CS99–42
Furnaces; gas, floor,
gravity-circulating-type

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

GAS FLOOR FURNACES

GRAVITY CIRCULATING TYPE

COMMERCIAL STANDARD CS99–42

Effective Date for New Production From May 25, 1942

A RECORDED VOLUNTARY STANDARD
OF THE TRADE

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PROMULGATION

of

COMMERCIAL STANDARD CS99–42

for

GAS FLOOR FURNACES—GRAVITY CIRCULATING TYPE

On December 4, 1941, at the instance of the Association of Gas Appliance & Equipment Manufacturers, a general conference of representative manufacturers, distributors, and users of gravity circulating-type gas floor furnaces adopted a recommended commercial standard for this commodity. Those concerned have since accepted and approved for promulgation by the United States Department of Commerce, through the National Bureau of Standards, the standard as shown herein.

The standard is effective for new production from May 25, 1942.

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.

GAS FLOOR FURNACES—GRAVITY CIRCULATING TYPE

COMMERCIAL STANDARD CS99–42

PURPOSE

1. The purpose of this standard is (1) to establish minimum specifications for the guidance of manufacturers, distributors, and users of gravity circulating type, natural draft gas floor furnaces; (2) to avoid delays and misunderstandings; and (3) to provide a uniform basis for guaranteeing compliance through the use of labels or certification.

SCOPE

2. With the latest American Standard Approval Requirements for Central Heating Gas Appliances Z21.13 published by the American Gas Association as basic prerequisites, this standard covers construction and installation requirements for gravity circulating type gas floor furnaces, including those having single- or dual-wall register outlets, for use with natural, manufactured, mixed and liquefied petroleum gases. It includes the sizing, placement, general installation requirements, venting, gas connections, and methods of certifying compliance with the standard.

DEFINITIONS

3. The following definitions apply for the purposes of this standard:

4. *Gas floor furnace.*—A completely self-contained-unit furnace, excluding those having additional or separate returns, suspended from the floor of the space being heated, taking air for combustion from outside this space, and with means for observing flames and lighting the appliance from the space being heated.

5. *Vent collar.*—A means provided to connect the vent pipe to the furnace.

6. *Draft hood.*—A device placed in and made a part of the flue pipe from an appliance, or in the appliance itself, which is designed to (1) insure the ready escape of the products of combustion in the event of no draft, back draft, or stoppage beyond the draft hood; (2) prevent a back draft from entering the appliance; and (3) neutralize the effect of stack action of the chimney flue upon the operation of the appliance.

7. *Chimney.*—A vertical structure constructed of masonry, either lined or unlined, for the purpose of carrying away products of combustion from an appliance burning gas as fuel.

8. *Vertical vent.*—A pipe designed to carry the products of combustion and which rises in a vertical direction from a horizontal-vent connection.

9. *Horizontal-vent connection.*—A pipe designed to carry the products of combustion and which runs in a generally horizontal direction from the vent collar of gas furnace to the vertical vent, flue, or chimney.

10. *Crossover or offset.*—Any deviation from the vertical rise of the vertical vent, necessitating one or more fittings.

11. *Automatic safety pilot.*—A device for shutting off, automatically, the gas supply to the main burner in the event of pilot or gas failure; also for preventing the gas from being turned into the main burner unless the pilot is lighted.

12. *One-hundred-percent-automatic safety pilot.*—A device for shutting off, automatically, the gas supply to the main burner and pilot in the event of pilot or gas failure, and also for preventing the gas from being turned into the main burner unless the pilot is lighted. (Required for liquefied petroleum gases.)

13. *Gas-pressure regulator.*—A device for controlling and maintaining a uniform pressure on a gas supply.

APPLIANCE-CONSTRUCTION REQUIREMENTS

14. *General.*—All gravity-type gas floor furnaces shall be manufactured so as to comply with the requirements for performance, safe operation, and substantial and durable construction set forth in the latest American Standard Approval Requirements for Central Heating Gas Appliances (Z21.13), published by the American Gas Association. Such compliance shall be determined from laboratory tests on one or more sample furnaces by a nationally recognized testing agency adequately equipped and competent to perform such services, and shall be evidenced by the attachment of its seal or label to such furnaces. Such agency shall be one which maintains a program of national inspection of production models of all such floor furnaces at least once each year on the manufacturers' premises. Approval by the American Gas Association Testing Laboratories, as evidenced by the attachment of their Approval Seal to such floor furnaces and a certificate or letter certifying approval under the above-mentioned requirements, shall be considered as constituting compliance with the provisions of this section.

