U. S. DEPARTMENT OF COMMERCE
JESSE H. JONES, Secretary
NATIONAL BUREAU OF STANDARDS
LYMAN J. BRIGGS, Director

EARTHENWARE (VITREOUS-GLAZED) PLUMBING FIXTURES

COMMERCIAL STANDARD CS111-43

Effective Date for New Production from October 15, 1943

A RECORDED VOLUNTARY STANDARD
OF THE TRADE

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PROMULGATION

of

COMMERCIAL STANDARD CS111–43

for

EARTHENWARE (VITREOUS-GLAZED) PLUMBING FIXTURES

On February 20, 1943, at the instance of Crane Co. and General Ceramics Co., a proposed commercial standard for earthenware (vitreous-glazed) plumbing fixtures was circulated to leading distributors, user organizations, Government agencies, and to manufacturers, for comment. Following adjustment in the light of the comment, the proposed commercial standard was circulated on July 26, 1943, to the entire trade for written acceptance.

Those concerned have since accepted and approved the revised standard as shown herein, for promulgation by the U. S. Department of Commerce, through the National Bureau of Standards.

The standard is effective for new production from October 15, 1943.

Promulgation recommended.

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

Promulgated.

Lyman J. Briggs,
Director, National Bureau of Standards.

Promulgation approved.

Jesse H. Jones,
Secretary of Commerce.

EARTHENWARE (VITREOUS-GLAZED) PLUMBING FIXTURES

COMMERCIAL STANDARD CS111–43

PURPOSE

1. The purpose of this commercial standard is to establish, for the guidance of manufacturers, distributors, and users, standard minimum requirements for the significant characteristics of earthenware (vitreous-glazed) plumbing fixtures. The standard provides a basic specification for the product, and also provides for certifying conformity with the requirements, thereby giving assurance of the quality of the product, as determined by tests and inspection made at the source, and subject to verification upon delivery.

SCOPE

2. This standard covers earthenware (vitreous-glazed) plumbing fixture items, such as bath tubs, lavatories, kitchen sinks, laundry trays, and similar products. The requirements cover properties of the material, methods of test, method of inspection, grading, definitions, and labeling of items which meet the standard.

GENERAL REQUIREMENTS

3. *Material.*—The fixtures shall be of earthenware having a vitreous glaze thoroughly fused and united to the body.

4. *Body and glaze.*—The body, upon fracture, shall appear dense, homogeneous, and fine-grained in structure. All visible surfaces of the body shall be glazed. Surfaces coming in contact with wall or floor and the underside of lavatories, sinks, laundry trays, bath tubs, shower receptors, and points where fixtures are supported in the kiln may be unglazed, but such unglazed surfaces shall be in positions not visible when installed in the normal manner. The glaze shall have a high gloss, and shall be white, except for colored ware.

5. *Coatings for unglazed surfaces of body.*—The following surfaces of fixtures, when not covered with glaze, shall be painted with a waterproof protective coating:

1. Surfaces which contact the floor when in normal use.
2. Areas for a distance of not less than 2 inches around an opening.
3. All walls of openings made in a fixture after it has been glazed.

6. *Physical properties determined by test.*—The properties of the ware shall be such as to meet the tests given herein for warpage, crazing, thermal shock, absorption, modulus of rupture, and reflectance. (See pars. 10 to 15.)

BLEMISHES

7. Fixtures shall be free from blemishes and defects to the extent specified in tables 1 and 2, and shall meet all other applicable requirements of this standard.

8. It is not commercially practicable to produce ware entirely free from blemishes. All ware is carefully inspected in manufacture, and the imperfections allowed are caused by unavoidable conditions in the manufacturing process. These imperfections do not affect the utility of the fixtures and do not make them unsafe from health or sanitary considerations.

