

U.S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
(formerly National Bureau of Standards-NBS)
OFFICE OF STANDARDS SERVICES

**PRODUCT STANDARD PS57-73
CELLULOSIC FIBER INSULATING BOARD**

Product Standard PS57-73, Cellulosic Fiber Insulating Board, was withdrawn by the U.S. Department of Commerce in 1982.

The following standard was used to replace PS57-73: American National Standard Institute/American Hardboard Association ANSI/AHA Standard A194.1, Cellulosic Fiber Board.

For additional assistance and information, contact:

American Hardboard Association (AHA)
1210 West NW Highway
Palatine, Illinois 60067, USA
Telephone: (847) 934-8800
Fax: (847) 934-8803

American National Standards Institute (ANSI)
11 West 42nd Street, 13th Floor
New York, New York 10026, USA
General Information/Orders: (212) 642-4900
Fax: (212) 302-1286

ANSI can provide assistance and standards information
pertaining to construction:

Telephone: (212) 642-4982: Fax: (212) 398-0023

National Bureau of Standards

Status Report on Voluntary Product Standards

AGENCY: National Bureau of Standards; Commerce.

ACTION: Maintenance, retention, replacement, and withdrawal of certain voluntary product standards

On August 19, 1980, the Department of Commerce (Department) announced in the Federal Register (45 FR 55250-2) the status of 80 documents classified as Voluntary Product Standards. The announcement was made in accordance with the revised Procedures for the Development of Voluntary Product Standards (15 CFR Part 10). Section 10.0(b) of the Procedures specifies six criteria that must be met for the Department to sponsor the development or maintenance of a Voluntary Product Standard.

Numerous requests to retain or maintain various standards were received in response to the August 19, 1980, notice. A number of the requests specified retention of standards for fixed periods of time that have now elapsed. The current status of all such standards is indicated below.

Based on proposals from the proponent organizations identified after the following titles, the following product standards will continue to be sponsored by the Department:

- PS 1-74, Construction and Industrial Plywood; American Plywood Association
- PS 20-70, American Softwood Lumber Standard; American Lumber Standards Committee
- PS 72-76, Toy Safety; Toy Manufacturers of America
- PS 73-77, Carbonated Soft Drink Bottles; Glass Packaging Institute
- TS 231, Proposed Voluntary Product Standard, Production of Carbonated Soft Drinks in Glass Bottles; National Soft Drink Association

Based on documented activity within a private standards-writing organization, the following standards will be retained by the National Bureau of Standards for the periods of time stated below to permit the orderly transfer of sponsorship of such standards from the Department to the identified organizations. The periods of time stated below shall commence from the date this notice is published in the Federal Register and supersede the periods of time stated for those standards in the August 19, 1980 notice.

- PS 30-70, School Chalk; the Crayon, Water Color and Craft Institute, Inc.; 6 months
- PS 36-70, Body Measurements for the Sizing of Boys' Apparel; Mail Order Association of America; 12 months

- PS 42-70, Body Measurements for the Sizing of Women's Patterns and Apparel; Mail Order Association of America; 12 months
- PS 45-71, Body Measurements for the Sizing of Apparel for Young Men (Students); Mail Order Association of America; 12 months
- PS 46-71, Flame-Resistant Paper and Paperboard; American Society for Testing and Materials; 6 months
- PS 51-71, Hardwood and Decorative Plywood; Hardwood Plywood Manufacturers Association; 12 months
- PS 54-72, Body Measurements for the Sizing of Girls' Apparel; Mail Order Association of America; 12 months
- PS 63-75, Latex Foam Mattresses for Hospitals; American Society for Testing and Materials; 12 months
- PS 64-75, School Paste; The Crayon Water Color and Craft Institute, Inc.; 6 months
- PS 65-75, Paints and Inks for Art Education in Schools; The Crayon, Water Color and Craft Institute, Inc.; 6 months
- PS 67-76, Marking of Gold Filled and Rolled Gold Plate Articles Other Than Watchcases; Jewelers Vigilance Committee; 24 months
- PS 68-76, Marking of Articles Made of Silver in Combination with Gold; Jewelers Vigilance Committee; 24 months
- PS 69-76, Marking of Articles Made Wholly or in Part of Platinum; Jewelers Vigilance Committee; 2 months
- PS 70-76, Marking of Articles Made of Karat Gold; Jewelers Vigilance Committee; 24 months
- PS 71-76, Marking of Jewelry and Novelties of Silver; Jewelers Vigilance Committee; 24 months
- CS 98-62, Artists Oil Paints; Artists Equity Association, Inc.; 6 months
- CS 130-60, Color Materials for Art Education in Schools; the Crayon, Water Color and Craft Institute, Inc.; 6 months
- CS 151-50, Body Measurements for the Sizing of Apparel for Infants, Babies, Toddlers and Children (for the Knit Underwear Industry); Mail Order Association of America; 12 months
- R 192-63, Crayons and Related Art Materials for School Use (Types, Sizes, Packages and Colors); The Crayon, Water Color and Craft Institute, Inc.; 6 months

The following standard has been replaced by a standard being developed or published by a private standards-writing organization and, therefore, Department of Commerce sponsorship is no longer need for it:

- PS 17-69, Polyethylene-sheeting (construction, industrial and agricultural applications); Society of the Plastics Industry

In the absence of any request for retention or maintenance, the following standards are withdrawn:

- PS 13-69, Uncorded Slab Urethane Foam for Bedding and Furniture Cushioning
- PS 15-69, Custom Contact-Molded Reinforced Polyester Chemical-Resistant Process Equipment
- PS 23-70, Horticultural Grade Perlite