SIZING

15. *Heat loss.*—It is recommended that for *residences* at least one gas floor furnace be used for each 45,000 Btu per hour, total heat loss. The heat loss may be based on a formula established by the American Society of Heating and Ventilating Engineers. Base calculations for residences on 70° F inside all rooms to be heated, when outside temperature is either at design temperature or 15° F above lowest recorded temperature of locality. For other types of buildings the inside design temperatures shall be as recommended by the ASH&VE Guide. Simplified formulas are generally used by gas floor furnace manufacturers, and the use of any one of these formulas is permissible provided the result is not less than that obtained from the ASH&VE current method.

16. *Size.*—After determining the correct heat loss, a pickup factor of not less than 10 percent shall be added. The minimum-size furnace or furnaces can then be selected. Under the marking rules of the American Gas Association, the input and output ratings of a gravity-type gas floor furnace are required on the name plate. When selecting the proper size furnace, the minimum-output rating of a furnace, or the combined output ratings of the furnaces, shall be not less than the computed maximum hourly heat loss, including the pickup factor.

TABLE 1.—*Sizes most generally available* [1]

Size	
Btu/hr. input	*Btu/hr. input*
20,000	50,000
25,000	60,000
30,000	65,000
35,000	70,000
37,000	75,000
40,000	

[1] Other sizes from 10,000 to 80,000 Btu per hour input are manufactured.

PLACEMENT

17. *General.*—After selecting the proper size furnace or furnaces, the next important consideration is their placement. The following are requirements that will serve in properly placing the furnace or furnaces to serve one story.

18. *Distance.*—To meet varying conditions of climate and usage, it is recommended that the furnace be so located that for residences the maximum distance, center to center, between the furnace and any room to be heated by it, measured through intervening openings, should be as short as possible—preferably not to exceed 15 feet.

19. *Doorways.*—The furnace or furnaces shall be so placed that any single path of air circulating to and from the furnace does not pass through more than one doorway and one arch.

20. *Walls and corners.*—With the exception of wall-register models, a floor furnace shall not be placed closer than 6 inches to the nearest wall, and wall-register models shall not be placed closer than 6 inches from a corner.

21. *Draperies.*—The furnace or furnaces shall be so placed that a door, drapery, or similar object cannot be nearer than 12 inches to any portion of the register of the furnace.

22. *Bathroom.*—Any dual-wall-register furnace installed between bath and adjoining rooms shall not recirculate air from the bathroom.

23. *Exposure.*—In case there is a choice of locations, the furnace shall favor (be nearer) the sides of the house exposed to the prevailing winter winds.

24. *Central location.*—Generally speaking, the more central the location, the better, favoring slightly the sides exposed to the prevailing winter winds.

GENERAL INSTALLATION REQUIREMENTS

25. *Main points.*—In the installation of a gas floor furnace, there are five main points to consider. These are sizing, placement, venting, gas connections, and general installation requirements.

26. *Upper-floor installations.*—Gas floor furnaces may be installed in an upper floor, provided the furnace assembly projects below into a utility room, closet, garage, or similar nonhabitable space. In such installations, the furnace shall be enclosed completely, with means for air intake to meet the requirements of paragraph 30, with provision for service, with furnace clearances of 6 inches on all sides and bottom, and with the enclosure constructed of portland cement plaster on metal lath or material of equal fire resistance.

27. *Floor levels.*—The floor immediately surrounding the floor furnace shall be reasonably level. When heating two rooms having different floor levels, the furnace shall be installed in the room having the lower floor. It is also well to locate the furnace near the steps, if possible. Where a dual-wall-register furnace is installed between rooms having different floor levels, the furnace shall be installed at the lower floor level with an approved vertical extension to the upper floor level.

28. *Bracing.*—The floor around the furnace shall be braced and headed with a framework of material not lighter than the joists. The inside dimensions of the framework shall be approximately ½ inch longer and wider than the furnace to be installed.

29. *Support.*—Means shall be provided to support the furnace when the floor grille is removed.

30. *Combustion air.*—Fixed ventilation shall be provided to any confined space which encloses the floor furnace by means of a duct or grille arranged to supply air from a permanently ventilated attic or under-floor space. The duct or grille shall be screened and have a free area at least twice the free area of the vent collar of the floor furnace and shall be installed in such a manner as to insure proper combustion.

