

U. S. DEPARTMENT OF COMMERCE

JESSE H. JONES, Secretary

NATIONAL BUREAU OF STANDARDS

National Bureau of Standards  
LYMAN J. BRIGGS, Director

OCT 22 1943

# STRUCTURAL FIBER INSULATING BOARD

(THIRD EDITION)

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COMMERCIAL STANDARD CS42-43

[Supersedes CS42-35]

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Effective Date for New Production From August 25, 1943



A RECORDED VOLUNTARY STANDARD  
OF THE TRADE

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1943

PROMULGATION  
of  
COMMERCIAL STANDARD CS42-43  
for  
STRUCTURAL FIBER INSULATING BOARD  
(Third Edition)

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On May 16, 1932, at the instance of a group of fiber insulating board manufacturers, a joint conference of representative manufacturers, distributors, and users of fiber insulating board adopted a recommended commercial standard for this commodity, which was subsequently accepted in writing by the trade and published as Commercial Standard CS42-32. In 1935 the standard was reaffirmed, with an amendment.

A recommended revision, submitted by the Insulation Board Institute and endorsed by the standing committee, was circulated on April 12, 1943, to the trade for written acceptance. Those concerned have since accepted and approved the revised standard as shown herein for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from August 25, 1943.

Promulgation recommended.

I. J. Fairchild,  
*Chief, Division of Trade Standards.*

Promulgated.

Lyman J. Eriggs,  
*Director, National Bureau of Standards.*

Promulgation approved.

Jesse H. Jones,  
*Secretary of Commerce.*

# STRUCTURAL FIBER INSULATING BOARD

(Third Edition)

## COMMERCIAL STANDARD CS42-43

### PURPOSE

1. This standard is offered for the common understanding of the insulating-board industry. It establishes definite criteria of insulating value and other physical requirements that should be possessed by this material, and presents a basis on which performance guaranties may be made by the manufacturer for the guidance and assurance of the prospective home owner, the architect, or builder.

### SCOPE

2. This standard is a minimum specification for five classes of structural fiber insulating board designated as follows:

Class *A*: Building Board.

Class *B*: Lath (for plaster base).

Class *C*: Roof-Insulation Board.

Class *D*: Interior Board (Factory finished).

Class *E*: Sheathing.

It also covers physical requirements and tests for thermal conductivity, strength, absorption, and expansion and sets forth the standard commercial sizes, tolerances, and methods of packing and labeling.

### GENERAL REQUIREMENTS

3. *Composition*.—Boards shall be manufactured principally from wood, sugar cane, or other vegetable fiber, by a felting or molding process, suitable sizing material being incorporated in the product to render it water resistant.

4. *Construction*.—The finished board may be either single or multiple ply. When multiple-ply boards  $\frac{3}{4}$  inch or less in thickness are supplied, a suitable moisture-resistant cement shall be used to join the plies. Multiple-ply boards 1 inch and over in thickness shall be stapled, stitched, or thoroughly cement, as specified.

5. *Destruction of rot-producing fungi*.—The material shall be subjected to such drying temperature as to effect complete destruction of rot-producing fungi.

### DETAIL REQUIREMENTS

6. *Edge finish*.

6a. *Building board: Class A*.—Edges shall be square.

6b. *Lath (for plaster base): Class B*.—Short edges shall be either square or fabricated and long edges specially fabricated.

6c. *Roof-insulation board: Class C*.—The  $\frac{1}{2}$ -inch thickness shall be

square edged. For thicknesses of 1 inch and over, edges shall be square unless offset is specified. When offset material is specified, the amount of the offset shall be either  $\frac{3}{4}$  inch or 1 inch at the manufacturer's option.

6d. *Interior board (factory finished): Class D.*—Edges shall be either square or specially fabricated.

6e. *Sheathing: Class E.*—Edges shall be either square or specially fabricated.

7. *Surfaces.*—For plaster base, roof insulation, and similar application, surfaces shall be natural or other approved finish and shall be free from cracks, lumps, excessive departure from planeness, or other defects. For interior finish, partitions, and similar applications where the board is exposed, surfaces shall be finished and shall be smooth and flat and reasonably free from coarse or hairy fibers.

8. *Physical properties.*—Structural fiber insulating board shall have the properties shown in table 1 when tested according to methods hereinafter described.

TABLE 1.

Physical properties	Classes				
	A	B	C	D	E
Maximum thermal conductivity, Btu/hr sq ft (deg F/in.), at a mean temperature of 75° F.....	0.38	0.38	0.38	0.38	0.40
Minimum transverse strength, each direction <sup>a</sup> ..... pounds.....	12	12	7	10	14
Deflection at ultimate load <sup>b</sup> not less than..... inch.....	0.25	0.25	0.25	0.15	0.25
Deflection at specified minimum transverse strength not greater than..... inches.....	.85	.85	1.25	1.00	.75
Minimum tensile strength <sup>c</sup> ..... lb/in <sup>2</sup> .....	150	150	100	150	150
Maximum water absorption.....%	7	7	10	10	10
Maximum linear expansion.....%	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

<sup>a</sup> This requirement is based on specimens  $\frac{1}{2}$ -inch thick. For specimens of other thickness, the requirement shall be increased in direct proportion, that is, for a thickness of 1 inch, it shall be doubled, etc.

<sup>b</sup> This requirement is based on specimens  $\frac{1}{2}$ -inch thick. For specimens of other thicknesses, the requirement shall be decreased in inverse proportion, that is, for a thickness of 1 inch, it shall be halved, etc.

