting action of the knife in a plane parallel to the grain but at an angle to the axis of the fibre.

#### 3.4 Granule

Particle in which the length, width and thickness are approximately equal, such as particle of saw dust.

#### 3.5 Shaving

Thin slice or strip of wood pared off with a knife, planer or other cutting instrument, the knife action being approximately along the axis of the fibre, such as the shavings produced in planing the surface of wood.

#### 3.6 Splinter and Sliver

Particle of nearly square or rectangular cross section with a length parallel to the grain of at least four times the thickness.

#### 3.7 Cement Bonded Particle Board

Particle board made from a mixture of wood particles and portland cement

### 4 MATERIALS

**4.1** Species of wood which do not hinder the process of setting of cement shall be used. Suitable additives such as sodium silicate conforming to IS 381 : 1972 and aluminium sulphate conforming to IS 260 : 1969 shall be used to prevent inhibitive effect of setting of cement when other species are used.

**4.2** Cement conforming to IS 8112 : 1989 shall be used.

### 5 MANUFACTURE

Wood particles for the manufacture of particle boards bonded with cement shall be produced by cutting wood into shavings, flakes, splinters or slivers of sizes up to 15 mm in length, 3 mm in width and 0.3 mm in thickness on a suitable chipping machine. Particles up to 30 percent by dry weight shall be blended with requisite quantity of cement, other chemical additives and water. The mixture shall then be formed into a board. Boards thus formed shall be stacked in a stacking device and then compressed and clamped in a hydraulic press. Boards after compression shall be allowed to set in a curing chamber in the clamped condition. Cured boards shall be allowed to mature for a period of 12 days and then dried in a drying chamber. Subsequently boards shall be trimmed to required size.

### 6 FINISH

**6.1** The particle boards shall be of uniform thickness and density throughout the length and width of the boards. All particle boards shall be flat and smooth.

### 7 DIMENSIONS AND TOLERANCES

**7.1** The sizes of cement bonded particle boards shall be as follows:

Length 3 050 mm and 2 440 mm

Width 1 220 mm

NOTE — Any other size as agreed to between the purchaser and the manufacturer may be manufactured

**IS 14276 : 1995**

**7.2 Thickness**

7.2.1 The thickness of cement bonded particle boards shall be as given below:

6, 8, 10, 12, 16, 20, 25, 30, and 40 mm

**7.3 Tolerances**

7.3.1 The following tolerances for the dimensions shall be permitted.

Length  $\pm 5$  mm

Width  $\pm 5$  mm

**Thickness**

i) Unsanded boards

6 mm to 12 mm  $\pm 1$  mm

12 mm to 20 mm  $\pm 1.5$  mm

20 mm and more  $\pm 2$  mm

ii) Sanded boards

( For all thickness )  $\pm 0.3$  mm

Edge straightness 2 mm per 1 000 mm

Squareness 2 mm per 1 000 mm

**8 PHYSICAL CHARACTERISTICS**

**8.1 Density**

The average density of the board when tested in

accordance with 10.3 shall not be less than 1 250 kg/m<sup>3</sup>.

**8.2 Moisture Content**

The average moisture content of the boards when determined in accordance with 10.4 shall not exceed the prescribed limits given in Table 1. The moisture content of individual test specimen shall not vary from the mean percentage by more than  $\pm 3$  percent

**8.3 Water Absorption**

The water absorption of the boards when determined in accordance with 10.5 shall not exceed the prescribed limits given in Table 1 for 2 and 24 h soaking.

**8.4 Swelling in Water**

The swelling in thickness, length and width, when determined in accordance with 10.6 shall not exceed the limits given in Table 1.

**8.5 Workability**

The boards shall not crack or split when drilled, sawed or nailed perpendicular to surface

**Table 1 Requirements of Physical and Mechanical Properties for Cement Bonded Particle Boards**  
( Clauses 8.2, 8.3, 8.4, 10.1, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10 and 10.11 )

Sl No.	Property	Requirement
i)	Density ( Min ) kg/m <sup>3</sup>	1 250
ii)	Moisture content, percent	6 to 12
iii)	Water absorption ( Max ), percent	
	2 h soaking	13
	24 h soaking	25
iv)	Swelling in water ( Max ), percent ( After 2 h soaking )	
	a) Thickness	2.0
	b) Length	0.5
	c) Width	0.5
v)	Modulus of rupture ( Min ), N/mm <sup>2</sup>	
	Dry condition	9
	*Wet condition	5.5
vi)	Modulus of elasticity ( Min ) N/mm <sup>2</sup>	3 000
vii)	Tensile strength perpendicular to surface ( Min ), N/mm <sup>2</sup>	
	a) Dry	0.4
	†b) Accelerated ageing	0.25
viii)	Screw withdrawal strength ( Min ), N	
	Face	1 250
	Edge	850
ix)	‡pH	11 to 13

\*MOR in wet condition — Specimens are soaked in water at 27  $\pm$  2°C for a period of 24 h. Modulus of rupture shall be determined in wet state.