- PS 24-70, Melamine Dinnerware (Alpha-Cellulose Filled) for Household Use
- PS 25-70, Heavy-Duty Alpha-Cellulose-Filled Melamine Tableware
- PS 27-70, Mosaic-Parquet Hardwood Slat Flooring
- PS 29-70, Plastic Heat-Shrinkable Film
- PS 31-70, Polystyrene Plastic Sheet
- PS 34-70, Fluorinated Ethylene-Propylene (FEP) Plastic-Lined Steel Pipe and Fittings
- PS 52-71, Polytetrafluorethylene (PTFE)
- PS 53-72, Glass-Fiber Reinforced Polyester Structural Plastic Panels
- PS 56-73, Structural Glued Laminated Timber
- PS 57-73, Cellulosic Fiber Insulation Board
- PS 58-73, Basic Hardboard
- PS 59-73, Prefinished Hardboard Paneling
- PS 60-73, Hardboard Siding
- PS 62-74, Grading of Diamond Powder in Sub-Sieve Sizes
- CS 138-55, Insect Wire Screening
- CS 192-53, General Purpose Vinyl Plastic Film
- CS 201-55, Rigid Polyvinyl Chloride Sheets
- CS 227-59, Polyethylene Film
- CS 245-62, Vinyl-Metal Laminates
- CS 257-63, TFE-Fluorocarbon (Polytetrafluorethylene) Resin Molded Basic Shapes
- CS 268-65, Hide-Trim Pattern for Domestic Cattlehides
- CS 274-66, TFE-Fluorocarbon Resin Sintered Thin Coatings for Dry Film Lubrication
- R2-62, Bedding Products and Components

In accordance with § 10.1(e) of the revised Procedures for the Development of Voluntary Product Standards and by agreement with the Consumer Product Safety Commission, the Department will retain sponsorship of the following Voluntary Product Standard for the period of time stated below to allow for arrangements to be made for its sponsorship by a private standards writing organization.

- PS 66-75, Safety Requirements for Home Playground Equipment; 12 months

For further information contact Eric A. Vadelund, Office of Engineering Standards, National Bureau of Standards, Washington, D.C. 20234. Telephone: (301) 921-3272.

Dated: January 13, 1982.

Ernest Ambler,

Director.

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A UNITED STATES
DEPARTMENT OF
COMMERCE
PUBLICATION



WITHDRAWN

Voluntary
Product
Standard

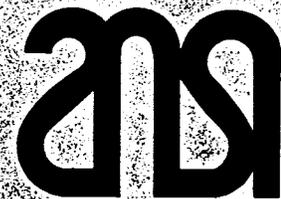
PS 57-73

WITHDRAWN

WITHDRAWN

**CELLULOSIC
FIBER
INSULATING BOARD**

U.S.
DEPARTMENT
OF
COMMERCE
National
Bureau
of
Standards



American National
Standards Institute

American National Standard A 194.1-1973

UNITED STATES DEPARTMENT OF COMMERCE • Frederick B. Dent, *Secretary*

NATIONAL BUREAU OF STANDARDS • Richard W. Roberts, *Director*

VOLUNTARY PRODUCT STANDARD PS 57-73

Cellulosic Fiber Insulating Board

Approved by American National Standards Institute on October 30, 1973 as
American National Standard A194.1-1973

Abstract

This Voluntary Product Standard covers requirements and applicable methods of test for the composition, construction, dimensions, moisture content, and physical properties of cellulosic fiber insulating board. Methods of identifying products which comply with this standard are included and information concerning surface finishes and edge details is given in appendix A.

Key words: Board, cellulosic fiber insulating; cellulosic fiber insulating board; fiber, cellulosic insulating board; insulating, cellulosic fiber board.

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Voluntary Product Standards

Voluntary Product Standards are developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The purpose of the standards is to establish nationally recognized requirements for products, and to provide all concerned interests with a basis for common understanding of the characteristics of the products. The National Bureau of Standards administers the *Voluntary Product Standards* program as a supplement to the activities of the private sector standardizing organizations.

Establishment of a Voluntary Product Standard

The role of the National Bureau of Standards in the establishment of a Voluntary Product Standard is to (1) act as an unbiased coordinator in the development of the standard, (2) provide editorial assistance in the preparation of the standard, (3) supply such assistance and review as is required to assure the technical soundness of the standard, (4) seek satisfactory adjustment of valid points of disagreement, (5) determine the compliance with the criteria of the Department's procedures, (6) provide secretarial functions for each committee appointed under the Department's procedures, and (7) publish the standard as a public document.

Producers, distributors, users, consumers, and other interested groups contribute to the establishment of a *Voluntary Product Standard* by (1) initiating and participating in the development of the standard, (2) providing technical or other related counsel as appropriate relating to the standard, (3) promoting the use of and support for the standard, and (4) assisting in keeping the standard current with respect to advancing technology and marketing practices.

Use of a Voluntary Product Standard

The use of a *Voluntary Product Standard* is voluntary; the National Bureau of Standards has no regulatory power in the enforcement of the provisions of the standards. However, since the standards represent a consensus of all interested groups, their provisions are likely to become established as trade customs. In addition, when a standard is made a part of a legal document, such as a sales contract or code, compliance with the standard is enforceable.

The benefits derived from *Voluntary Product Standards* are in direct proportion to their general recognition and actual use. Producers and distributors whose products meet the requirements of a *Voluntary Product Standard* may refer to the standard in advertising and on labels to promote greater public understanding of or confidence in their products. Purchasers may order products conforming to the requirements of the standards.

For copies of the *Voluntary Product Standards* procedures or for more information concerning the development and use of these standards you may write to: Office of Engineering Standards Services; National Bureau of Standards; Washington, D.C. 20234.