TABLE 1.—*Maximum blemishes for lavatories*

[See method of inspection and definitions given herein]

Blemish or defect	Maximum permitted
LOCATION: GENERAL	
Dunts	None allowed.
Craze	Do.
Warpage	Warpage of slab out of horizontal plane not to exceed ¼ inch on all sizes. (The same allowable deviation to apply to lavatories with back, when attached to wall.)
LOCATION: VISIBLE SURFACE	
Dull or eggshell finish	One allowed, not over ½ inch.
Exposed body	None allowed.
Fire check	Do.
Spots, blisters, and pinholes.	No segregation; a total of not more than four.
Bubbles and specks	Do.
Polishing mark	Not more than two allowed.

TABLE 2.—*Maximum blemishes for sinks, bath tubs, urinals, laundry trays, pedestals, legs, and similar fixtures*

Blemish or defect	Maximum permitted
LOCATION: GENERAL	
Dull or eggshell finish	Not over 4 square inches.
Warpage	Not more than ¼ inch per foot; total warpage not more than ½ inch.
Large blisters	Not more than two.
Dunts	None allowed.
Projections	Do.
LOCATION: VISIBLE SURFACE	
Exposed body	None allowed.
Fire check	Do.
Spots, blisters, and pinholes.	No segregation; a total of not over 10.
Bubbles or specks	Not over 10 in 1 "pottery square"; a total of not over 25.

METHODS OF INSPECTION AND TEST

9. *Inspection.*—The surface being inspected shall be at a distance of about 2 feet from the eyes of the observer. The light source shall be partially diffused daylight, supplemented, if necessary, with diffused

artificial light, the total being of intensity approximating that usually available within a few feet of an outside window but not in direct sunlight. It is not intended that inspectors shall measure or count blemishes except in case of doubt, since, with practice, dimensional limits and numbers can be readily gaged by eye. Some waviness in a glazed surface is unavoidable and is not cause for rejection.

10. *Method of determining warpage.*—The fixture is placed on a flat surface so as to ascertain the amount of deviation from the horizontal plane that exists at the edges of the fixture. If a feeler gage of thickness equal to the total allowable warpage will not slide under the fixture without forcing, the fixture satisfactorily comes within the warpage limitations. If the fixture will rock on two opposite high corners, the horizontal plane shall be determined by placing one feeler gage of the total warpage allowed under one low corner and forcing the fixture down on this gage. If a second feeler gage of the same thickness will not slide under the fixture at any other point, the fixture is not warped out of the horizontal plane by more than the specified tolerance and satisfactorily comes within the warpage limitations.

11. *Tests for crazing.*—Earthenware (vitreous-glazed) fixtures shall withstand, without cracking or crazing, immersion for 14 days (24 hours each) in constantly boiling water at atmospheric pressure. The fixture shall be totally immersed, shall be removed each day for inspection, and shall be immediately returned to the boiling water if no evidence of failure is discernible. As an alternative to the above boiling test, the following autoclave test may be used: Sample flat pieces of the ware having an area of not less than 16 square inches on one side shall be either cut or broken from fixtures, or when order for fixtures so specifies, sample pieces may be separately prepared, using the same batch of body and glaze materials used in making the fixtures they represent. Samples prepared separately shall be fired in the same kiln with the fixtures. Approximately two-thirds of the surface of separately prepared samples shall be glazed. The sample pieces shall be placed in an autoclave and subjected to a constant pressure of 75 pounds per square inch in saturated steam for 1 hour, after which time the pressure shall be released by opening the blow-off valve and the samples allowed to cool to room temperature in the autoclave. The samples shall be examined for cracking or crazing by applying a dye solution to the surface. After four cycles of the above test the sample shall show no cracking or crazing.

12. *Test for thermal shock.*—The plumbing fixture shall be filled with boiling water and the water kept at the boiling point until the material is heated throughout, after which the boiling water shall be quickly emptied from the fixture and the fixture immediately filled with ice water at a temperature of 38° F. The water shall be kept at 38° F, by the addition of ice, until the material is thoroughly cooled, after which the ice water shall be quickly emptied from the fixture and the cycle repeated. The plumbing fixture shall withstand at least 25 cycles without being injured.