31. *Clearance.*—The bottom of the floor furnace shall have at least a 6-inch clearance from the ground. When that clearance is not present, the ground below and to the sides shall be excavated to form a "basinlike" pit under the furnace so that there is a 6-inch clearance beneath the furnace and a 12-inch clearance on all sides, except the control side, which shall have an 18-inch clearance. This facilitates any servicing that may be required and allows ample air for proper combustion.

32. *Seepage pan.*—Whenever the excavation exceeds 12 inches or water seepage is apparent under the house, a watertight copper pan, concrete pit, or other suitable material shall be used. A copper pan shall be made of not less than 16-ounce-per-square-foot sheet copper. The pan shall be anchored in place, and the walls shall extend at least 4 inches above the ground level, with 12-inch clearance on all sides except the control side, which shall have 18-inch clearance.

33. *Access.*—Adequate provision shall be made for easy access to the furnace under the house by means of an opening in the foundation wall or through a trap door of at least 18 by 24 inches, located at some convenient point in the house, and a clear and unobstructed passageway to the furnace at least 24 inches high by 24 inches wide. The local utility should be consulted with reference to the access facilities for servicing where it provides service.

34. *Appliance alterations.*—All gas floor furnaces, including those having single-or dual-wall register outlets, shall be installed as ap-

proved under this standard without alterations, extensions, or changes of any kind in the furnace.

35. *Adjustment.*—All gas floor furnaces except those using liquefied petroleum gases shall be equipped with a gas-pressure regulator, which shall be adjusted and sealed so the the gas input does not exceed the approved input rating.

VENTING

36. *General.*—Each gas floor furnace shall be properly vented to the outer air. The following are requirements covering the proper venting of a floor furnace:

37. *Draft hood.*—A draft hood which meets the approval requirements of the AGA shall be made a part of the vent connection to the vertical chimney or vent unless the construction of the floor furnace serves the same purpose.

38. *Damper.*—A damper or similar device shall never be installed in the vent pipe from a gas floor furnace.

39. *Size.*—All gas floor furnaces shall be vented into a vertical vent, flue, or chimney of a size not less than the vent collar of the floor furnace, and in no case less than 12 square inches in area.

40. *Height.*—The vertical vent, flue, or chimney shall extend at least 2 feet above the highest elevation of a building within 10 feet of the termination of the vertical vent, flue, or chimney.

41. *Venting material.*—In case venting material (not a chimney) is used for the vertical vent, the material used shall conform to the local building code. In addition, it shall be installed according to the local building code. In the absence of a local building code, the vent shall consist of approved fireproof material. All masonry chimneys constructed for the purpose of venting a gas floor furnace shall be lined with a terra-cotta or comparable flue lining. Whenever a gas floor furnace is vented into an existing unlined masonry chimney, the chimney shall be clean. The horizontal-vent connection in all cases shall enter the chimney at least 1 foot above the bottom of the chimney. Means shall be provided for cleaning out the base of the chimney.

42. *Horizontal-vent connection.*—The horizontal-vent connection shall be as short as practicable and shall not be longer than 75 percent of the height of the vertical vent, flue, or chimney, and have an incline of not less than ¼ inch per foot of length. The horizontal-vent connection, when in contact with the soil, shall be insulated and protected against corrosion. The horizontal-vent connection shall not project into the free area of the flue or chimney.

43. *Crossover or offset.*—No crossover or offset shall be permitted at an angle of less than 30 degrees to the horizontal.

44. *Holes.*—Both vertical-vent and horizontal-vent connection shall be clear and free from any stoppage and free from any holes that would restrict draft.

45. *Area.*—When the floor furnace is connected to a chimney or vertical vent, flue, or chimney into which other appliances are connected, or when two or more furnaces are connected to a single vertical vent, the vertical vent, flue, or chimney shall have a cross-sectional area at least equal to the cross-sectional area of the largest vent collar plus 50 percent of the area of each additional appliance vent collar connected thereto.

GAS CONNECTIONS

46. *Testing.*—All gas connections shall be tested to be sure they are gas tight.

47. *Control valve.*—A manual main gas-control valve shall be placed in the gas line leading to the furnace, so that the gas can be easily shut off if desired and shall be connected ahead (upstream or inlet side) of the pressure regulator.

48. *Gas-pressure regulator.*—All gas floor furnaces (excepting those using liquefied petroleum gases) shall be installed with a gas-pressure regulator.

49. *Automatic safety pilot.*—If automatic operation of floor furnaces is desired, care must be taken that a model approved for use with an automatic pilot is employed. No automatic pilot shall be installed in the field on a floor furnace that has not been approved with such equipment. Automatic safety pilots are recommended for all floor furnaces.