Cellulosic Fiber Insulating Board

Effective August 10, 1973 (see section 4)

(This Standard, which was initiated by the Acoustical and Insulating Materials Association, has been developed under the *Procedures for the Development of Voluntary Product Standards* of the U.S. Department of Commerce as a revision of CS 42-49, *Structural Fiber Insulating Board*, and R 179-63, *Structural Insulating Board [Wood or Cane Fiber]*. See Section 5, *History of Project*, for further information.)

1. PURPOSE

The purpose of this Voluntary Product Standard is to establish nationally recognized dimensional and quality requirements for cellulosic fiber insulating board and to provide producers, distributors, and users with a basis for common understanding of the characteristics of this product.

2. SCOPE AND CLASSIFICATION

2.1. Scope—This Voluntary Product Standard covers requirements and applicable methods of test for the composition, construction, dimensions,

moisture content, and physical properties of cellulosic fiber insulating board. Methods of identifying products which comply with this Standard are included, and information concerning surface finishes and edge details is given in appendix A.

Note: As an aid in correlating U.S. customary units to metric units, conversion factors for the units used in this Standard are given in appendix B.

2.2. Classification—This Standard covers the types and classes of insulating board listed in table 1.

TABLE 1. *Types, classes, and intended uses of insulating board*

Type	Class	Name	Intended Use
I		Sound deadening board	In wall assemblies to control sound transmission.
II		Building board	As a base for interior finishes.
III		Insulating formboard	As a permanent form for poured-in-place reinforced gypsum or lightweight concrete aggregate roof construction.
IV		Sheathing:	
	1	Regular-density	As wall sheathing in frame construction where method of application and/or thickness determines adequacy of racking resistance.
	2	Intermediate-density	As wall sheathing where usual method of application provides adequate racking resistance.
	3	Nail-base	As wall sheathing where usual method of application provides adequate racking resistance, and in addition, exterior siding materials, such as wood or asbestos shingles, can be directly applied with special nails.
V		Shingle backer	As an undercoursing for wood or asbestos cement shingles.
VI		Roof insulating board	As above-deck insulation under built-up roofing.
VII		Ceiling tiles and panels:	
	1	Nonacoustical	As decorative wall and ceiling coverings.
	2	Acoustical	As decorative, sound absorbing wall and ceiling coverings.
VIII		Insulating roof deck	As roof decking for flat, pitched, or shed-type open-beamed, ceiling-roof construction.
IX		Insulating wallboard	As a general-purpose product used for decorative wall and ceiling covering.

TABLE 2. Nominal dimensions of insulating board

Type of insulating board	Nominal dimensions		
	Width	Length	Thickness
	<i>inches</i>	<i>inches</i>	<i>inches</i>
Type I.....	48	96 or 108	1/2
Type II.....	48	96, 120, or 144	1/2
Type III.....	24, 32, 48	48 to 144	1
Type IV:			
Class 1.....	24 48	96 96 or 108	1/2 or 25/32 1/2 or 25/32
Classes 2 and 3.....	48	96 or 108	1/2
Type V.....	11 3/4, 13 1/2, or 15	48	5/16 or 3/8
	23	47	1/2, 1, 1 1/2, 2, 2 1/2, or 3
Type VI.....	24	48	1/2, 1, 1 1/2, 2, 2 1/2, or 3
Type VII:			
Class 1.....	12 12 16 24 48	12 or 24 96 or 120 16 or 32 24 or 48 96, 120, or 144	1/2, 9/16, or 5/8 1/2 1/2, 9/16, or 5/8 1/2, 9/16, or 5/8 1/2
Class 2.....	12 24	12 or 24 24 or 48	1/2, 9/16, or 5/8 1/2, 9/16, or 5/8
Type VIII.....	24	96	1 1/2, 2, or 3
Type IX.....	48	96 or 120	3/8

3. REQUIREMENTS

3.1. Definitions—The definitions of terms used in this Standard shall be as given in the American Society for Testing and Materials (ASTM) D 1554-67, *Definition of Terms Relating to Wood-Base Fiber and Particle Panel Materials*.¹

3.2. Composition—The board shall consist primarily of lignocellulosic fibers that have been interfelted and consolidated into homogeneous panels having a density of less than 31 pounds per cubic foot but having a density of more than 10 pounds per cubic foot. Other ingredients may be added to provide specific physical properties.

3.3. Construction—The insulating board may either be single or multiple ply. The plies of all boards shall be joined by stapling or by an adhesive.

3.3.1. Finish and edge details—The finish and edge details of insulating board shall be as agreed upon between purchaser and seller (see appendix A).

3.4. Dimensions—The nominal dimensions of the types of insulating board covered by this Standard shall be as specified in table 2.

3.4.1. Tolerances—The actual dimensions of the board shall be within the following tolerances

when determined in accordance with the applicable test method specified in table 3. The tolerance for the length and width dimensions shall be plus 0, minus 1/16 inch per foot with a maximum of plus 0, minus 3/8 inch in any dimension. The thickness tolerances shall be as follows:

Nominal thickness	Tolerance (plus or minus)
<i>inch</i>	<i>percent</i>
5/16, 3/8.....	12
1/2, 9/16, 5/8.....	10
25/32.....	8
1.....	7
1 1/2.....	6
2, 3.....	5

3.4.2. Thickness of roof insulation board—The actual thickness of Type VI insulating board shall be as necessary to provide thermal conductance, "C," values of 0.72, 0.36, 0.24, 0.19, 0.15, 0.12, respectively for its nominal thicknesses (thinnest to thickest) listed in table 2. Thermal conductance shall be determined in accordance with the applicable test method specified in table 3.

3.5. Physical properties—The boards shall have the physical properties specified in table 4 when tested in accordance with the applicable test methods specified in table 3.