13. *Test for absorption.*—The test sample shall consist of three fragments taken from any part of the fixture, each fragment having one of the two largest surfaces glazed, and approximately 12 square inches of unglazed surface area. Thickness shall be not more than 1⅛ inches. The pieces shall be dried to a constant weight at 230° ± 10° F

and shall then be stored in a desiccator until cooled to room temperature. After reaching room temperature, the specimens shall be weighed on a balance to an accuracy of 0.1 gram.

13a. The weighed pieces shall then be placed in distilled water in a suitable vessel and boiled for 2 hours. They shall be supported so as not to contact the heated bottom of the container. The pieces shall be allowed to remain in the water for 20 hours and cool to room temperature, then shall be dried slightly with a damp towel to remove excess water, and reweighed to an accuracy of 0.1 gram.

13b. The absorption shall be reported as a percentage of the weight of the dried sample, and is obtained by dividing the weight of the water absorbed, in grams, by the weight of the dried test piece, in grams, and multiplying by 100. The piece shall not absorb more than 15 percent of its own weight.

14. *Modulus of rupture.*—The modulus of rupture of the material shall be not less than 2,000 pounds per square inch, as determined from three bars of the material 1 inch square in cross section, mounted on supports 5½ inches apart, and loaded rapidly (approximately 10 lb/sec) at the midpoint.

14a. The material for the test bars shall be broken from a glazed part of the fixture and ground to a cross section 1 inch square. If the material is not of sufficient thickness for a fullsized test bar, the bar may be ground to rectangular shape 1 inch by as much as the thickness of the material will permit, but not less than 1 by ¾ inch. The glazed surface shall be on top when tested. When orders so specify, sample test bars may be separately prepared, using the same batch of body and glaze materials used in making the fixtures they represent and shall be heated in the same kiln with the fixture. Test bars prepared separately shall be 1 inch square and shall have one side glazed. The modulus of rupture shall be calculated from the formula

$$S=\frac{1.5PL}{bd^2},$$

in which

S=Modulus of rupture.
P=Total load.
L=Length of span.
b=Width of test bar, to the nearest 0.01 inch.
d=Depth of test bar, to the nearest 0.01 inch.

15. *Reflectance test.*—The 45°, 0° daylight luminous apparent reflectance of each white specimen tested shall be not less than 65 percent. The purpose of this test is to determine approximately what fraction of the daylight incident on a given specimen is diffusely reflected. The above quantity (for brevity referred to herein as reflectance) is measured in such a way that the specularly reflected component is left out of account. (Note.—An instrument such as the multi-purpose photoelectric reflectometer described in Research Paper RP1345, published in the National Bureau of Standards Journal of Research (November 1940) will prove suitable under the specified conditions.)

15a. *Area to be measured and precision of determinations.*—A flat, clean area not less than that of a circle 5 cm in diameter shall be measured in each reflectance determination. A determination shall

comprise a sufficient number of readings so that the average can be reproduced in successive determinations within a spread of 0.5 percent reflectance.

15b. *Reflectance standards.*—The primary standard (100 percent) shall be a magnesium-oxide panel prepared in the manner described in National Bureau of Standards Letter Circular LC547. The secondary, or working, standards actually used shall be porcelain-enameled plaques that have been accurately calibrated against magnesium oxide.

MARKING

16. *Marking.*—Each fixture shall be permanently and legibly marked under or into the glaze with the manufacturer's name, or with a registered trade mark by which the maker can be readily identified. Said marking shall be visible after the fixture is installed.

LABELING

17. In order that the purchaser may be assured that he is obtaining fixtures which meet this standard, ware conforming thereto may bear a label certifying conformity. The following uniform label is recommended:

> The manufacturer guarantees this earthenware (vitreous-glazed) plumbing fixture to meet the grading standards and tests of Commercial Standard CS111–43, as issued by the National Bureau of Standards of the United States Department of Commerce. If this fixture proves defective due to faulty workmanship or material within one year after installation, a new fixture of the same type and size will be furnished. No labor or consequential damages will be allowed.

