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"

"राज मे 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—Nitisatakam
"Knowledge is such a treasure which cannot be stolen"

IS 14276 (1995): Cement bonded particle boards
-Specification [CED 20: Wood and other Lignocellulosic products]
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 ±3 percent (absolute) •

(Page 2, clause 8.5) — Delete.

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

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Property</th>
<th>Requirement</th>
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<tbody>
<tr>
<td></td>
<td>Modulus of rupture (Mrl), N/mm²</td>
<td></td>
</tr>
<tr>
<td>v)</td>
<td>Dry condition</td>
<td>9 (Average)</td>
</tr>
<tr>
<td></td>
<td>Wet condition</td>
<td>5.3 (Average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.5 (minimum individual)</td>
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<tr>
<td></td>
<td></td>
<td>6.8 (minimum individual)</td>
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<td></td>
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<tr>
<td>v)</td>
<td>Modulus of elasticity (Mrl), N/mm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dry condition</td>
<td>3.000 (Average)</td>
</tr>
<tr>
<td></td>
<td>Wet condition</td>
<td>2.200 (Average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.700 (minimum individual)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.900 (minimum individual)</td>
</tr>
</tbody>
</table>

(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 I) shall be determined for specimens prescribed in 9.2.1(i) in accordance with IS 2380 (Part 4) 1977 and shall comply with the requirements specified in Sl No (vi) of Table 1.

(CED 20)
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)
AMENDMENT NO.3 JUNE 2009
TO
IS 14276: 1995 CEMENT BONDED
PARTICLE BOARDS — SPECIFICATION

(preamble, 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)

Reproductions 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:


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:

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.050 mm</td>
<td>1.220 mm</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Length</th>
<th>± 5 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>± 5 mm</td>
</tr>
</tbody>
</table>

Thickness

- i) Unstained boards
  - 6 mm to 12 mm: ± 1 mm
  - 12 mm to 20 mm: ± 1.5 mm
  - 20 mm and more: ± 2 mm

- ii) Sanded boards
  - (For all thickness): ± 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/m³.

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 ±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.
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:

<table>
<thead>
<tr>
<th>Lot Size</th>
<th>No. of Boards</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>n</td>
</tr>
<tr>
<td>Up to 50</td>
<td>2</td>
</tr>
<tr>
<td>51 to 100</td>
<td>3</td>
</tr>
<tr>
<td>101 to 200</td>
<td>4</td>
</tr>
<tr>
<td>201 to 300</td>
<td>5</td>
</tr>
<tr>
<td>301 to 500</td>
<td>7</td>
</tr>
<tr>
<td>501 and above</td>
<td>10</td>
</tr>
</tbody>
</table>

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 rth 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 x 75 mm x 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 x 75 mm x 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 x 300 mm in full thickness of board from each sample.

d) For Swelling in Water

Three test specimens of size 200 mm x 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 x 50 mm in full thickness of material.

h) For Screw Withdrawal Strength

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

j) For pH Value

Three test specimens from each sample of size 150 mm x 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 1) 1977 and shall comply with the 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 requirements 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 requirements 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(i) 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

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
<th>IS No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>260 : 1969</td>
<td>Aluminium sulphate, non-ferric (first revision)</td>
<td>(Part 4) : 1977</td>
<td>Part 4 Determination of static bending strength (first revision)</td>
</tr>
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<td>381 : 1972</td>
<td>Sodium silicate (first revision)</td>
<td>(Part 5) : 1977</td>
<td>Part 5 Determination of tensile strength perpendicular to surface (first revision)</td>
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<td>Preparation and conditioning of test specimens (first revision)</td>
<td>(Part 17) : 1977</td>
<td>Part 17 Determination of swelling in water (first revision)</td>
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<td>(Part 2) : 1977</td>
<td>Part 2 Accuracy of dimensions of boards (first revision)</td>
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<td>(Part 3) : 1977</td>
<td>Part 3 Determination of moisture content and density (first revision)</td>
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<td>4905 : 1968</td>
<td>Methods for random sampling</td>
<td>8112. 1989</td>
<td>43 grade ordinary portland cement (first revision)</td>
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</tbody>
</table>
ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Wood Products Sectional Committee, CED 20