¹ Later issues of this publication may be used provided that the requirements are applicable and consistent with the issue designated. Copies of ASTM publications can be purchased from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

TABLE 3. Test methods for insulating board

Property or dimension	Test method ^a	Comment or exception
Certain properties of Type VIII insulating board only: Thermal conductance. Modulus of rupture (dry and after accelerated aging). Modulus of elasticity. Deflection span ratio. Vapor permeance.	ASTM D 2164-65, <i>Standard Methods of Test for Structural Insulating Roof Deck.</i>	For strength parameters use equivalent Uniform Load.
All other properties: Thickness. Thermal conductivity. Transverse strength (dry and wet). Modulus of rupture (dry and wet). Deflection at specified min load (dry and wet). Tensile strength parallel to the surface. Tensile strength perpendicular to the surface. Water absorption (except for Type IV Class 2 and Class 3 boards). Direct nail withdrawal resistance (dry and soaked).	ASTM C 209-72, <i>Standard Methods of Testing Structural Insulating Board Made from Vegetable Fibers.</i>	(1) <i>Transverse strength</i> —Wet value for Type III board obtained after conditioning as follows: one side of board shall be submerged for 24 hours under 1/4 inch of water which is at a temperature of 70 ± 5 °F. Edges shall be sealed when soaking and the soaked side of the specimen shall be in compression when testing. (2) <i>Modulus of rupture</i> —(a) Values computed from transverse strength test data using the formula: $MOR = \frac{6P}{t^2}$, where MOR = modulus of rupture, P = transverse load, t = thickness. (b) Wet value for Type III board obtained as described in (1) above. (3) <i>Deflection at specified min load</i> —Wet value for Type III board obtained as described in (1) above. (4) <i>Tensile strength parallel to surface</i> —Value for Type VIII board pertains to individual plies making up the board (see 3.3) no larger than 1-inch thick. (5) <i>Direct nail withdrawal resistance</i> —A 0.100-inch-diameter aluminum wire nail at least 1 3/8-inch long with 20 sharp rings per inch measuring 0.116-inch max outside diameter shall be used. Testing speed shall be 1.0 inch per minute ± 50%.
Flame spread index	ASTM E 84-70, <i>Standard Method of Test for Surface Burning Characteristics of Building Materials.</i>	
Racking load (dry and wet)	ASTM E 72-68, <i>Standard Methods of Conducting Strength Tests of Panels for Building Construction.</i> In conjunction with Federal Housing Administration Technical Circular No. 12, <i>A Standard for Testing Sheathing Materials for Resistance to Racking.</i>	Specimens shall be fastened 6 inches apart to intermediate framing and 3 inches apart around edges. Specimens shall be in a vertical position when tested. Studs shall be placed 16 inches on center. Specimens shall be nailed with 1 1/2-inch galvanized roofing nails or 6d common nails or 16-gage staples 1 1/8-inch long with a minimum crown of 7/16 inch for 1/2-inch sheathing. 23/32-inch sheathing shall be nailed with 1 3/4-inch galvanized nails or 8d common nails or 16-gage staples 1 1/2-inch long with a minimum crown of 7/16 inch.
Vapor permeance	ASTM C 355-64, <i>Standard Methods of Test for Water Vapor Transmission of Thick Materials.</i>	
Width Length Linear expansion Water absorption (for Type IV, Class 2 and Class 3 boards only).	ASTM D 1037-64, <i>Standard Method of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials.</i>	
Thermal conductance	ASTM C 177-63, <i>Standard Method of Test for Thermal Conductivity of Materials by Means of the Guarded Hot Plate.</i>	

^a Later issues of the publications indicated may be used provided that the requirements are applicable and consistent with the issues designated. Copies of ASTM publications can be purchased from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. Copies of Federal Housing Administration Technical Circulars can be purchased from the Federal Housing Administration, U.S. Department of Housing and Urban Development, Washington, D.C. 20411.

TABLE 4. Physical properties of insulating board

Property	Type I	Type II	Type III	Type IV			Type V		Type VI 1/2 in thick	Type VII ^c	Type VIII	Type IX
	0.38	0.38	0.40	Class 1	Class 2	Class 3	3/8 in thick	5/16 in thick	See 3.4.2	0.38	0.40	0.40
				1/2 in thick	25/32 in thick	25						
Thermal conductivity, "k," avg max (Btu inch per h sq ft deg Fahr at 75 ± 5 °F).	0.38	0.38	0.40	0.40	0.44	0.48	0.40	0.40	0.40	0.38	0.40	0.40
Transverse strength either direction, avg min (lb).	12 NR	12 NR	37 NR	14 NR	17 NR	25 NR	25 NR	6 NR	7 NR	10 NR	NR	6 NR
Modulus of rupture, avg min (psi)	240 NR	240 NR	190 NR	275 NR	340 NR	500 NR	200 NR	200 NR	140 NR	200 NR	225 NR	200 NR
After accelerated aging	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	" 50 percent of dry value	NR
Modulus of elasticity, avg min (psi × 10 ³)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	40	NR
Deflection span ratio, avg max	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1.240	NR
Deflection at specified min load, avg max (in)	0.85 NR	0.85 NR	0.16 NR	0.75 NR	0.75 NR	0.65 NR	0.56 NR	1.18 NR	1.25 NR	NR	NR	NR
Tensile strength parallel to surface, avg min (psi)	150	150	150	150	200	300	150	150	50	150	150	150
Tensile strength perpendicular to surface, avg min (psi)	600	600	600	600	800	1000	600	600	500	600	600	600
Water absorption by volume, avg max, percent	7	7	10	7	15	12	7	7	10	NR	10	15
Linear expansion, 50-90 percent RH, avg max, percent	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Vapor permeance, avg min (grains per h sq ft inch Hg pressure differential)	NR	NR	5	5	5	5	5	5	NR	NR	" 0.5	NR
Direct nail withdrawal resistance, avg min (lb per nail)	NR NR	NR NR	NR NR	NR NR	NR NR	40 25	NR NR	NR NR	NR NR	NR NR	NR NR	NR NR
Racking load, avg min (lb)	NR NR	NR NR	NR NR	NR NR	5200 4000	5200 4000	5200 4000	NR NR	NR NR	NR NR	NR NR	NR NR
Flame spread index, finish surface, max	NR	200	NR	NR	NR	NR	NR	NR	NR	200	200	200