NOMENCLATURE AND DEFINITIONS

Blister.—A raised portion of the surface 1/32 (0.031) inch and less than 1/8 (0.125) inch in maximum dimension.

Large blister.—A raised portion of the surface 1/8 (0.125) inch to 1/4 (0.25) inch, inclusive, in maximum dimension.

Bubble.—A raised portion of the surface or a sand speck smaller than 1/32 (0.031) inch in maximum dimension.

Craze.—Fine cracks in the glaze.

Discoloration.—A single colored spot over 1/4 (0.25) inch in diameter or a sufficient number of *spots* to give the effect of a change in color. Faint-green spots are not classified as discoloration.

Dull or eggshell finish.—Dead or flat finish. Undeveloped glaze. Slightly matted. A semiglazed finish with appearance of numerous very fine pinholes. Not glossy.

Dunt.—A hairline fracture extending through the body caused by strains set up in the process of manufacture.

Exposed body.—Unglazed portion 1/16 (0.063) inch or more in maximum dimension.

Fire check.—Fine, shallow crack in the body, not covered with glaze. (When sufficiently covered with glaze as to be easily cleaned, it is not detrimental.)

Kiln support marks.—Large unglazed surfaces resulting from blocks necessary to support the ware while firing.

Pinhole.—Unglazed portion of body, or small hole under 1/16 (0.063) inch in diameter.

Polishing mark.—A spot where some minor blemish has been ground off and surface polished and with an area not greater than that of a 3/8 (0.375) inch circle.

Pottery square.—A square 2 inches on a side. For grading purposes, it may be a 2-inch square hole cut in a small sheet of any flexible material, such as rubber or paper, for convenience in sliding over irregular surfaces to determine segregations.

Projection.—A raised portion of the surface over 1/4 (0.25) inch in maximum dimension.

Segregation.—More than four spots, blisters, or pinholes in any *pottery square.*

Speck.—A colored portion less than 1/32 (0.031) inch in maximum dimension. Specks less than 1/100 (0.01) inch in maximum dimension, unless in sufficient number to form a discoloration, are not counted.

Spot.—Colored portion of the surface 1/32 (0.031) inch and less than 1/8 (0.125) inch in maximum dimension.

Visible surface.—The surface which after installation of the fixture is readily visible to an observer in normal standing position.

Wavy finish.—A defect in the finish having the appearance of numerous runs in the glaze; irregular or mottled.

EFFECTIVE DATE

The standard is effective for new production from October 15, 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. Each organization nominated its own representatives. 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.

R. H. Zinkil, chairman, Crane Co., 836 S. Michigan Avenue, Chicago 5, Ill.

G. E. Kadisch, General Ceramics Co., Keasbey, N. J.

I. A. Hansen, Fords Porcelain Works, Perth Amboy, N. J.

Jere L. Murphy, 340 E. 44th Street, New York 17, N. Y., representing National Association of Master Plumbers.

W. J. Spillané, James B. Clow & Sons, Box 6600A, Chicago 80, Ill.

Benjamin Cadbury, Hajoca Corporation, P. O. Box 7319, Philadelphia 1, Pa.

A. J. Natemeyer, Sears, Roebuck & Co., Chicago 7, Ill.

The American Institute of Architects, 1741 New York Avenue, Washington 6, D. C. (Invited to name a representative.)

John N. Hatfield, The Pennsylvania Hospital, 8th & Spruce Sts., Philadelphia 7, Pa., representing American Hospital Association.

Wm. C. Groeniger, 478 W. 5th Ave., Columbus 1, Ohio, representing The American Society of Sanitary Engineering.

Robert J. Potbury, Bureau of Yards and Docks, U. S. Navy Department, Washington 25, D. C.