†Accelerated ageing — Specimens are boiled in water for a period of 2 h. Afterwards they are dried at 27  $\pm$  2°C to a moisture content around 12 percent and then tensile strength perpendicular to surface shall be determined.

‡pH — Specimens are immersed in water at 27  $\pm$  2°C for a period of 72 h. After removing the specimens, pH value of the water shall be determined using a pH meter.

## 9 SAMPLING AND INSPECTION

### 9.1 Scale of Sampling

#### 9.1.1 Lot

In any consignment, all the boards of the same 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 standard shall be ascertained on the basis of tests on boards selected from it.

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

Lot Size	No. of Boards
$N$	$n$
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 boards shall be selected at random ( see IS 4905 : 1968 ). In order to ensure randomness of selection, all the boards in the lot may be arranged in a serial order and every  $r$ th 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

### 9.2 Test Specimens and Number of Tests

The length, width, thickness and the diagonals of the boards selected as in 9.1.2 shall be measured before cutting the boards for taking test specimens. The straightness of edges shall also be measured. The lot having been found satisfactory shall be further tested for physical characteristics given in 8. For this purpose, the boards examined according to 9.2.1 and found satisfactory shall be used.

**9.2.1** From each of the board selected following test specimens shall be cut out from portions 150 mm away from the edges for tests as specified under 10. The method of preparation and conditioning of specimens shall be as specified in IS 2380 ( Part 1 ) : 1977.

#### a) For Determination of Density

Three test specimens from each sample, each of size 150 mm × 75 mm × full thickness of board. Specimens of other sizes may be used when deemed necessary.

#### b) For Determination of Moisture Content

Three test specimens from each sample, each of size 150 mm × 75 mm × full thickness of board. Specimens of other sizes may be used when deemed necessary.

#### c) For Water Absorption

Three test specimens of size 300 mm × 300 mm in full thickness of board from each sample.

#### d) For Swelling in Water

Three test specimens of size 200 mm × 100 mm in full thickness of board from each sample.

#### e) For Modulus of Rupture

Three test specimens each for dry and wet condition from each sample conforming to dimensions as specified in IS 2380 ( Part 4 ) : 1977.

#### f) For Modulus of Elasticity

Three test specimens from each sample conforming to dimensions specified in IS 2380 ( Part 4 ) : 1977.

#### g) For Tensile Strength Perpendicular to Surface

Three test specimens each for dry and accelerated ageing test from each sample of size 50 mm × 50 mm in full thickness of material.

#### h) For Screw Withdrawal Strength

Three test specimens from each sample of size 150 mm × 75 mm in full thickness of material.

#### j) For pH Value

Three test specimens from each sample of size 150 mm × 75 mm in full thickness of material. Other sizes may be used when deemed necessary.

## 9.3 Criteria for Conformity

A lot shall be considered as conforming to the requirements of this specification, if the sample and test specimens pass the requirements prescribed in 10.

**9.3.1** In case of failure, double the number of samples shall be taken from the lot for testing. The lot shall be considered to have passed if all these samples conform to the requirements specified in 10.

## **10 TESTING OF SAMPLES**

**10.1** The samples and test specimens shall be tested as given in 10.2 to 10.11 and shall conform to the requirements prescribed in 8 and Table 1.

### **10.2 Accuracy of Dimensions of Boards**

The accuracy of dimensions of boards shall be measured as specified in IS 2380 (Part 2) : 1977. All the samples selected in accordance with 9.2.1 shall be measured for straightness of edges, squareness of boards, length, width and thickness.

### **10.3 Test for Density**

The average density of the board shall be determined for specimens prescribed in 9.2.1 (a) in accordance with IS 2380 (Part 3) : 1977 and shall comply with requirements specified in SI No. (i) of Table 1.