^a For example, if the dry MOR is found to be 300 psi, then the MOR after accelerated aging must be not less than 150 psi.
^b Average maximum. For products without a vapor barrier, there is no requirement for vapor permeance.
^c The physical properties listed for acoustical material, except for flame spread, apply to the base material before punching, drilling, perforating, or embossing.
 NR = Not required for this product.

4. EFFECTIVE DATE AND IDENTIFICATION

The effective date of this Standard is August 10, 1973. After this date, the authority to refer to the superseded standards, CS 42-49 and R 179-63, as voluntary standards developed under the Department of Commerce procedures is terminated. As of the effective date, reference to PS 57-73 may be made in contracts, codes, advertising, invoices, product labels, and the like, but no product may be advertised or represented in any manner which would imply or tend to imply approval or endorsement of that product by the National Bureau of Standards, the Department of Commerce, or by the Federal Government.

The following statements are suggested for use in representing products as conforming to all requirements of this Standard:

- (1) "This insulating board conforms to all requirements established in Voluntary Product Standard PS 57-73, developed and published in accordance with the U.S. Department of Commerce *Procedures for the Development of Voluntary Product Standards*. Full responsibility for the conformance of this product to the standard is assumed by (name and address of producer or distributor)."
- (2) "Conforms to PS 57-73, (name and address of producer or distributor)."

5. HISTORY OF PROJECT

Commercial Standard CS 42-49, *Structural Fiber Insulating Board*, was developed at the request of the Acoustical and Insulating Materials Association and was published in 1949. Simplified Practice Recommendation R 179-63, *Structural Insulating Board (Wood or Cane Fiber)*, was developed at the request of the same organization and was published in 1963.

In 1968, the Acoustical and Insulating Materials Association requested that the National Bureau of Standards initiate a revision of CS 42-49 and R 179-63 under the *Procedures for the Development of Voluntary Product Standards*. A proposed revision was approved by the Standing Committee in September 1972. The recommended revision was then circulated for acceptance in October 1972. The response to this circulation indicated that certain changes to the standard were necessary. A new proposal was approved by the Standing Committee in May 1973. The new recommended standard was circulated for acceptance in June 1973. The responses to this circulation indicated a consensus among producers, distributors, and users, in accordance with the published procedures.

The new edition of the standard was designated Voluntary Product Standard PS 57-73, *Cellulosic Fiber Insulating Board*, and became effective on August 10, 1973.

Technical Standards Coordinator:

Karl G. Newell, Jr., Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234.

6. STANDING COMMITTEE

A Standing Committee has been appointed to assist in keeping this Voluntary Product Standard up to date. The names of the members of the committee are available from the Office of Engineering Standards Services, Washington, D.C. 20234, which serves as the secretariat of the committee.

APPENDIX A—SURFACE FINISH AND EDGE DETAILS

Each type and class of insulating board covered by this Standard is usually given a surface finish and certain edge details that relate to the intended end use of the board. The most common finishes and edges of insulating board are presented in table A1.

APPENDIX B—METRIC CONVERSION

The conversion factors and units contained in this appendix are in accordance with the International System of Units (abbreviated SI for *Système International d'Unités*). The SI was defined and given official status by the 11th General Conference on Weights and Measures which met in Paris in October 1960. For assistance in converting U.S. customary units to SI units, see ASTM E 380, *ASTM Standard Metric Practice Guide*, available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103. The conversion factors for the units found in this Standard are as follows:

$$1 \text{ inch} = 25.4 \text{ millimeters}$$

$$1 \text{ British Thermal Unit (thermochemical) inch per hour square foot degrees Fahrenheit} = 0.141314 \text{ watt per meter degree K}$$

$$1 \text{ pound} = 0.454 \text{ kilogram}$$

$$1 \text{ pound per square inch} = 6.895 \text{ pascals}$$

$$1 \text{ grain per hour square foot} = 16.7 \text{ grams per 24 hour square meter}$$

$$t_c = (t_F - 32)/1.8$$

where:

$$t_c = \text{temperature in degrees Celsius}$$

$$t_F = \text{temperature in degrees Fahrenheit}$$

TABLE A1. *Surface finishes and edge details of insulating board*

Type of insulating board	Surface finish	Edge details
Type I.....	Natural ^a	Square.
Type II.....	Factory surface ^b	Square.
Type III.....	Natural or factory surface.....	Square.
Type IV:		
Class 1.....	Natural or factory surface on either one or both sides.	Ends square and long edges fabricated in 24-inch widths; all edges square in 48-inch widths.
Classes 2 and 3.....	Natural or factory surface.....	Square.
Type V.....	Natural.....	Square.
Type VI.....	Natural or factory surface.....	Square or fabricated.
Type VII:		
Class 1.....	Exposed face and bevels factory surface (smooth or textured).	Fabricated in 12-inch widths by 12- or 24-inch lengths and in 16-inch widths; other 12-inch widths, long edges are fabricated and ends square; all edges square in 24- and 48-inch widths.
Class 2.....	Exposed face and bevels factory surface [face smooth or textured with visible surface openings (perforated, fissured or other) in a regular or irregular pattern].	Fabricated in 12-inch widths; square in 24-inch widths.
Type VIII.....	Exposed face and bevels factory surface (smooth or textured).	Ends square or fabricated; long edges fabricated.
Type IX.....	Factory surface (smooth or textured).....	Square.