R. F. Geller, National Bureau of Standards, Washington 25, D. C.

Miss Lenore E. Sater, Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture, Washington 25, D. C.

HISTORY OF PROJECT

The Crane Co. informally requested the cooperation of the National Bureau of Standards in the establishment of a commercial standard for earthenware (vitreous-glazed) plumbing fixtures, and submitted a draft for consideration by other manufacturers.

The request was supported by the General Ceramics Co. under date of February 24, 1943, and a draft sponsored by these two companies was circulated to a large number of leading distributors, user organizations, Government agencies, and to all manufacturers for comment and criticism.

On June 10, 1943, a conference under the auspices of the National Bureau of Standards reviewed this comment and adjusted the draft accordingly. On July 26, 1943, the revised draft was circulated to the entire trade for written acceptance. Following acceptance by a satisfactory majority in the absence of active opposition, an announcement was issued on September 15, 1943, that the standard had been accepted as the recorded voluntary standard of the trade, effective for new production from October 15, 1943.

ACCEPTANCE OF COMMERCIAL STANDARD

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 25, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS111–43 as our standard of practice in the

Production [1] Distribution [1] Use [1] Testing [1]

of earthenware (vitreous-glazed) plumbing fixtures.

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_____

Company_____
(Fill in exactly as it should be listed in pamphlet)

Street address_____

City and State_____

[1] 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 standard as their standard of practice in the production, distribution and use of earthenware (vitreous-glazed) plumbing fixtures. Such endorsement does not signify that they may not find it necessary to deviate from the standard, nor that the producers so listed guarantee 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 Society of Sanitary Engineering, The, Columbus, Ohio.
Associated General Contractors of America, Inc., The, Washington, D. C.
National Association of Master Plumbers, New York, N. Y.
National Council of Women of the United States, New York, N. Y. (In principle.)
Producers' Council, Inc., The, Washington, D. C. (In principle.)
Saginaw Association of Master Plumbers, Saginaw, Mich.
Vermont Master Plumbers Association, Windsor, Vt.

FIRMS

Aitchison-Richmond Supply Co., St. Joseph, Mo.
American Radiator & Standard Sanitary Corporation, Minneapolis, Minn. and Pittsburgh, Pa.
Appleby Bros. & Whittaker Co., Harrisburg, Pa.
Baltimore, City of, Bureau of Plans & Surveys, Baltimore, Md.
Barrett Hardware Co., Joliet, Ill.
Bellingham Plumbing Supply Co., Bellingham, Wash.
Bethlehem Plumbing Supply Co., Bethlehem, Pa.
Biggs-Kurtz Hardware Co., The, Grand Junction, Colo.
Biggs Pump & Supply Co., Inc., Lafayette, Ind.
Blackwell-Wielandy Co., St. Louis, Mo.
Bohn & Kern Supply Co., Zanesville, Ohio.
Bond Supply Co., Kalamazoo, Mich.
Braman, Dow & Co., Boston, Mass.
Byrd Plumbers' Supply Co., The, Cleveland, Ohio.
Canfield Supply Co., Kingston, N. Y.
Careva Co., Inc., The, York, Pa.
Church Manufacturing Co., C. F., Holyoke, Mass.
City Plumbing & Heating Supply Co., Gainesville, Ga.
Cohen & Son, P., Brooklyn, N. Y.
Cole Supply Co., Geo. H., Troy, N. Y.
Conference of State & Provincial Health Officers, Chicago, Ill.
Consolidated Supply Co., Portland, Oreg.
Cooper Sanitary Co., Philadelphia, Pa.
County Seat Plumbing Supply Co., Inc., White Plains, N. Y.
Crane Co., Chicago, Ill.
Daly & Sons, Inc., M. J., Waterbury, Conn.
Dalziel Plumbing Supplies, San Francisco, Calif.
Davies Supply Co., The, Chicago, Ill.
Dornack Plumbing & Heating, H., Rochester, Minn.
Dubuque Supply Co., R. A., St. Louis, Mo.
Dunlay-Armand Co., Inc., Houston, Tex.
Dunning & Co., R. B., Bangor, Maine.
Eastern Plumbing Supply Co., Inc., The, Hartford, Conn.
18 Ave. Plumbers Supply Co., Inc., Brooklyn, N. Y.
Elizabeth Plumbing & Heating Supply Co., Elizabeth, N. J.
Emch Machine & Plumbing Supply, Nick, Toledo, Ohio.
Endicott Supply Co., Vineland, N. J.
Engineering Systems, Inc., Chicago, Ill.
Estabrook's Sons, R., (Division of Herrick Co.), S. Boston, Mass.
Federal-Huber Co., Chicago, Ill.
Ferguson Supply Co., Grand Rapids, Mich.
Fleck Co., Camden, N. J.
Fleck-Marshall Co., Lancaster, Pa.
Flushing Plumbing Supply Co., Inc., Flushing, L. I., N. Y.
Fords Porcelain Works, Perth Amboy, N. J.
Fort Pitt Supply Co., Pittsburgh, Pa.
Friends Hospital, Frankford, Philadelphia, Pa.
General Ceramics Co., Metuchen, N. J.
Glustoff Co., D., Chicago, Ill.
Grady Plumbing Co., Carbondale, Ill.
Hajoca Corporation, Philadelphia, Pa.
Hama Plumbing & Heating Co., J. D., Chicago, Ill.
Hanks, Inc., Abbot A., San Francisco, Calif.
Hansen Plumbing Co., Dallas, Tex.
Hartford Plumbing Supply, Inc., Hartford, Conn.
Herron Co., The James H., Cleveland, Ohio.
Hobbs Supply Co., W. H., Eau Claire, Wis.