<sup>c</sup> Tensile strength requirements shall be applicable only on thicknesses up to and including 1 inch.

## STANDARD SIZES AND TOLERANCES

9. *Standard commercial sizes.*—The nominal width and length dimensions shall be as specified in paragraphs 9a to 9e, inclusive.

9a. *Building board: Class A.*—Four feet wide by 6, 7, 8, 9, 10, and 12 feet long by  $\frac{1}{2}$  inch,  $\frac{3}{4}$  inch, and 1 inch thick. Dimensions are over-all.

9b. *Lath (for plaster base): Class B.*—Forty-eight inches long by 16, 18, and 24 inches wide by  $\frac{1}{2}$  inch and 1 inch thick. For the  $\frac{1}{2}$ -inch thickness the dimensions are over-all, and for the 1-inch thickness the dimensions may be either over-all or coverage.

9c. *Roof insulation board: Class C.*—The roof insulation size may be 22×47 inches or 23×47 inches (at the option of the manufacturer) by  $\frac{1}{2}$  inch, and multiples of  $\frac{1}{2}$  inch, thick. Dimensions are coverage except where material is cut from the piece to make an offset joint, in which case dimensions are over-all.

9d. *Interior board (factory finished): Class D.*—Panels 8×8 inches, 12×12 inches, 12×24 inches, 16×16 inches, 16×32 inches by  $\frac{1}{2}$  inch,  $\frac{3}{4}$  inch, and 1 inch thick; planks 8, 10, 12, and 16 inches wide by 6, 8,



10, and 12 feet long by  $\frac{1}{2}$  inch thick; boards 4 feet wide by 6, 7, 8, 9, 10, and 12 feet long by  $\frac{1}{2}$  inch,  $\frac{3}{4}$  inch, and 1 inch thick. Dimensions are coverage.

9e. *Sheathing: Class E.*—Four feet wide by 8,  $8\frac{1}{2}$ , 9,  $9\frac{1}{2}$ , 10, and 12 feet long by  $\frac{1}{2}$  inch and  $\frac{2}{3}$  inch thick; also 2 feet wide by 8 feet long by  $\frac{2}{3}$  inch thick. Dimensions may be either over-all or coverage.

10. *Tolerances.*—The following tolerances shall be permitted:

Length and width: Minus  $\frac{1}{4}$  inch, plus none.

Thickness: Plus or minus  $\frac{1}{16}$  inch.

## METHOD OF SAMPLING AND TESTING

11. *Sampling.*—Samples shall be taken at random so as to give a fair representation of the entire shipment. Pieces from five boards of any carload, or one-half of 1 percent of the number of pieces in less than carload shipments, but not less than three boards of any shipment shall constitute the test samples. From each, a specimen  $24 \times 48$  inches shall be cut, the larger dimension being crosswise of the longer dimension of the board as it is usually obtained. When a shipment consists of more than one car or carrier load, samples shall be selected from each car or carrier. When the individual pieces are less than  $24 \times 48$  inches in size, enough pieces shall be taken to give the equivalent area.

12. *Tests.*

12a. *Atmospheric conditions.*—Tests for tensile strength, transverse breaking load, and deflection shall be made under prevailing atmospheric conditions except in the case of dispute. These tests shall then be made on samples conditioned for at least 24 hours at a relative humidity of 65 percent and at a temperature of  $70^{\circ}$  to  $75^{\circ}$  F.

12b. *Thermal conductivity.*—The guarded hot-plate method shall be the standard method for determination of thermal conductivity. The temperature of the surfaces of the material shall be regarded as that of the plates on each side. The test specimen shall be at least  $8 \times 8$  inches and the plate shall be applied in such a manner that the density and other physical characteristics of the material under test are not altered. The procedure shall be that recommended in the "Standard Method of Test for Thermal Conductivity of Materials by Means of the Guarded Hot Plate," adopted in July 1942, by the American Society of Heating and Ventilating Engineers, New York, N. Y. The apparatus may be the National Research Council plate or the National Bureau of Standards plate.

12c. *Transverse load.*—The transverse load shall be determined as follows: A specimen 3 inches wide and 18 inches long is taken for test. The transverse load is determined by placing the specimen on horizontal supports 12 inches apart and applying the load at midspan on a bearing parallel to the end supports, so that the head of the testing machine through which the load is applied moves at a rate of 12 inches per minute, plus or minus 2 inches, until the maximum load has been attained. The bearing and supports shall be rounded to a radius of approximately  $\frac{3}{8}$  inch to prevent injury to the specimen. Three specimens from the long direction of the board and three at right angles thereto shall be tested. The transverse load in each direction is the average of three specimens taken from that direction.

12d. *Deflection test.*—Deflection shall be determined at the time each specimen is under the minimum specified transverse load and at the time ultimate load is attained. The average of the deflections of three specimens from each direction shall meet both reflection requirements of its class as given in table 1.

12e. *Tensile strength.*—The test for tensile strength shall be as follows: From each sample, specimens 2 inches wide and not less than 10 inches long shall be clean-cut parallel to the longest direction of the board and at right angles thereto. The distance between clamps shall be not less than 6 inches. Results on specimens under test that break within  $\frac{1}{2}$  inch of the jaws shall be disregarded. The machine speed shall be set for the openings between the clamps at the rate of 2 inches per minute. The specimens before being placed in the testing machine shall be measured for width and thickness to the nearest 0.01 inch. The tensile strength shall be taken as the average of three specimens from each direction of the board.