GUARANTEE

50. All furnaces shall carry the manufacturer's specific guarantee against defects in material and workmanship for a minimum period of 1 year.

CERTIFICATION AND LABELS

51. *Manufacturer's guarantee.*—In addition to the permanently attached label or seal of the laboratory or testing agency determining compliance with these specifications as set forth in paragraph 14, each individual furnace shall also bear the manufacturer's label or seal, permanently attached and visible, embodying the following wording:

> This gas floor furnace is guaranteed as complying with Commercial Standard CS99–42.

52. *Installer's certificate.*—The following certificate supplied by the manufacturer shall be placed with each individual installation by the installer:

> This _____ Gas Floor Furnace has
> (Brand or company name)
> been installed in strict compliance with the requirements of Commerical Standard CS99–42, as issued by the National Bureau of Standards of the U. S. Department of Commerce.
>
> _____
> Signature
>
> _____
> Date

EFFECTIVE DATE

The standard is effective for new production from May 25, 1942.

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. Com-

ment 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:

Testing Laboratories:

J. H. Eiseman (chairman), Gas Chemistry Section, National Bureau of Standards, Washington, D. C.
R. M. Conner, director, AGA Testing Laboratories, 1032 East 62d Street, Cleveland, Ohio.
R. S. Dill, chief, Heat Transfer Section, National Bureau of Standards, Washington, D. C.

Manufacturers:

Clarence Coleman, Gas Heating Division, The Coleman Lamp & Stove Co., Wichita, Kans.
R. E. James, general manager, Appliance Division, Rheem Manufacturing Co., Room 1508, 30 Rockefeller Plaza, New York, N. Y.
R. O. Montrief, engineer, Ward Heater Co., 1800 West Washington Blvd., Los Angeles, Calif.
Frank C. Packer, asst. vice pres. & general mgr., Payne Furnace & Supply Co., 336 N. Foothill Road, Beverly Hills, Calif.
Carl F. Schlenk, engineer, The Estate Stove Co., Hamilton, Ohio.

Distributors:

Harry L. Warren, sales research engr., Southern California Gas Co., Metropolitan Station, Box 6110, Los Angeles, Calif.
O. A. Kinzer, utilization engineer, Dallas Gas Co., Representing Lone Star Gas Co., 301 S. Harwood St., Dallas, Tex.
James P. Dresen, Public Service Co., Denver, Colo.
L. B. Wilson, Jr., supt., Gas & Steam Distribution, Consolidated Gas, Electric Light & Power Co., 1068 N. Front St., Baltimore, Md.
A. T. Chameroy, buyer, Sears, Roebuck & Co., Chicago, Ill.

Consumers:

A. L. Blakeslee asst. chief, Protection Construction Unit, Office of the Supervising Architect, Federal Works Agency, Washington, D. C.
R. K. Thulman, mechanical engineer, Federal Housing Administration, Federal Loan Agency, Room 812, Federal Housing Administration Bldg., Washington, D. C.
C. M. Wilcox, Standards Section, Consumer Division, War Production Board, Temporary Bldg. D, 6th and Independence Ave., Washington, D. C.
American Home Economics Association: (Invited to name representative).
Mrs. Charlotte Payne, executive secretary, National Council of Women, 501 Madison Avenue, Room 1904, New York, N. Y.

HISTORY OF PROJECT

Pursuant to a request on December 12, 1940, from the Association of Gas Appliance and Equipment Manufacturers for the cooperation of the National Bureau of Standards in the establishment of a commercial standard for gas floor furnaces, preliminary conferences of interested manufacturers were held in Los Angeles, Calif., on June 2, and in Washington, D. C., on July 18, in order to adjust the draft to suit the consensus of producers.

The proposed standard, as adjusted by the preliminary manufacturers' conferences, was then submitted to a number of National organizations of distributors, consumers, testing laboratories, and to several Federal agencies for advance consideration and recommenda-

tions. Following receipt of these recommendations, the draft was adjusted in line therewith at a conference in Atlantic City on October 23, 1941. A general conference was held in Washington, D. C., on December 4, 1941, to which all interested producers, distributors, users, and testing laboratories were invited. The adjusted draft as adopted by the general conference was circulated to all concerned on December 29, 1941, for written acceptance.

Upon receipt of written acceptances from a preponderant majority, announcement was issued on February 25, 1942, that the standard would become effective for new production from May 25, 1942.