Hoffman Manufacturing Co., B., Milwaukee, Wis.
Holyoke Supply Co., Holyoke, Mass.
Home Plumbing & Heating Co., Twin Falls, Idaho.
Hooper Plumbing Co., Frank W., Dallas, Tex.
Hoppert's Plumbing & Heating Co., Wahpeton, N. Dak.
Hospital Bureau of Standards & Supplies, Inc., New York, N. Y.
Huber-Lanctot Housewrecking Corporation, Buffalo, N. Y.
Hunting Co., The, Auburn, N. Y., and Rochester, N. Y.
Integrity Supply, Inc., New York, N. Y., and New Castle, Pa.
Interstate Hardware Co., Inc., Bristol, Tenn.
Jackson Plumbing Co., Roy M., St. Joseph, Mo.
James Supply Co., Chattanooga, Tenn.
Jedlicka Bros. Co., Inc., Sayville, N. Y.
Johnson Hardware Co., Clarksburg, W. Va.
Johnson Plumbing Co., Texarkana, Ark.
Kahn, Inc., Samuel R., Howard Beach, N. Y.
Kalispell Mercantile Co., Kalispell, Mont.
Keiser-Van Leer Co., The, Bloomington, Ill.
Kiefaber Co., The W. H., Dayton, Ohio.
Kinsey Co., H. P., Easton, Pa.
Knapp Supply Co., The, Muncie, Ind.
La Crosse Plumbing Supply Co., La Crosse, Wis.
Lebanon Plumbing Supply Co., Lebanon, Pa.
Lee Co., Inc., George G., Norfolk, Va.
Lee Hardware Co., The, Salina, Kans.
Lehigh Plumbing & Heating Co., Allentown, Pa.
Leighton Supply Co., Fort Dodge, Iowa.
Locke Stevens, Inc., Somerville, Mass.
Long Plumbing & Heating Supply Co., Chicago, Ill.
Lorenz Co., Klamath Falls, Oreg.
Lycette, John J., Nashua, N. H.
Malone Plumbing Supply Co., S. S., Pittsburgh, Pa.
Mason & Co., George D., Detroit, Mich.
Master Plumber & Heating Contractor Magazine, The, Brooklyn, N. Y.
May Supply Co., Anderson, Ind.
McGowin Lyons Hardware & Supply Co., Mobile, Ala.
McGuire, C. F., Hardware & Plumbing, Hornell, N. Y.
McNally Pump & Plumbing Supply Co., Hannibal, Mo.
Mead Co., Inc., John J., Sayville, L. I., N. Y.
Meerhoff, Wm. H., Richmond, Ind.
Merkel Bros. Co., The, Cincinnati, Ohio.
Merrimack Valley Supply Co., Lowell, Mass.
Milwaukee, City of, Public Works, Bureau of Bridges & Public Buildings, Milwaukee, Wis.
Missoula Mercantile Co., Missoula, Mont.
Modern Plumbing & Heating Co., Grand Rapids, Mich.
Monroe Co., Jamaica Plain (Boston District), Mass.
Montogomery Ward & Co., Chicago, Ill.
Morley Bros., Saginaw, Mich.
Muntz & Lea Co., Elgin, Ill.
Murdock Manufacturing & Supply Co., The, Cincinnati, Ohio.
Nailon Corporation, Peoria, Ill.
Nelson Supply Co., Hutchinson, Kans.
New Jersey Engineering & Supply Co., Passaic, N. J.
New Jersey Orthopedic Hospital & Dispensary, Orange, N. J.
New Orleans, Inc., Better Business Bureau of, New Orleans, La. (In principle.)
Oakland Public Schools, Oakland, Calif.
Ohio State Supply Co., The, Youngstown, Ohio.
Olsen & Heffernan, San Francisco, Calif.
Orange Memorial Hospital, Orange N. J.
Osterfeld Co., The H. J., Dayton, Ohio.
Paterson General Hospital, Paterson, N. J.
Patzig Testing Laboratories, Des Moines, Iowa.
Paul Supply Co., Chicago, Ill.
Pennsylvania Hospital, Philadelphia, Pa.
Pennsylvania Railroad, The, Philadelphia, Pa.
Petersen Plumbing & Heating Co., John L., Grand Rapids, Mich.
Petter Supply Co., Henry A., Paducah, Ky.
Pitt & Co., Walter A., Bloomfield, N. J.
Plimpton & Hills Corporation, The, Hartford, Conn.
Plumbers & Factory Supplies, Inc., Columbus, Ohio.
Plumber's Supply Co., New Bedford, Mass.
Plumbers Supply Co. of St. Louis, St. Louis, Mo.
Plumbing & Heating Jobbers, Baltimore, Md.
Plumbing & Heating Selling Co., New Orleans, La.
Plumbing & Heating Supply Co., The, Nashville, Tenn.
Rapid Plumbing Co., Rapid City, S. Dak.
Rayl Co., The, Detroit, Mich.
Reading Foundry & Supply Co., Reading, Pa.
Reddington Supply Co., Scranton, Pa.
Redmond Co., The Geo., Cleveland, Ohio.