12f. *Water absorption.*—A specimen  $12 \times 12$  inches shall be dried at  $160^{\circ}$  F for 24 hours and cooled to room temperature in a dry atmosphere. The thickness of the sample shall be measured and the volume calculated therefrom. The sample shall then be carefully weighed and submerged horizontally under 1 inch of distilled water maintained at a temperature of  $70^{\circ}$  F plus or minus  $5^{\circ}$  F. After 2 hours of submersion, the sample shall be stood on end to drain for 10 minutes, at the end of which time the excess surface water shall be removed by hand with a blotting paper or paper towel and the sample immediately weighed, the volume of absorbed water\* calculated, and the water absorption expressed in percent by volume based on the initial volume.

12g. *Linear expansion.*—The maximum linear expansion shall be determined in the following manner from a specimen  $3 \times 12$  inches that has been cut parallel with the long dimension of the board and from a like specimen cut at right angles thereto. At each of two points approximately 10 inches apart on the center line of each specimen a small area is coated by rubbing with a glass marking pencil (or a wax crayon). A fine cross mark is made with a razor blade on the center line in each of these two areas as reference points for the length measurements. The specimens are then conditioned for 24 hours at 50-percent relative humidity and a temperature of  $70^{\circ}$  to  $90^{\circ}$  F, and measurements are then made of the distance between the two reference points. A scale graduated in hundredths of an inch is used and readings are made with a magnifying lens to the nearest 0.005 inch. The specimens are next conditioned for 24 hours at 97-percent relative humidity and a temperature of  $70^{\circ}$  to  $90^{\circ}$  F, after which the distance between the two reference points is again measured. The measurements shall be made in the conditioned air specified in each case, or as quickly as possible after each specimen is removed therefrom. The linear expansion shall be reported as the increase in the length between reference marks as a percentage of the length at 50-percent relative humidity. (In the absence of other facilities, a convenient means of conditioning the specimens at the specified humidity conditions is to expose them in an enclosed space immediately above saturated solutions of suitable salts, such as sodium dichromate ( $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$ ) for 50-percent relative humidity and potassium sulfate ( $\text{K}_2\text{SO}_4$ ) for 97-percent relative humidity.)

## PACKING AND LABELING

13. *Packing*.—Unless otherwise specified, the structural fiber insulating board shall be delivered in packages so constructed as to insure acceptance by common or other carriers for safe transportation at the lowest rate to the point of delivery.

14. *Marking*.—When specified, the shipping containers shall be marked with the name of the material, class, size, and quantity contained therein, as defined by the contract or order under which shipment is made, the name of the contractor and the number of the contract or order.

15. *Labeling*.—In order to assure the purchaser that he is getting structural fiber insulating board conforming to this commercial standard it is recommended that producers, either individually or in concert with their trade association or testing laboratories, issue a guarantee label containing the following wording:

This structural fiber insulating board is guaranteed by  
----- to meet all requirements of  
(Name of company)  
Commercial Standard CS42-43, as issued by the Na-  
tional Bureau of Standards, United States Department  
of Commerce.

16. Purchasers should specify the class, purpose for which used, dimensions, and kind of surface desired; also whether cemented, stapled or stitched joining of plies is desired in boards 1 inch in thickness and over. Under Class *C* (Roof-Insulation Board), when other than square-edge finish is desired, the kind desired should be specified. (See paragraph 6c.).

## EFFECTIVE DATE

The standard is effective for new production from August 25, 1943.

## STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the committee.

FRANK B. ROWLEY (chairman), University of Minnesota, Minneapolis, Minn.  
ALLEN E. PEARCE, Armstrong Cork & Insulation Co., Lancaster, Pa.  
R. T. MILLER, Masonite Corporation, 111 W. Washington St., Chicago, Ill.  
HERMAN W. STEIN, The Celotex Corporation, 1205 La Salle Bldg., Chicago, Ill.  
A. S. BULL, The Insulite Co., Builder Exchange Building., Minneapolis, Minn.  
RUSSELL E. BACKSTROM, Wood Conversion Co., First National Bank Building, St. Paul, Minn.  
O. W. FROST, U. S. Gypsum Co., 300 W. Adams St., Chicago, Ill.  
THEODORE I. COE, American Institute of Architects, 4000 Cathedral Avenue., N. W., Washington, D. C.



M. S. VAN DUSEN, National Bureau of Standards, Washington, D. C.  
J. C. PEEBLES, Armour Research Foundation, 35 W. 33d St., Chicago, Ill.  
H. R. NORTHUP, National Retail Lumber Dealers Association, 1713 Rhode Island Ave., N. W., Washington, D. C.  
S. PERCY THOMPSON, (representing National Retail Lumber Dealers Association) 807 15th St., N. W., Washington, D. C.  
GEORGE LANDIS WILSON, Roofing Contractors Association of Cook County, 2621 N. Halsted St., Chicago, Ill.

## HISTORY OF PROJECT

Pursuant to a request from manufacturers of fiber insulating board, a general conference of manufacturers, distributors, and users of this product was held in Chicago, Ill., on May 16, 1932, at which time the recommended standard was approved for circulation to the trade for acceptance. Following written acceptance from a satisfactory majority, the standard was promulgated as CS42-32, to become effective for new production on November 15, 1943.