^aThe term "natural" in connection with surface finishes refers to the surface as produced by the basic manufacturing process of felting or forming, without the inclusion of special ingredients intended to enhance the surface appearance, or any subsequent processing or retouching of the surface.

^bThe term "factory surface" refers to a special processing or additional steps in the manufacturing process, which are intended to provide one surface of the board with special features of appearance, texture, or functional performance which would not be provided by the "natural" surface.

Therefore, the following are the proposed changes to ASTM C208:

Table 3, Page 5

- (1) Change the value for transverse load for Intermediate sheathing from 20 lbs. to 17 lbs.
- (2) Change the value for modulus of rupture for Intermediate sheathing from 400 psi to 340 psi.
- (3) Delete footnote "b" with reference to the 20 lb. transverse load for Intermediate sheathing.
- (4) Add racking loads, avg. min. lb. of 5200 lbs. dry and 4000 lbs. wet for 25/32" regular density, 1/2" Intermediate and 1/2" nail-base.

Table 4, Page 6

- (1) Under the table delete the word "follow" in second line of footnote "d" and add the following in same line before the word "Method" - "be tested and calculated by".

The above changes will make all physical properties in this standard consistent with the Department of Commerce Product Standard PS 57-73, Cellulosic Fiber Insulating Board which has universal acceptance by industry, government and users.



AMERICAN SOCIETY FOR TESTING AND MATERIALS

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Standard Specification for INSULATING BOARD (CELLULOSIC FIBER), STRUCTURAL AND DECORATIVE¹

This Standard is issued under the fixed designation C 208; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope and Classification

1.1 This specification covers the principal types, grades, and sizes of insulating board. Requirements are specified for composition, construction, physical properties, tolerances, sampling procedures, and test methods to determine compliance. Reference is provided to an established source for nomenclature and definitions.

1.2 The principal types, grades, and sizes of insulating board that are covered by this specification are listed in Tables 1 and 2.

2. Applicable Documents

2.1 ASTM Standards:

C 209 Testing Insulating Board (Cellulosic Fiber) Structural and Decorative.²

C 532 Specification for Formboard Made From Vegetable Fibers.²

D 1037 Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials.³

D 1554 Definitions of Terms Relating to Wood-Base Fiber and Particle Panel Materials.³

D 2164 Tests for Structural Insulating Roof Deck.³

D 2277 Specification for Fiberboard Nail-Base Sheathing.³

E 72 Conducting Strength Tests of Panels for Building Construction.²

3. Definitions

3.1 *General*—The definition of terms used in this specification shall be in accordance with Definitions D 1554.

3.2 *insulating board (cellulosic fiber) structural and decorative*—a fibrous-felted, homogeneous panel made from ligno-cellulosic fi-

bers (usually wood or cane) and having a density of less than 31 lb/ft³ (497 kg/m³) but more than 10 lb/ft³ (160 kg/m³). It is characterized by an integral bond which is produced by interfelting of the fibers, but which has not been consolidated under heat and pressure as a separate stage in manufacture. Other materials may be added during manufacture to improve certain properties.

4. Requirements

4.1 *General*—All insulating board products represented as conforming to this specification shall meet all applicable requirements as set forth in this section. Required test methods are given in Methods C 209. Reference to standard nomenclature and definitions that apply to this specification is given in Section 2.

4.2 *Composition*—Insulating board (cellulosic fiber) structural and decorative shall be manufactured from refined or partly refined ligno-cellulosic (wood or cane) fibers, by a felting or molding process, into homogeneous panels. Other ingredients may be added to provide or improve certain properties such as strength and water resistance, in addition to surface finishes for decorative products and special coatings which impart resistance to flame spread. The material is subjected to such drying temperatures as to effect complete

¹ This specification is under the jurisdiction of ASTM Committee C-16 on Thermal and Cryogenic Insulating Materials.

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² *Annual Book of ASTM Standards*, Part 14.

³ *Annual Book of ASTM Standards*, Part 16.



destruction of rot producing fungi.

4.3 *Construction*—The finished board may be either single- or multiple-ply. When multiple-ply boards are supplied, a suitable moisture-resistant adhesive shall be used to join the plies.

4.4 *Physical Properties*—Insulating board shall have the limiting property values shown in Tables 3 and 4 when tested according to the methods outlined in Methods C 209.

4.5 *Moisture Content*—The insulating board shall not exceed 10 weight % moisture content when shipped from the factory.

4.6 *Tolerances*—The tolerance for length and width of any size panel shall be $+0, -\frac{1}{16}$ in./ft (-5.2 mm/m), but the total tolerance shall not exceed $+0, -\frac{3}{8}$ in. (-9.5 mm). The tolerances for thickness are listed in Tables 1

and 2.

5. Workmanship and Finish

5.1 The surface of all boards shall be free of cracks, lumps, excessive departure from planeness, or other defects that adversely affect performance and appearance.

5.2 *Surface Finish*—The surface finishes of board shall be as specified in Tables 1 and 2.

5.3 *Edge Details*—The edge details of board shall be as specified in Tables 1 and 2.

6. Rejection

6.1 In case of rejection, the seller shall have the right to reinspect the rejected material on the site and resubmit the lot after removal of this portion of the material not conforming to the specified requirements.

