

American National Standard

Basic Hardboard

ANSI A135.4-2012



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Abstract

This Standard defines hardboard, covers requirements and test methods for water absorption, thickness swelling, modulus of rupture, tensile strength, surface finish, dimensions, squareness, edge straightness, and moisture content of five classes of basic hardboard. Where appropriate, test methods in ASTM D 1037 are required. Methods of identifying hardboard that conforms to this Standard are provided.

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ANSI A135.4-2012 Basic Hardboard

This **Foreword** is not a part of American National Standard for Basic Hardboard.) Basic hardboard has numerous uses, from wall paneling to furniture components, to a variety of utility boards for home and industry.

This Standard was originally promulgated under the procedures of the U.S. Department of Commerce National Bureau of Standards and designated as Voluntary Product Standard PS 58-73. The 1982 revision was published with adjustments to physical properties listed in Table I which reflected the state of the art. In 1988 the Standard was reaffirmed without change. The 1995 revision made editorial corrections and added metric equivalents. The 2004 revision made only editorial changes. This 2012 revision updates the ASTM standard references, refines the definition of hardboard, and makes minor editorial changes.

The development of this American National Standard for Basic Hardboard offers manufacturers, consumers, and the general public concerned with the product an effective guide developed under the consensus procedures of the American National Standards Institute.

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Consensus for this standard was achieved by use of a canvass body and ANSI's Essential Requirements for due process. The following organizations, recognized as having an interest in hardboard standards, were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

APA—The Engineered Wood Association

CMI/CraftMaster Manufacturing, Inc.

Decorative Panels International

Element (formerly Stork Materials Technology)

Georgia-Pacific Corporation

JELD-WEN Windows & Doors

Kitchen Cabinet Manufacturers Association

Lynden Door, Inc.

Louisiana-Pacific Corporation

Masonite International

National Association of Home Builders

North American Fiberboard Association

Stimson Lumber Company

Valspar Corporation

University of Illinois

American National Standard for Basic Hardboard

1. Scope

This Standard covers requirements and methods of testing for the water resistance, modulus of rupture, tensile strength, surface finish, dimensions, squareness, edge straightness, and moisture content of five classes of basic hardboard. Engineered wood siding, engineered wood trim and prefinished hardboard paneling are covered by separate American National Standards. Methods of identifying hardboard that conforms to this Standard are provided.

2. Definition

2.1. Basic Hardboard. Hardboard is a panel manufactured primarily from inter-felted lignocellulosic fibers consolidated under heat and pressure in a hot press to a density of 500 kg/m³ (31 lbs/ft³) or greater by:

- A) a wet process, or
- B) a dry process that uses:
 - a) a phenolic resin, or
 - b) a resin system in which there is no added formaldehyde as part of the resin cross-linking structure, or
- C) a wet formed/dry pressed process.

Other materials may be added to improve certain properties, such as stiffness, hardness, finishing properties, resistance to abrasion and moisture, as well as to increase strength, durability, and utility.

2.2. Surface. Hardboard panels are available with either one (S1S) or two (S2S) smooth sides.

3. Requirements

3.1. General. All hardboard represented as complying with this Standard shall meet all of the requirements specified herein. The inspection and test procedures contained in this section are to be used to determine the conformance of products to the requirements of this Standard.

3.2. Classes. The hardboard shall be classified based on the physical properties shown in Table 1. The properties shall be determined in accordance with the applicable test methods in Part B of the American Society for Testing and Materials (ASTM) D 1037-06a *Test Methods for Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials*, except that, when testing modulus of rupture, specimens greater than 9.5 mm (3/8 inch) thick shall be tested according to Part A, Section 9 of this reference.

3.3. Surface Finish. The smooth surfaces shall be as free from visible variations in the surface plane as commercially practicable when visually inspected by an individual competent in the field

3.4. Dimensions and Tolerances. The hardboard panels shall have a nominal width of 1220 mm or 1524 mm (4 feet or 5 feet). The nominal length of the panels shall be as agreed upon by the purchaser and the seller. The tolerance on the nominal width and length shall be plus or minus 1.6 mm/m (1/64 inch/linear foot). The nominal thicknesses shall be as designated in Table 2. Thickness ranges shall be as specified in Table 2 when measured in accordance with the applicable test method in Part B of ASTM D 1037-06a.