### FIRST REVISION

At the request of a manufacturer of laminated insulation board, the standing committee considered the standard for revision late in 1934 with special reference to the temperature of drying preparatory to determining thermal conductivity. While the committee believed that there was no need for general revision of the standard, it approved, as an amendment, a reduction of the drying temperature from 220° to 160° F for those types of boards which are injured by the higher temperature. The recommendation of the standing committee was circulated to the industry June 24, 1935, and, in the absence of opposition, it was incorporated in the second edition of this standard CS42-35.

### SECOND REVISION

On February 24, 1943, the Insulation Board Institute submitted a proposed revision which included requirements for five classes of structural fiber insulating board, as compared with two classes covered in the previous edition. Upon approval by the standard committee, the recommended revision was submitted on April 12, 1943 to the trade for written acceptance. Following acceptance by a preponderant majority, the establishment of the revision was announced on July 24, 1943 as Commercial Standard CS42-43.



## ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date \_\_\_\_\_

Division of Trade Standards,  
National Bureau of Standards,  
Washington, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS42-43 as our standard of practice in the

Production <sup>1</sup>                      Distribution <sup>1</sup>                      Use <sup>1</sup>                      Testing <sup>1</sup>  
of structural fiber insulating board.

We will assist in securing its general recognition and use, and will cooperate with the standing committee to effect revisions of the standard when necessary.

Signature of individual officer \_\_\_\_\_  
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer \_\_\_\_\_

Organization \_\_\_\_\_  
(Fill in exactly as it should be listed)

Street address \_\_\_\_\_

City and State \_\_\_\_\_

<sup>1</sup> Please designate which group you represent by drawing lines through the other three. Please file separate acceptances for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade papers, colleges, etc., desiring to record their general approval, the words "in principle" should be added after the signature.

## TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold: first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active, valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

## ACCEPTORS

The organizations and individuals listed below have accepted this commercial standard as their standard of practice in the production, distribution, and use of structural fiber insulating board. Such endorsement does not signify that they may not find it necessary to deviate from the standard, nor that producers so listed guarantee all all of their products in this field to conform with the requirements of this standard. Therefore, specific evidence of conformity should be obtained where required.

## ASSOCIATIONS

American Institute of Refrigeration, Chicago, Ill. (In principle.)  
 American Specification Institute, Chicago, Ill.  
 Arizona Retail Lumber & Builders' Supply Association, Inc., Phoenix, Ariz.  
 Carolina Lumber & Building Supply Association, Charlotte, N. C. (In principle.)  
 Insulation Board Institute, Chicago, Ill.  
 Michigan Retail Lumber Dealers' Association, Lansing 68, Mich.  
 Producers' Council, Inc., The, Washington, D. C. (In principle.)  
 Southern California Retail Lumber Association, San Diego, Calif.  
 Wisconsin Retail Lumbermen's Association, Milwaukee, Wis.

## FIRMS

Adams, Franklin O., Tampa, Fla.  
 Allen, George W., La Porte, Ind.  
 Altfillisch, Charles, Decorah, Iowa.  
 Anderson Show Case Manufacturing Co., Minneapolis, Minn.  
 Andrews, Jones, Biscoe & Whitmore, Boston, Mass.  
 Angelina County Lumber Co., Keltys, Tex.  
 Antrim Lumber Co., St. Louis, Mo.  
 Armour Research Foundation, Chicago, Ill.  
 Armstrong Cork Co., Lancaster, Pa.  
 Augusta Lumber Co., Augusta, Ga.  
 Auler, Jensen & Brown, Oshkosh, Wis.  
 Baird Co., David, Camden, N. J.  
 Baldridge Lumber Co., J. C., Albuquerque, N. Mex.  
 Baltimore, City of, Bureau of Plans & Surveys, Baltimore, Md.  
 Barr Lumber Co., Santa Ana, Calif.  
 Baxter, C. B., Kansas City, Mo.  
 Beaver Falls Planing Mill Co., Beaver Falls, Pa.  
 Behrend, Jacob, Philadelphia, Pa.  
 Belli, Edo J., Chicago, Ill.

Berger, F. E.-R. L. Kelley, Champaign, Ill.  
 Berkshire Lumber Co., Pittsfield, Mass.  
 Beuttler, Wm., Sioux City, Iowa.  
 Bickford, Robert Turner, Elmira, N. Y.  
 Binda & Bial, Union City, N. J.  
 Bird & Son, Inc., East Walpole, Mass.  
 Bishop, Horatio W., La Mesa, Calif.  
 Blacker & Shepard Co., Boston, Mass.  
 Blake, Edgar Ovet, Evanston, Ill. (In principle.)  
 Blithe, Wesley Leshner, Philadelphia, Pa.  
 Boehm, George A., New York, N. Y.  
 Bogner, Harry, Milwaukee, Wis.  
 Botsford Lumber Co., Winona, Minn.  
 Bowser Morner Testing Laboratories, Dayton, Ohio.  
 Brattin & Son, F. J., Shepherd, Mich.  
 Brazer, Clarence W., New York, N. Y.  
 Brunswick Balke Collender Co., The, Muskegon, Mich. (In principle.)  
 Brust & Brust, Milwaukee, Wis.  
 Bucky, Fred W., Jr., Jacksonville, Fla.  
 Buffalo, City of, Division of Buildings-Architectural Service, Department of Public Works, Buffalo, N. Y.  
 Builders Supply Co., Bismarck, N. Dak.  
 Building Service, Inc., Great Falls, Mont.  
 Building Supplies Corporation, Norfolk, Va.  
 C & M Construction Co., Inc., Philadelphia, Pa.  
 California Builders Supply Co., Ltd., Oakland, Calif.  
 Cameron Lumber Co., Inc., Newburgh, N. Y.  
 Camlet, J. Thomas, Passaic, N. J.  
 Cannon & Mullen, Salt Lake City, Utah.  
 Carder, Macon O., Amarillo, Tex.  
 Carhart Lumber Co., Wayne, Nebr.  
 Carolina Builders Corporation, Raleigh, N. C.  
 Carroll, John, Ventnor, N. J.  
 Cavalier Corporation, Chattanooga, Tenn.