Reeves-Wiedeman Co., Kansas City, Mo.
Roberts-Hamilton Co., Minneapolis, Minn.
Robischung-Kiesling Contracting Corporation, Houston, Tex.
Rochester Plumbing Supply Co., Inc., Rochester, N. Y.
Rodgers Supply Co., McKees Rocks, Pa.
Rom Co., The Robert, Milwaukee, Wis.
Rundle-Spence Manufacturing Co., Milwaukee, Wis.
Schafer & Co., E. G., Washington, D. C.
Seashore Supply Co., Atlantic City, N. J.
Seattle Plumbing Supply Co., Seattle, Wash.
Seckinger, M. Q.,—Plumbing & Heating, Savannah, Ga.
Shellady, Inc., Wm. D., Wilmington, Del.
Shivers Plumbing Supply Co., W. M., Houston, Tex.
Simpson, Inc., W. H., Olean, N. Y.
Somerville Co., Thos., Washington, D. C.
Southside Plumbing & Heating Maintainance, Freeport, N. Y.
Specification Record, Chicago, Ill.
Standard Pipe & Plumbing Supply Co., Kansas City, Mo.
Standard Plumbing & Heating Co., Dumont, N. J.
Star Plumbing & Heating Supply Co., Yonkers, N. Y.
Staten Island Supply Co., Inc., Staten Island, N. Y.
Steinmann, Robert, Cincinnati, Ohio.
Stroh & Wilson, Inc., New York, N. Y.
Summers Hardware & Supply Co., Johnson City, Tenn.
Swank Hardware Co., Johnstown, Pa.
Thompson-Durkee Co., Allston, Mass.
Thornley Supply Co., The, Pawtucket, R. I.
Trenton Potteries Co., The, Trenton, N. J.
Trimble & Lutz Supply Co., Wheeling, W. Va.
Trumbull Plumbing Supply Co., Warren, Ohio.
Trumbull Plumbing Supply Co., Youngstown, Ohio.
Turner & Van Scoy Co., Inc., Wilkes-Barre, Pa.
Turney, D. R., San Rafael, Calif.
U. S. Supply Co., Kansas City, Mo.
United States Testing Co., Inc., Hoboken, N. J. (In principle.)
Universal Supply Co., The, Newark, Ohio.
Van Camp Hardware & Iron Co., Indianapolis, Ind.
Van Denberg Supply Co., Rockford, Ill.
Virginia Polytechnic Institute, Blacksburg, Va.
Vogel Co., John J., Boston, Mass.
Vogel & Sons Co., P. A., Louisville, Ky.
Warburton's, Madera, Calif.
Warren Balderston Co., Trenton, N. J.
Weber & Co., Inc., C. L., Philadelphia, Pa.
Weekes & Son Co., John, Watertown, N. Y.
Westchester Square Plumbing Supply Co., Inc., New York, N. Y.
Western Electric Co., Inc., New York, N. Y.
Western Supply Co., Lincoln, Nebr.
Wheatland Co., Cedar Rapids, Iowa.
White Haven Sanatorium, White Haven, Pa.
White & Shauger, Inc., Paterson, N. J.
Whitney & Ford Co., Chicago, Ill.
Wigman Co., Sioux City, Iowa.
Woolcock Plumbing & Heating Co., Niagara Falls, N. Y.
Worthington Co., The George, Cleveland, Ohio.
Wright & Kremers, Inc., Niagara Falls, N. Y.