APPENDIX

The general conference of December 4, 1941, recommended that an investigation be made of the desirability and practicability of lowering the figure for maximun register temperature (350° F above room temperature) permitted by American Standard Z21.13, incorporated by reference in the present standard. This recommendation was referred to the chairman of the ASA Sectional Committee Z21, who has advised that the matter would receive prompt consideration by his committee.

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 CS99–42 as our standard of practice in the

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

of gravity circulating-type gas floor furnaces.

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 _____

[1] Please designate which group you represent by drawing lines through the other four. 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 mutally 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, installation, use, and testing of gravity circulating-type gas floor furnaces. Such endorsement does not signify that they may not find it necessary to deviate from the standard nor that 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 Association of Engineers, Chicago, Ill.
American Gas Association Testing Laboratories, Cleveland, Ohio.
American Home Economics Association, Washington, D. C. (In principle.)
American Specification Institute, Chicago, Ill.
Associated Factory Mutual Fire Insurance Co.'s, Boston, Mass. (In principle.)
Household Science Institute, Chicago, Ill.
National Council of Women of the U. S., Inc., New York, N. Y.
Stove Mounters International Union of North America, St. Louis, Mo.

FIRMS

Advance Furnace Co., The, Wichita, Kans.
Alabama Gas Co., Birmingham, Ala.
Amarillo Gas, Co., Amarillo, Tex.
Amere Gas Utilities Co., Beckley, W. Va.
American Gas Co., The, Bartlesville, Okla.
American Radiator & Standard Sanitary Corporation, Pittsburgh, Pa.
Anchor Burner Co., Oklahoma City, Okla.
Andrews Heater Co., Los Angeles, Calif.
Ashburn Bros. Heating, Inc., Los Angeles, Calif.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Calif.
Bastian-Morley Co., Inc., La Porte, Ind. (In principle.)
Baxter Springs Gas Co., Bartlesville, Okla.
Belleville Gas Heater Co., Belleville, Ill.
Birmingham Gas Co., Birmingham, Ala.
California-Pacific Utilities Co., San Francisco, Calif.
California, University of, Berkeley, Calif. (In principle.)
Central Florida Gas Corporation, Winter Haven, Fla.
Central Gas Utilities Co., The, Abilene, Kans.
Central Vermont Public Service Corporation, Rutland, Vt.
Chaney Hardware, Montpelier, Ind.
Coast Counties Gas & Electric Co., Santa Cruz, Calif.
Coleman Lamp & Stove Co., Wichita, Kans., Philadelphia, Pa., and other cities.
Cole's Hot Blast Manufacturing Co., Chicago, Ill.
Colladay Hardware Co., The Frank, Hutchinson, Kans.
Co-Op. Community Builders, Inc., Wauwatosa, Wis.
Consolidated Edison Co. of New York, Inc., New York, N. Y.
Conwell & Co., E. L., Philadelphia, Pa.
Corriveaux, F.,—Home & Industrial Service, Schenectady, N. Y.
Dallman Supply Co., Sacramento, Calif.
Day & Night Manufacturing Co., Monrovia, Calif.
Delaware Power & Light Co., Wilmington, Del.
Detroit Testing Laboratory, The, Detroit, Mich.
Electrogas Furnace Co., San Francisco, Calif.
Empire Stove Co., Belleville, Ill.
Equitable Gas Co., Pittsburgh, Pa.
Essick Manufacturing Co., Los Angeles, Calif.
Estate Stove Co., The, Hamilton, Ohio.
Fraser Furnace Co., Stockton, Calif.
Gardner Hardware Co., Minneapolis, Minn.
Hammel Radiator Corporation, Los Angeles, Calif.