- Cellarius, Charles F., Cincinnati, Ohio.  
 Celotex Corporation, The, Chicago, Ill.  
 Chapin, Rollin C., Minneapolis, Minn.  
 (In principle.)  
 Chapin Lumber Co., The, Aurora, Colo.  
 Charlottesville Lumber Co., Inc., Charlottesville, Va.  
 Coe Manufacturing Co., New York, N. Y.  
 Conrad & Cummings, Binghamton, N. Y.  
 Coolidge, Shepley, Bulfinch & Abbott, Boston, Mass.  
 Cooper, David M., Ambridge, Pa.  
 Cottonwood Lumber Co., Cottonwood, Ariz.  
 Cram & Ferguson, Boston, Mass.  
 Crowell & Lancaster, Bangor, Maine.  
 Cunningham, Lamb & Prince, Inc., Charlestown, Mass.  
 De Jarnette, Charles Wagner, Des Moines, Iowa.  
 Dearstine Lumber Co., J. C., Schenectady, N. Y.  
 Detroit Testing Laboratory, The, Detroit, Mich. (In principle.)  
 Dickey Associates, C. W., Honolulu, Hawaii.  
 Dix Lumber Co., North Cambridge, Mass.  
 Doak Lumber Co., Greeneville, Tenn.  
 Dods Lumber Co., Omaha, Nebr.  
 Donovan, John J., Berkeley, Calif.  
 Dover Lumber Co., Dover, N. J.  
 East Bay Refrigerator & Fixture Co., Oakland, Calif.  
 Electrical Testing Laboratories, Inc., New York, N. Y.  
 Erdelen, Arthur F., St. Louis, Mo. (In principle.)  
 Everett & Associates, H. F., Allentown, Pa.  
 Exchange Lumber Co., Inc., Rochester, N. Y.  
 Fedders Manufacturing Co., Inc., Buffalo, N. Y.  
 Fetzter & Fetzter, Salt Lake City, Utah.  
 Fir-Tex Insulating Board Co., Portland 4, Oreg.  
 Flannagan, Eric G., Henderson, N. C.  
 Flintkote Co., The, New York 20, N. Y.  
 Florida, University of, School of Forestry, Gainesville, Fla.  
 Fort Wayne Builders Supply Co., Fort Wayne, Ind.  
 Furer, William C., Honolulu 54, Hawaii.  
 Gall, Harry L. C., New York, N. Y.  
 General Millwork Corporation, Utica, N. Y.  
 Gibb, Arthur N., Ithaca, N. Y.  
 Gibbs Lumber Co., Anaheim, Calif.  
 Giusti & Co., S. A., San Francisco, Calif.  
 Guernsey-Westbrook Co., The, Hartford, Conn.  
 Hahn, Stanley W., Silver Spring, Md.  
 Hallack & Howard Lumber Co., The, Denver, Colo.  
 Hannaford & Sons, Samuel, Cincinnati, Ohio.  
 Haralson & Mott, Fort Smith, Ark.  
 Harder Refrigerator Corporation, Cobleskill, N. Y.  
 Harrison Co., The W. H., Grand Island, Nebr.  
 Hartung Co., F. L., Seattle, Wash.  
 Hassess, Carlisle D., Harrisburg, Pa.  
 Hawaiian Cane Products, Ltd., San Francisco, Calif., and Honolulu, Hawaii.  
 Hawkins Lumber & Warehouse Co., Boston, Mass.  
 Haxby & Bissell, Minneapolis, Minn.  
 Heidritter Lumber Corporation, Elizabeth, N. J.  
 Henshaw Refrigeration & Fixture Co., San Francisco, Calif.  
 Herrick Refrigerator Co., Waterloo, Iowa.  
 Higgins, Charles H., New York, N. Y.  
 Hines Lumber Co., Edward, Chicago, Ill.  
 Hoffman & Baldwin, West Chester, Pa.  
 Hoffmann Lumber Co., Pittsburgh, Pa.  
 Holcomb & Hoke Manufacturing Co., Indianapolis, Ind.  
 Holsman & Holsman, Chicago, Ill.  
 Hope, Frank L., Jr., San Diego, Calif.  
 Hopkins, Albert Hart, Niagara Falls, N. Y.  
 Houkom, S. M., Fargo, N. Dak.  
 Houston Lumber Co., The A. C., Wichita, Kans.  
 Huber-Lanctot Housewrecking Corporation, Buffalo, N. Y.  
 Hunt Co., Robert W., Chicago, Ill.  
 Hunter Lumber Co., Chillicothe, Ill.  
 Illinois, University of, Department of Architecture, Urbana, Ill. (In principle.)  
 Interior Lumber & Fuel Co., Fargo, N. Dak.  
 Interstate Lumber Co., Missoula, Mont.  
 Iowa Builders Supply Co., Cedar Rapids, Iowa.  
 Ivey, Inc., Edwin J., Seattle, Wash.  
 Jefferson Wood Products Co., Jefferson, Wis.  
 Johns-Manville Sales Corporation, New York, N. Y.  
 Johnson, Wallwork & Dukehart, Portland, Oreg.  
 Kahn Associated Architects & Engineers, Inc., Albert, Detroit, Mich.  
 Kansas State College, Department of Architecture, Manhattan, Kans.  
 Karcher & Smith, Philadelphia, Pa. (In principle.)  
 Keich & O'Brien, Warren, Ohio.  
 Kenosha Lumber & Coal Co., Kenosha, Wis.  
 Kentucky Lumber Co., Louisville, Ky.