U. S. GOVERNMENT

Federal Works Agency, Public Buildings Administration, Washington, D. C. (In principle.)
Justice, U. S. Department of, Bureau of Prisons, Washington, D. C.
War Department, Washington, D. C

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).

[1] See footnote on page 14.

CS No. Item

21–39. Interchangeable ground-glass joints, stopcocks, 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 watch-cases.
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.
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.
97–42. Electric supplementary driving and passing lamps for vehicles (after market).
98–42. Artists' oil paints.
99–42. Gas floor furnaces—gravity circulating type.
100–42. Multiple-coated, porcelain-enameled steel utensils.
101–43. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
102– . (Reserved for Diesel and fuel-oil engines.)
103–42. Cotton and rayon velour (jacquard and plain).
(E)104–43.[1] Warm-air furnaces equipped with vaporizing pot-type oil burners.
105–43. Mineral wool; loose, granulated, or felted form, in low-temperature installations.
(E)106–43.[1] Boys' pajamas (made from woven fabrics).
(E)107–43.[1] Commercial electric-refrigeration condensing units.
108–43. Treading automobile and truck tires.
109–44. Solid-fuel-burning forced-air furnaces.
110–43. Tire repairs—vulcanized (passenger, truck, and bus tires).
111–43. Earthenware (vitreous-glazed) plumbing fixtures.
112–43. Homogeneous fiber wallboard.
113–44. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
114–43. Hospital sheeting for mattress protection.

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 25, D. C.

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

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