3.5. Squareness. The length of the diagonals of the hardboard panels shall not vary by more than 1.6 mm/m (1/64 inch/foot) of length of the panels. Opposite sides of the panels shall not vary in length more than 3.2 mm (1/8 inch).

3.6. Edge Straightness. The edges of the hardboard panels shall be straight within 1.6 mm/m (1/64 inch/foot) of length or width. Edge straightness shall be determined by stretching a string or wire from one corner and measuring the widest distance between the string or wire and the panel edge being tested.

3.7. Moisture Content. The moisture content of the hardboard shall be not less than 2 percent nor more than 9 percent and, within any one shipment, shall not vary by more than 3 percentage points as measured by the moisture content of the modulus of rupture specimens. Moisture content shall be determined in accordance with the applicable test method in Part B of ASTM D 1037-06a. Since hardboard is a wood-base material, its moisture content will vary with environmental humidity conditions. When the humidity conditions in the area of intended use are a critical factor, the purchaser should specify a moisture content range more restrictive than 2 to 9 percent so that fluctuation in the moisture content of the panel will be kept to a minimum.

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3.8. Marking and Identification. All basic hardboard which is represented as conforming to this Standard shall be identified by either of the following methods when requested by the purchaser:

- a) Each board shall be marked with a colored vertical stripe or stripes which indicates the class of the board. The marking for the different classes shall be as follows:

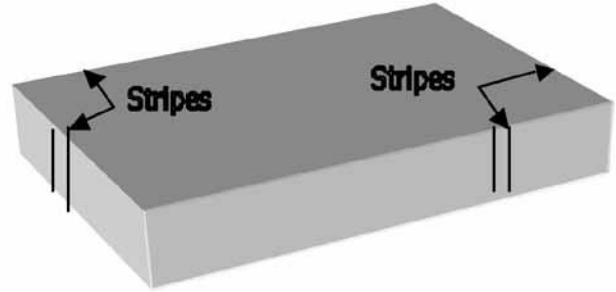


Figure 1. A stack of hardboard showing placement of markings.

| Class | Number and color of stripes |
|------------------|------------------------------------|
| Tempered | 1 Red |
| Service Tempered | 2 Red |
| Standard | 1 Green |
| Service | 2 Green |
| Industrialite | 1 Blue |

- b) The shipment or order shall be accompanied by a written certification stating the class of the hardboard and that the hardboard conforms to the requirements of this Standard.

The stripe or stripes shall be applied to the four edges of a board as follows:

On the short sides of the board, the stripe should be applied 75 mm (3 inches) from the left hand corner (as determined when the marker faces the side being marked); on the long sides of the board, the stripe should be applied 75 mm (3 inches) from the right hand corner as determined when the marker faces the side being marked. See Figure 1 for an example of the placement of the markings. Stripes shall be 13 mm (1/2 inch) in width. When two stripes are used they shall be 25mm (1 inch) apart.

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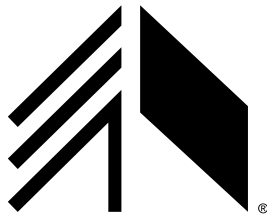
Table 1
Classification of Hardboard by Thickness and Physical Properties