TABLE 1 Standard Types and Sizes of Construction Grades of Insulating Board

Construction Grades	Nominal Dimensions				Surface Finish	Edge Details
	Widths	Lengths	Thicknesses, in. (mm)	Thickness Tolerance, ±%		
	ft (m)	ft (m)				
Building Board	4 (1.22)	8 (2.44) 10 (3.05) 12 (3.66)	½ (12.7)	10	natural ^a	square
Insulating Formboard	Covered by Specification C 532					
	ft (m)	ft (m)				
Sheathing:						
Regular Density	2 (0.61)	8 (2.44)	½ (12.7) ¾ (19.8)	10 8	natural or factory surface on either one or both sur- faces ^b	2-ft widths ends square and long edges fabricated ^c 4-ft widths, all edges square
	4 (1.22)	8 (2.44) 9 (2.74)	½ (12.7) ¾ (19.8)	10 8		
Intermediate	4 (1.22)	8 (2.44) 9 (2.74)	½ (12.7)	10	natural or factory surface	
Nail-Base	Covered by Specification D 2277					
	in. (mm)	in. (mm)				
Shingle Backer	11¼ (298)	48 (1219)	⅝ (7.9) ¾ (9.5)	12 12	natural	square
	13½ (343)	48 (1219)	⅝ (7.9) ¾ (9.5)	12 12		
	15 (381)	48 (1219)	⅝ (7.9) ¾ (9.5)	12		
	ft (m)	ft (m)				
Sound Deadening Board	8 (2.44) 4 (1.22)	8 (2.44) 9 (2.74)	½ (12.7)	10	natural	square
	in. (mm)	in. (mm)				
Roof Insulating Board	23 (584)	47 (1194)	½ (12.7) 1 (25.4) 1½ (38.1)	10 7 6	natural or factory surface	square, offset, or shiplapped
	24 (610)	48 (1219)	2 (50.8) 2½ (63.5) 3 (76.2)	5		

^a The term "natural" in connection with surface finishes refers to the surface as produced by the basic manufacturing process of felting or forming, without the inclusion of special ingredients intended to enhance the surface appearance, or of any subsequent processing or retouching of the surfaces.

^b The term "factory surface" refers to a special processing or additional steps in the manufacturing process, which is intended to provide one surface of the board with special features of appearance, texture, or functional performance, which would not be provided by the "natural" surface.

^c The term "edges fabricated" refers to any type of edge treatment, other than square edges without reinforcement.

TABLE 2 Standard Types and Sizes of Finish Grades of Insulating Board

Finish Grades	Nominal Dimensions			Thickness Tolerance, ±%	Surface Finish	Edge Details
	Widths	Lengths	Thick-nesses, in. (mm)			
	in. (mm)	in. (mm)				
Ceiling Tile (non-acoustical)	12 (305)	12 (305) 24 (610)	½ (12.7) ⅙ (14.3) ⅙ (15.9)	10	exposed face and bevels factory surface, smooth or textured ^a	all edges fabricated ^b
	16 (406)	16 (406) 32 (813)	½ (12.7) ⅙ (14.3) ⅙ (15.9)	10		
Ceiling Tile (acoustical)	12 (305)	12 (305) 24 (610)	½ (12.7) ⅙ (14.3) ⅙ (15.9)	10	exposed face and bevels factory surface; face smooth or textured with visible surface openings, (perforations or fissuring) in a regular or irregular pattern.	all edges fabricated ^b
	ft (m)	ft (m)				
Insulating Roof Deck	2 (0.61)	8 (2.44)	1½ (38.1)	6	exposed face and bevels factory surface, smooth or textured	long edges fabricated, ends square or fabricated
			2 (50.8)	5		
			3 (76.2)	5		
Interior Finish Board	4 (1.22)	8 (2.44) 10 (3.05) 12 (3.66)	½ (12.7)	10	factory surface, smooth or textured	square
	in. (mm)	ft (m)				
Plank	12 (305)	8 (2.44)	½ (12.7)	10	exposed face and bevels factory surface, smooth or textured	long edges fabricated, ends square
		10 (3.05)	⅙ (14.3)			
	ft (m)	ft (m)				
Insulating Wall-board	4 (1.22)	8 (2.44) 10 (3.05)	⅙ (9.5)	12	factory surface, smooth or textured	square
Lay-In Panels (non-acoustical)	2 (0.61)	4 (1.22)	½ (12.7)	10	factory surface, smooth or textured	square
			⅙ (14.3)			
			⅙ (15.9)			
Lay-In Panels (acoustical)	2 (0.61)	4 (1.22)	½ (12.7)	10	factory surface, smooth or textured, with surface openings such as hole perforations or fissures	square
			⅙ (14.3)			
			⅙ (15.9)			

^a The term "factory surface" refers to a special processing or additional steps in the manufacturing process, which is intended to provide one surface of the board with special features of appearance, texture or functional performance, which would not be provided by the "natural" surface.

^b The term "edges fabricated" refers to any type of edge treatment, other than square edges without reinforcement.



TABLE 3 Physical Property Requirements for Construction Grades of Insulating Board