Representing

Indian Plywood Industries Research and Training Institute, Bangalore

Indian Plywood Industries Research and Training Institute, Bangalore

Public Works Department, Uttar Pradesh

Forest Department, Government of Assam, Guwahati

Directorate of Standardization, Ministry of Defence, New Delhi

Plywood Manufacturers' Association of West Bengal, Calcutta

Directorate General of Technical Development, New Delhi

Indian Institute of Packaging, Bombay

Andaman Chamber of Commerce and Industry, Port Blair

The Western Indian Plywood Ltd, Bahagattam

Central Public Works Department, New Delhi

Ministry of Defence (R&D), New Delhi

National Testing House, Calcutta

The Indian Plywood Manufacturers Company Limited, Bombay

Engineer-in-Chief's Branch, Army Headquarters, New Delhi

In personal capacity (C-29 Interprise, New Delhi 110012)

Federation of Indian Plywood and Panel Industry, New Delhi

Assam Plywood Manufacturers' Association, Tinsukia

South Indian Plywood Manufacturers' Association, Trivandrum

Forest Products Division, FRI, Dehra Dun

Indian Academy of Wood Science, Bangalore

Mangalam Timber Products Ltd, Calcutta

Directorate General of Civil Aviation, New Delhi

Central Building Research Institute (CSIR), Roorkee

Ministry of Defence (DGQA)

NUCHEM Ltd, Faridabad

Directorate General of Supplies and Disposals, New Delhi

Stapur Plywood Manufacturers' Ltd, Stapur

Director General, BIS (Ex-officio Member)

Secretary

Shrimati Rachna Senhgal

Assistant Director (Civ Engg), BIS

(Continued on page 7)
Wood-Based Building Boards Subcommittee, CED 20 : 6

<table>
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<th>Convener</th>
<th>Representing</th>
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<tr>
<td>Dr H N Jagadesh</td>
<td>Indian Plywood Industries Research and Training Institute, Bangalore</td>
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**Members**

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<tr>
<th>Dr L K Agrawal</th>
<th>Central Building Research Institute (CSIR), Roorkee</th>
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<td>Dr N Skaram</td>
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<td>Shri D Skaram</td>
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<td>Shri P S Srivastava</td>
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<td>Superintendenting Engineer (S &amp; S)</td>
<td>Ministry of Defence (DGQA)</td>
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<td>Executive Engineer (S &amp; S)</td>
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Jolly Board Ltd, Bombay
The Western India Plywoods Ltd, Cannanore
Lloyd Insulation (India) Pvt Ltd, New Delhi
Assam Hardboard Ltd, Calcutta
National Buildings Organization, New Delhi
Engineer-in-Chief's Branch, Army Headquarters, New Delhi
The Indian Plywood Manufacturing Co Ltd, Bombay
Novopan India Ltd, Hyderabad
Kutty Flush Doors and Furniture (Pvt) Ltd, Madras
Mangalam Timber Products Ltd, Calcutta
Forest Research Institute, Forest Products Division (Composite Wood), Dehra Dun
Andaman Chamber of Commerce and Industry, Port Blair
Ministry of Defence (R & D)
Nucem Limited, Faridabad
Ministry of Defence (R & D)
Central Public Works Department, New Delhi
Directorate General of Supplies and Disposals, New Delhi
Godrej & Boyce Manufacturing Co Ltd, Bombay
Sitapur Plywood Manufacturers' Ltd, Sitapur
This Indian Standard has been developed from Doc No. CED 20 (5496)

Amendments Issued Since Publication

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BUREAU OF INDIAN STANDARDS

Headquarters: Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Regional Offices:
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Eastern : 1/14 C. I. T. Scheme VIII M, V. I. P. Road, Maniktola
CALCUTTA 700054

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093

Branch: AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
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