### **10.4 Test for Moisture Content**

The average moisture content of boards shall be determined for specimens prescribed in 9.2.1 (b) in accordance with IS 2380 (Part 3) : 1977 and shall comply with the requirements specified in SI No. (ii) of Table 1.

### **10.5 Test for Water Absorption**

The average water absorption shall be determined for specimens prescribed in 9.2.1 (c) in accordance with IS 2380 (Part 16) : 1977 and shall comply with the requirement specified in SI No. (iii) of Table 1.

### **10.6 Test for Swelling in Water**

The swelling in thickness, length and width shall be determined for specimens prescribed in 9.2.1 (d) in accordance with IS 2380 (Part 17) : 1977 and shall comply with the requirement specified in SI No. (iv) of Table 1.

### **10.7 Test for Modulus of Rupture**

The average of modulus of rupture in dry and wet condition (see Table 1) shall be determined for specimens prescribed in 9.2.1 (e) in accordance with IS 2380 (Part 4) : 1977 and shall comply with the requirements specified in SI No. (v) of Table 1.

### **10.8 Test for Modulus of Elasticity**

The average modulus of elasticity shall be determined for specimens prescribed in 9.2.1 (f) in accordance with IS 2380 (Part 4) : 1977 and shall comply with the requirements specified in SI No. (vi) of Table 1.

### **10.9 Test for Tensile Strength Perpendicular to Surface**

The average tensile strength perpendicular to surface in dry and accelerated ageing test (see Table 1) shall be determined for specimens prescribed in 9.2.1 (g) in accordance with IS 2380 (Part 5) : 1977 and shall comply with the requirements specified in SI No. (vii) of Table 1.

### **10.10 Test for Screw Withdrawal Strength**

The average screw withdrawal strength shall be determined for specimens prescribed in 9.2.1 (h) in accordance with IS 2380 (Part 14) : 1977 and shall comply with the requirements specified in SI No. (viii) of Table 1.

### **10.11 Test for pH Value**

The average pH shall be determined for specimens prescribed in 9.2.1 (j) in accordance with Table 1 and shall comply with the requirements specified in SI No. (ix) of Table 1.

## **11 MARKING**

**11.1** Each board shall be legibly and indelibly marked or stamped near any of its edges with the following

- a) Name of the manufacturer or trade-mark, if any;
- b) Thickness; and
- c) Date of manufacture.

### **11.2 BIS Certification Marking**

**11.2.1** The product may also be marked with the Standard Mark.

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

**ANNEX A**  
( Clause 2.1 )

**LIST OF REFERRED INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
260 : 1969	Aluminium sulphate, non-ferric ( <i>first revision</i> )	( Part 4 ) : 1977	Part 4 Determination of static bending strength ( <i>first revision</i> )
381 : 1972	Sodium silicate ( <i>first revision</i> )	( Part 5 ) : 1977	Part 5 Determination of tensile strength perpendicular to surface ( <i>first revision</i> )
707 : 1976	Glossary of terms applicable to timber technology and utilization ( <i>second revision</i> )	( Part 14 ) : 1977	Part 14 Screw and nail withdrawal test ( <i>first revision</i> )
2380	Methods of test for wood particle boards and boards from other lignocellulosic materials:	( Part 16 ) : 1977	Part 16 Determination of water absorption ( <i>first revision</i> )
( Part 1 ) : 1977	Part 1 Preparation and conditioning of test specimens ( <i>first revision</i> )	( Part 17 ) : 1977	Part 17 Determination of swelling in water ( <i>first revision</i> )
( Part 2 ) : 1977	Part 2 Accuracy of dimensions of boards ( <i>first revision</i> )	4905 : 1968	Methods for random sampling
( Part 3 ) : 1977	Part 3 Determination of moisture content and density ( <i>first revision</i> )	8112 : 1989	43 grade ordinary portland cement ( <i>first revision</i> )

**ANNEX B**

( *Foreword* )

**COMMITTEE COMPOSITION**

Wood Products Sectional Committee, CED 20

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SHRI N. K. UPADHYAY	Directorate General of Supplies and Disposals, New Delhi
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SHRI VINOD KUMAR, Director ( Civ Engg )	Director General, BIS ( <i>Ex-officio Member</i> )

*Secretary*

SHRIMATI RACHNA SEHGAL  
Assistant Director ( Civ Engg ), BIS

( *Continued on page 7* )

(Continued from page 6)

## Wood-Based Building Boards Subcommittee, CED 20 : 6

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