- Kilham, Hopkins & Greeley, Boston, Mass. (In principle.)
- Koch Butchers' Supply Co., The, Koch Refrigerators Division, North Kansas City, Mo.
- Kohn, Robert D., Charles Butler, New York, N. Y.
- Kyle, Herbert S., Charleston, W. Va. (In principle.)
- Lambert Lumber Co., Leavenworth, Kans.
- Lander Lumber Co., El Paso, Tex.
- Larrick, Thomas, Athens, Ohio.
- Latenser & Sons, John, Omaha, Nebr.
- Law, Law & Potter, Madison, Wis.
- Lawrence & Allyn, Portland, Oreg.
- Lee, W. H., Philadelphia, Pa.
- Levy, Will, St. Louis, Mo.
- Lewis Lumber Co., Spring Lake, N. J.
- Loeb, Laurence M., White Plains, N. Y.
- Loizeaux Lumber Co., J. D., Plainfield, N. J.
- Los Angeles, City of, Los Angeles, Calif.
- Lovell-Denniston Lumber Co., Eldora, Iowa.
- Lyman-Hawkins Lumber Co., Akron, Ohio.
- Mackemer Lumber Co., R. G., Macomb, Ill.
- Maizewood Insulation Co., Dubuque, Iowa.
- Mann & Co., Hutchinson, Kans.
- Markland Contracting Co., M. B., Atlantic City, N. J.
- Marshall Wright Lumber Co., Ionia, Mich.
- Martin, Edgar, Chicago, Ill.
- Mason & Co., George D., Detroit, Mich.
- Masonite Corporation, Chicago, Ill.
- Matot, Inc., D. A., Chicago, Ill.
- Mauk Lumber Co., The C. A., Toledo, Ohio.
- Mauran, Russell, Crowell & Mullgardt, St. Louis, Mo.
- Merrell Lumber Co., Brigham City, Utah.
- Merrill-Schaaf Lumber Co., Pierre, S. Dak.
- Michigan Wholesalers, Inc., Fort Wayne, Ind.
- Mid-West Lumber Co., The, Mankato, Kans.
- Midwest Lumber Co., Dubuque, Iowa.
- Miles Lumber & Coal Co., A. W., Livingston, Mont.
- Miller & Yeager, Terre Haute, Ind.
- Minnesota Department of Highways, Saint Paul, Minn.
- Minnesota & Ontario Paper Co., Insulate Division, Minneapolis, Minn.
- Mock & Morrison, Tacoma, Wash.
- Modern Refrigerator Works, Glendale, 3, Calif.
- Moore Dry Dock Co., Oakland, Calif.
- Mooser, William, San Francisco, Calif.
- Morrison-Merrill & Co., Salt Lake City, Utah.
- Mueller, Hair & Hetterich, Hamilton, Ohio.
- Muhlenberg Bros., Reading, Pa.
- Nassau Suffolk Lumber & Supply Corporation, Amityville, N. Y.
- National Gypsum Co., Buffalo, N. Y.
- Nebraska, University of, Mechanical Engineering Department, Lincoln, Nebr.
- Nelson, Albert L., Saint Louis, Mo.
- New Rochelle Coal & Lumber Co., New Rochelle, N. Y.
- Northwest Supplies Co., Minneapolis, Minn.
- O & N Lumber Co., Menomonie, Wis.
- Officer, Gwynn, Berkeley, Calif.
- Oregon State College, Corvallis, Oreg.
- Orth, H. W., Saint Paul, Minn. (In principle.)
- Patzig Testing Laboratories, Des Moines, Iowa.
- Pehrson, G. A., Spokane, Wash.
- Pennsylvania Lumberman, Scranton, Pa.
- Pennsylvania State College, The, Department of Forestry, State College, Pa. (In principle.)
- Pepper, George W., Jr., Philadelphia, Pa.
- Percival Co., C. L., Boone, Iowa.
- Perlin Lumber Co., Brooklyn, N. Y.
- Pittsburgh, City of, The Board of Public Education, Pittsburgh, Pa.
- Pittsburgh Testing Laboratory, Pittsburgh, Pa.
- Platt & Bro., F. P., New York, N. Y.
- Prentiss Wabers Products Co., Wisconsin Rapids, Wis.
- Puffer-Hubbard Manufacturing Co., Grand Haven, Mich.
- Purves & Cope, Philadelphia, Pa.
- Rather, J. T., Jr., Houston, Tex.
- Resnikoff, Abraham, New York, N. Y.
- Richardson Phelps Lumber Co., Grinnell, Iowa.
- Ritchie & Associates, James H., Boston, Mass.
- Robert & Co., Inc., Atlanta, Ga.
- Rodgers Refrigerator Works, Fay, Memphis, Tenn.
- Rosenberger & Co., Inc., John W., Winchester, Va.
- Santa Fe Lumber Co., San Francisco, Calif.
- Schulzke, William H., Moline, Ill.
- Searle & Chapin Lumber Co., Lincoln, Nebr.
- Sears, Roebuck & Co., Chicago, Ill.
- Shanley, George H., Great Falls, Mont.
- Short & Walls Lumber Co., Middletown, Del.
- Simons Lumber Co., Henry, Minneapolis, Minn.
- Smith Lumber Co., Fred A., Rockford, Ill.
- Smith & Sons, J. E., Philadelphia, Pa.
- Smoot-Holman Co., Inglewood, Calif.