Physical Requirements	Building Board		Sheathing				Shingle Backer		Sound Deadening Board		Roof Insulating Board					
	½ in. (12.7 mm)		Regular		Intermediate		¾ in. (19.9 mm)		¾ in. (19.9 mm)		½ in. (12.7 mm)		1 in. (25.4 mm)		2 in. (50.8 mm)	
	0.38 (0.055)	12 (53.4)	½ in. (12.7 mm)	¾ in. (19.9 mm)	½ in. (12.7 mm)	20° (89.0)	¾ in. (19.9 mm)	¾ in. (19.9 mm)	¾ in. (19.9 mm)	¾ in. (19.9 mm)	½ in. (12.7 mm)	½ in. (12.7 mm)	1 in. (25.4 mm)	1 in. (25.4 mm)	2 in. (50.8 mm)	
Thermal conductivity (k) avg max, Btu-in./h-ft²-deg F (W/m·K) at mean temperature of 75 ± 5 F (24 ± 3 C)	0.38 (0.055)	12 (53.4)	0.40 (0.058)	0.40 (0.058)	0.44 (0.063)	20° (89.0)	0.40 (0.058)	0.40 (0.058)	0.40 (0.058)	0.38 (0.055)	0.38 (0.055)	0.38 (0.055)	0.38 (0.055)	0.38 (0.055)	0.38 (0.055)	
Transverse load either direction, avg min lb (N)	14 (62.3)	150 (1034)	25 (111.2)	150 (1034)	200 (1379)	200 (1379)	6 (26.7)	6 (26.7)	6 (26.7)	7 (31.1)	7 (31.1)	14 (62.3)	14 (62.3)	28 (124.6)		
Tensile strength parallel to surface, min psi (kPa) ^a	600 (28.7)	600 (28.7)	600 (28.7)	600 (28.7)	800 (38.3)	800 (38.3)	600 (28.7)	600 (28.7)	600 (28.7)	500 (23.9)	500 (23.9)	500 (23.9)	500 (23.9)	500 (23.9)		
Tensile strength perpendicular to surface, min lb/ft² (kPa)	7	7	7	7	15	15	7	7	7	7	7	10	10	10		
Water absorption by volume, max % ^d	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Linear expansion, 50-90% RH, avg max %	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)	5 (0.287)		
Vapor permeance, grains/h·ft²·in. Hg pressure differential avg min (mg/s·m²·kPa)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Modulus of rupture, min psi (kPa) ^c	240 (1655)	275 (1896)	200 (1379)	200 (1379)	400 (2758)	400 (2758)	200 (1379)	200 (1379)	240 (1655)	240 (1655)	240 (1655)	240 (1655)	240 (1655)	240 (1655)		
Deflection at specified min load, avg max in. (mm)	0.85 (22)	0.75 (19)	0.56 (14)	0.56 (14)	0.75 (19)	0.75 (19)	0.56 (14)	0.56 (14)	1.18 (30)	1.18 (30)	1.18 (30)	1.18 (30)	1.18 (30)	1.18 (30)		

^a Tensile strength requirements shall be applicable only on thicknesses up to and including 1 in. (25.4 mm).
^b The 20-lb (89.0-N) transverse load and the modulus of rupture requirements are not required for wall sheathing applications where the manufacturer certifies proof that his product will meet the specified racking requirements when run in accordance with Method E 72, in conjunction with FHA Technical Circular No. 12 applied vertically and fastened 6 in. (152 mm) apart to intermediate framing and 3 in. (76 mm) apart around edges of sheet, which call for racking strengths of 5200 lb (2359 kg) dry and 4000 lb (1814 kg) wet.
^c Modulus of rupture values are calculated from transverse tests as measured by Method C 209 and are calculated as follows:

$$MOR = 6P/t^2$$

where:
P = transverse load, and
t = thickness.
^d Intermediate sheathing water absorptions are determined by the 24-h test in accordance with Method D 1037 and all other products are determined by the 2-h test in accordance with Method C 209.

TABLE 4 Physical Property Requirements for Interior Finish Grades of Insulating Board

Physical Requirements	Ceiling Tileboard and Lay-In Panels		Insulating Roof Deck 1 1/2 (38.1) 2 (51.0) 3 (76.2)	Interior Finish Board and Plank in. (mm) 1/2 (12.7)	Insulating Wallboard in. (mm) 3/8 (9.5)
	Non-acoustical ^b 1/2 (12.7) 5/16 (14.3) 3/8 (19.9)	Acoustical ^b 1/2 (12.7) 5/16 (14.3) 3/8 (15.9)			
Thermal conductivity (k), avg max Btu · in./h · ft ² · deg F (W/m · K) at mean temperature of 75 ± 50 F (24 ± 3 C)	0.38 (0.055)	0.38 (0.055)	0.40 (0.058)	0.38 (0.055)	0.40 (0.058)
Transverse load, either direction, avg min lbf (N)	10 (44.5)	10 (44.5)	...	10 (44.5)	6 (26.7)
Tensile strength parallel to surface, min psi (kPa)	150 (1034)	150 (1034)	150 (1034)	150 (1034)	150 (1034)
Tensile strength perpendicular to surface, min lb/ft ² (kPa) ^a	600 (28.7)	600 (28.7)	600 (28.7)	600 (28.7)	600 (28.7)
Water absorption by volume, max %	...	...	10	10	15
Linear expansion, 50–90% RH, avg max %	0.5	0.5	0.5	0.5	0.5
Flame spread index, max finish surface	200	200	200	200	200
Vapor permeance, grains/h · ft ² · in. Hg pres- sure differential, avg max (mg/s · m ² · kPa) ^c	...	...	0.5 (0.029)	...	...
Modulus of rupture, min psi (kPa) "do" after accelerated aging, % of unaged matching specimen, min ^d	...	...	225 (1551)	200 (1379)	200 (1379)
Modulus of elasticity, min psi × 10 (MPa)	...	...	50 40 (276)	...	...
Deflection span ratio, max	...	...	1/240	...	...

^a Tensile strength requirements shall be applicable only on thicknesses up to and including 1 in. (25.4 mm).
^b Physical properties listed in this column, except flame spread index, apply to the base material before punching, drilling, perforating or embossing.
^c For products without a vapor barrier, there is no requirement for vapor permeance.
^d Modulus of rupture values are calculated from transverse tests as measured by Method C 209 and are calculated as follows, except for insulating roof deck which is to follow Method D 2164.

$$MOR = 6P/t^2$$

where:
P = transverse load, and
t = thickness.

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