| Class | Nominal thickness | | Water resistance (max. average per panel) | | Modulus of rupture (min. average per panel) | | Tensile strength (min. average per panel) | | | |
|-----------------------|-------------------|------|--|--------------------|--|------|--|------|--------------------------|-----|
| | | | Water absorption based on weight | Thickness Swelling | | | Parallel to surface | | Perpendicular to surface | |
| | mm | inch | percent | percent | MPa | psi | MPa | psi | MPa | psi |
| 1 Tempered | 2.1 | 1/12 | 30 | 25 | 41.4 | 6000 | 20.7 | 3000 | 0.90 | 130 |
| | 2.5 | 1/10 | 25 | 20 | | | | | | |
| | 3.2 | 1/8 | 25 | 20 | | | | | | |
| | 4.8 | 3/16 | 25 | 20 | | | | | | |
| | 6.4 | 1/4 | 20 | 15 | | | | | | |
| | 7.9 | 5/16 | 15 | 10 | | | | | | |
| | 9.5 | 3/8 | 10 | 9 | | | | | | |
| 2 Standard | 2.1 | 1/12 | 40 | 30 | 31.0 | 4500 | 15.2 | 2200 | 0.62 | 90 |
| | 2.5 | 1/10 | 35 | 25 | | | | | | |
| | 3.2 | 1/8 | 35 | 25 | | | | | | |
| | 4.8 | 3/16 | 35 | 25 | | | | | | |
| | 6.4 | 1/4 | 25 | 20 | | | | | | |
| | 7.9 | 5/16 | 20 | 15 | | | | | | |
| | 9.5 | 3/8 | 15 | 10 | | | | | | |
| 3 Service-Tempered | 3.2 | 1/8 | 35 | 30 | 31.0 | 4500 | 13.8 | 2000 | 0.52 | 75 |
| | 4.8 | 3/16 | 30 | 30 | | | | | | |
| | 6.4 | 1/4 | 30 | 25 | | | | | | |
| | 9.5 | 3/8 | 20 | 15 | | | | | | |
| 4 Service | 3.2 | 1/8 | 45 | 35 | 20.7 | 3000 | 10.3 | 1500 | 0.34 | 50 |
| | 4.8 | 3/16 | 40 | 35 | | | | | | |
| | 6.4 | 1/4 | 40 | 30 | | | | | | |
| | 9.5 | 3/8 | 35 | 25 | | | | | | |
| | 11.1 | 7/16 | 35 | 25 | | | | | | |
| | 12.7 | 1/2 | 30 | 20 | | | | | | |
| | 15.9 | 5/8 | 25 | 20 | | | | | | |
| 5 Industrialite | 6.4 | 1/4 | 50 | 30 | 13.8 | 2000 | 6.9 | 1000 | 0.17 | 25 |
| | 9.5 | 3/8 | 40 | 25 | | | | | | |
| | 11.1 | 7/16 | 40 | 25 | | | | | | |
| | 12.7 | 1/2 | 35 | 25 | | | | | | |
| | 15.9 | 5/8 | 30 | 20 | | | | | | |

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Table 2
Thickness Ranges for Hardboard Panels

| Nominal Thickness | | | Thickness Range (min.-max.) | |
|-------------------|------|---------|-----------------------------|---------------|
| mm | inch | | mm | inch |
| 2.1 | 1/12 | (0.083) | 1.8 – 2.3 | 0.070 – 0.090 |
| 2.5 | 1/10 | (0.100) | 2.3 – 2.8 | 0.091 – 0.110 |
| 3.2 | 1/8 | (0.125) | 2.9 – 3.9 | 0.115 – 0.155 |
| 4.8 | 3/16 | (0.188) | 4.2 – 5.2 | 0.165 – 0.205 |
| 6.4 | 1/4 | (0.250) | 5.3 – 6.7 | 0.210 – 0.265 |
| 7.9 | 5/16 | (0.312) | 7.4 – 8.5 | 0.290 – 0.335 |
| 9.5 | 3/8 | (0.375) | 8.9 – 10.2 | 0.350 – 0.400 |
| 11.1 | 7/16 | (0.438) | 10.4 – 11.7 | 0.410 – 0.460 |
| 12.7 | 1/2 | (0.500) | 12.1 – 13.3 | 0.475 – 0.525 |
| 15.9 | 5/8 | (0.625) | 15.2 – 16.5 | 0.600 – 0.650 |



COMPOSITE PANEL ASSOCIATION

Founded in 1960, the Composite Panel Association (CPA) is dedicated to advancing the North American wood-based panel and decorative surfacing industries. CPA represents both industries on technical, regulatory, quality assurance and product acceptance issues. CPA General Members include the leading manufacturers of particleboard, medium density fiberboard (MDF) and hardboard, representing about 95% of North American manufacturing capacity.

CPA Associate Members include manufacturers of decorative surfaces, furniture, cabinets, mouldings, doors and equipment, along with laminators, distributors, industry media and adhesive suppliers. All are committed to product advancement and industry competitiveness.