- Snow Lumber Co., High Point, N. C.  
 Solie Lumber Co., Janesville, Wis.  
 South Side Lumber & Supply Co., The, Toledo, Ohio.  
 Sowers-Benbow Lumber Co., The, Columbus, Ohio.  
 Spahn & Rose Lumber Co., Dubuque, Iowa.  
 Specification Record, Chicago, Ill.  
 Spencer Lumber Co., Gastonia, N. C.  
 Standard Lumber Co., Spokane, Wash.  
 Standard Lumber Yards, Inc., Green Bay, Wis.  
 Stewart Lumber Co., A. P., Thermopolis, Wyo.  
 Stockton Lumber Co., Inc., Stockton, Calif.  
 Stoetzel, Ralph E., Chicago, Ill.  
 Strong & Hale Lumber Co., The, Portland, Conn.  
 Sweets Catalog Service, New York, N. Y. (In principle.)  
 Taylor, Ellery K., Haddonfield, N. J.  
 Taylor, Edward Cray & Ellis Wing, Los Angeles, Calif.  
 Texas Tech. College, Lubbock, Tex. (In principle.)  
 Thompson Lumber Co., Champaign, Ill.  
 Thompson Lumber Co., Minneapolis, Minn.  
 Thorne, Henry Calder, Ithaca, N. Y.  
 Trane Co., The, La Crosse, Wis.  
 United States Gypsum Co., Chicago, Ill.  
 United States Machinery Co., Inc., New York, N. Y.  
 United States Testing Co., Inc., Hoboken, N. J. (In principle.)  
 Velde Lumber Co., Pekin, Ill.  
 Vickere Lumber Co., T. W., Sheridan, Wyo.  
 Viking Refrigerators, Inc., Kansas City, Mo.  
 Virginia Polytechnic Institute, Blacksburg, Va.  
 Voell, Richard F., Alexandria, Va.  
 Walsh, Louis A., Waterbury 5, Conn.  
 Ware & McClenahan, Salt Lake City, Utah.  
 Weaver, Rudolph, Gainesville, Fla.  
 Welch, Carroll E., Huntington, N. Y.  
 Wenner & Fink, Philadelphia, Pa.  
 West, Albert E., Boston, Mass.  
 Westernman Lumber Co., H. E., Montgomery, Minn.  
 Western Electric Co., Inc., New York, N. Y.  
 Wholesale Building Supply, Inc., Oakland, Calif.  
 Wholesale Distributing Co., Pittsburgh, Pa.  
 Willatsen, Andrew, Seattle, Wash.  
 Willson, Fred F., Bozeman, Mont.  
 Wilson, Adrian, Los Angeles, Calif.  
 Wilson & Greene Lumber Co., Syracuse, N. Y.  
 Wischmeyer, William F., Saint Louis, Mo.  
 Wood Conversion Co., Saint Paul, Minn.  
 Wood & Son Associates, Edward J., Clarksburg, W. Va.  
 Wright & Wright, Detroit, Mich. (In principle.)  
 Young & Richardson, Seattle, Wash.  
 Zimmerman, A. C., Pasadena 8, Calif.  
 Zimmermann Lumber, Inc., Buffalo, N. Y.  
 Zipp Lumber Co., George T., Petoskey, Mich.

## U. S. GOVERNMENT

- Agriculture, Department of, Washington, D. C.  
 Federal Housing Administration, Washington, D. C.  
 Federal Public Housing Authority, Washington, D. C.  
 Federal Works Agency, Public Buildings Administration, Washington, D. C. (In principle.)  
 Interior, Department of, Office of Indian Affairs, Chicago, Ill., and Salt Lake City, Utah.  
 Justice, Department of, Bureau of Prisons, Washington, D. C.  
 U. S. Naval Drydocks, San Francisco, Calif.  
 Veterans' Administration, Washington, D. C.  
 War Department, U. S. Engineers Office, Syracuse, N. Y.



## COMMERCIAL STANDARDS

CS No.	Item
0-40.	Commercial standards and their value to business (third edition).
1-42.	Clinical thermometers (third edition).
2-30.	Mopsticks.
3-40.	Stoddard solvent (third edition).
4-29.	Staple porcelain (all-clay) plumbing fixtures.
5-40.	Pipe nipples, brass, copper, steel, and wrought iron.
6-31.	Wrought-iron pipe nipples (second edition). Superseded by CS5-40.
7-29.	Standard weight malleable iron or steel screwed unions.
8-41.	Gage blanks (third edition).
9-33.	Builders' template hardware (second edition).
10-29.	Brass pipe nipples. Superseded by CS5-40.
11-41.	Moisture regains of cotton yarns (second edition).
12-40.	Fuel oils (fifth edition).
13-42.	Dress patterns (third edition).
14-43.	Boys' button-on waists, shirts, junior and sport shirts (made from woven fabrics) (third edition).
(E) 15-43.1	Men's pajamas (made from woven fabrics) (second edition).
16-29.	Wall paper.
17-42.	Diamond core drill fittings (third edition).
18-29.	Hickory golf shafts.
19-32.	Foundry patterns of wood (second edition).
20-42.	Staple vitreous china plumbing fixtures (third edition).
21-39.	Interchangeable ground-glass joints, stop-cocks, and stoppers (fourth edition).
22-40.	Builders' hardware (nontemplate) (second edition).
23-30.	Feldspar.
24-43.	Screw threads and tap-drill sizes.
25-30.	Special screw threads. Superseded by CS24-43.
26-30.	Aromatic red cedar closet lining.
27-36.	Mirrors (second edition).
28-32.	Cotton fabric tents, tarpaulins, and covers.
29-31.	Staple seats for water-closet bowls.
30-31.	Colors for sanitary ware.
31-38.	Wood shingles (fourth edition).
32-31.	Cotton cloth for rubber and pyroxylin coating.
33-43.	Knit underwear (exclusive of rayon) (second edition).
34-31.	Bag, case, and strap leather.
35-42.	Plywood (hardwood and eastern red cedar) (second edition).
36-33.	Fourdrinier wire cloth (second edition).
37-31.	Steel bone plates and screws.
38-32.	Hospital rubber sheeting.
39-37.	Wool and part-wool blankets (second edition). (Withdrawn as commercial standard, July 14, 1941).
40-32.	Surgeons' rubber gloves.
41-32.	Surgeons' latex gloves.
42-43.	Structural fiber insulating board (third edition).
43-32.	Grading of sulphonated oils.
44-32.	Apple wraps.
45-42.	Douglas fir plywood (fifth edition).
46-40.	Hosiery lengths and sizes (third edition).
47-34.	Marking of gold-filled and rolled-gold-plate articles other than watchcases.
48-40.	Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).
49-34.	Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
50-34.	Binders board for bookbinding and other purposes.

CS No.	Item
51-35.	Marking articles made of silver in combination with gold.
52-35.	Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
53-35.	Colors and finishes for cast stone.
54-35.	Mattresses for hospitals.
55-35.	Mattresses for institutions.
56-41.	Oak flooring (second edition).
57-40.	Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).
58-36.	Woven elastic fabrics for use in overalls (overall elastic webbing).
59-41.	Woven textile fabrics—testing and reporting (third edition).
60-36.	Hardwood dimension lumber.
61-37.	Wood-slat venetian blinds.
62-38.	Colors for kitchen accessories.
63-38.	Colors for bathroom accessories.
64-37.	Walnut veneers.
65-43.	Methods of analysis and of reporting fiber composition of textile products (second edition).
66-38.	Marking of articles made wholly or in part of platinum.
67-38.	Marking articles made of karat gold.
68-38.	Liquid hypochlorite disinfectant, deodorant, and germicide.
69-38.	Pine oil disinfectant.
70-41.	Phenolic disinfectant (emulsifying type) (second edition) (published with CS71-41).
71-41.	Phenolic disinfectant (soluble type) (second edition) (published with CS70-41).
72-38.	Household insecticide (liquid spray type).
73-43.	Old growth Douglas fir standard stock doors (second edition).
74-39.	Solid hardwood wall paneling.
75-42.	Automatic mechanical draft oil burners designed for domestic installations (second edition).
76-39.	Hardwood interior trim and molding.
77-40.	Sanitary cast-iron enameled ware.
78-40.	Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).
79-40.	Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78-40).
80-41.	Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
81-41.	Adverse-weather lamps for vehicles (after market).
82-41.	Inner-controlled spotlamps for vehicles (after market).
83-41.	Clearance, marker, and identification lamps for vehicles (after market).
84-41.	Electric tail lamps for vehicles (after market).
85-41.	Electric license-plate lamps for vehicles (after market).
86-41.	Electric stop lamps for vehicles (after market).
87-41.	Red electric warning lanterns.
88-41.	Liquid-burning flares.
89-40.	Hardwood stair treads and risers.
90- .	(Reserved for power shovels and cranes.)
91-41.	Factory-fitted Douglas fir entrance doors.
92-41.	Cedar, cypress, and redwood tank stock lumber.
93-41.	Portable electric drills (exclusive of high frequency).
94-41.	Calking lead.
95-41.	Lead pipe.
96-41.	Lead traps and bends.

CS No.	Item	CS No.	Item
97-42.	Electric supplementary driving and passing lamps for vehicles (after market).	103-42.	Cotton and rayon velour (jacquard and plain).
98-42.	Artists' oil paints.	(E) 104-43. <sup>1</sup>	Warm-air furnaces equipped with vaporizing pot-type oil burners.
99-42.	Gas floor furnaces—gravity circulating type.	105-43.	Mineral wool; loose, granulated, or felted form, in low-temperature installations.
100-42.	Multiple-coated, porcelain-enameled steel utensils.	(E) 106-43. <sup>1</sup>	Boys' pajamas (made from woven fabrics).
101-43.	Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.	(E) 107-43. <sup>1</sup>	Commercial electric-refrigeration condensing units.
102-	(Reserved for Diesel and fuel-oil engines.)	108-43.	Treading automobile and truck tires.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Division of Trade Standards, National Bureau of Standards, Washington, D. C.

<sup>1</sup> Where "(E)" precedes the CS number, it indicates an emergency commercial standard, drafted under war conditions with a view toward early revision.