Hardware & Supply Co., The, Massillon, Ohio.
Hart Heating Co., Los Angeles, Calif.
Heating Equipment Co., San Francisco, Calif.
Henkle & Joyce Hardware Co., Lincoln, Nebr.
Herlan-Patterson, Inc., Buffalo, N. Y.
Hibbard, Spencer, Bartlett & Co., Chicago, Ill.
Higginbothom Pearlstone Hardware Co., Dallas, Tex.
Holland Furnace Co., Holland, Mich.
Holly Heating & Manufacturing Co., South Pasadena, Calif.
Hoosier Gas Corporation, Vincennes, Ind.
Howle Co., The, Chicago, Ill.
Hoyt Heater Co., Los Angeles, Calif.
Indiana-Kentucky Natural Gas Corporation, Owensboro, Ky.
Inland States Testing Laboratory, Dubuque, Iowa.
Integrity Supply, Inc., New York, N. Y.
La Porte Gas & Electric Co., La Porte, Ind.
Laclede Gas Light Co., The, St. Louis, Mo.
Lee Hardware Co., The, Salina, Kans.
Mack Air Conditioning Corporation, Atlantic City, N. J.
Madison Gas & Electric Co., Madison, Wis.
Manufacturers Light & Heat Co. & Affiliated Co's., Pittsburgh, Pa.
McGowin Lyons Hardware & Supply Co., Mobile, Ala.
Mellish & Murray Co., Chicago, Ill.
Michigan State College, Engineering Division, East Lansing, Mich.
Mission Water Heater Co., Los Angeles, Calif.
Monarch Heating Co., Los Angeles, Calif.
Monongahela West Penn. Public Service Co., Fairmont, W. Va.
Moran Plumbing Supply Co., Oakland, Calif
Motor Wheel Corporation, Duo-Therm Division, Lansing, Mich.
Mount Vernon Furnace & Manufacturing Co., Mount Vernon, Ill.
New Orleans, Inc., Better Business Bureau of, New Orleans, La. (In principle.)
Newark College of Engineering, Newark, N. J.
North Penn Gas Co., Port Allegany, Pa.
Northern Oklahoma Gas Co., Ponca City, Okla.
O'Hair & Co., P. E., San Francisco, Calif.
Ohio Foundry & Manufacturing Co., The, Steubenville, Ohio.
Ohio Fuel Gas Co., The, Columbus, Ohio.
Oklahoma A. & M. College, Stillwater, Okla.
Oklahoma, University of, Norman, Okla.
Pacific Gas Heating Co., San Francisco, Calif.
Pacific Gas Radiator Co., Huntington Park, Calif.
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif.
Peoples Natural Gas Co., The, Pittsburgh, Pa.
Perry Hardware Co., The, New Lexington, Ohio.
Perth Amboy Hardware Co., Perth Amboy, N. J.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
Port Jervis Automatic Heat, Port Jervis, N. Y.
Pueblo Gas & Fuel Co., The, Pueblo, Colo.
Red River Gas Co., Amarillo, Tex. (In principle.)
Rheem Manufacturing Co., New York, N. Y.
Richmond Hardware Co., Richmond, Va.
Roanoke Hardware Co., Inc., Roanoke, Va.
Sacramento, Better Business Bureau of, Sacramento, Calif. (In principle.)
Saint Louis Sampling & Testing Works, St. Louis, Mo.
Samuel Stamping & Enameling Co., Chattanooga, Tenn.
San Diego Gas & Electric Co., San Diego, Calif.
Sears, Roebuck & Co., Chicago, Ill.
Southern California Gas Co., Los Angeles, Calif.
Southern Counties Gas Co. of California, Los Angeles, Calif.
Specification Record, Chicago, Ill.
Springfield Gas & Electric Co., Springfield, Mo.
Stephens Manufacturing Co., Tulsa, Okla.
Strevell-Paterson Hardware Co., Salt Lake City, Utah.
Swank Hardware Co., Inc., The, Johnstown, Pa.
Tennessee Enamel Manufacturing Co., Nashville, Tenn.
Twining Laboratories, The, Fresno, Calif.
Unimatic Heating Systems, Inc., Los Angeles, Calif.
United Gas Corporation, Houston, Tex.
United States Testing Co., Inc., Hoboken, N. J.
Utility Fan Corporation, Los Angeles, Calif.
Vicksburg Municipal Gas System, Vicksburg, Miss.
Wak Co., Charleston, W. Va.
Wanner Bros., Baltimore, Md.

Ward Heater Co., Los Angeles, Calif.
Washington Gas & Electric Co., Tacoma, Wash.
Washington, State College of, Pullman, Wash.
Weaver, Rudolph, Gainesville, Fla.
West Texas Gas Co., Lubbock, Tex.
Western Kentucky Gas Co., Owensboro, Ky.
Williams Radiator Co., Los Angeles, Calif.
Wyeth Hardware & Manufacturing Co., St. Joseph, Mo.
Wylie, W. O., Glendale, Calif.
Wyoming Gas Co., Basin, Wyo.
Zink Co., John, Tulsa, Okla.

U. S. GOVERNMENT

Federal Housing Administration, Washington, D. C.
United States Housing Authority, Washington, D. C.
Veterans Administration, 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).
13-39. Dress patterns (second edition).
14-39. Boys' button-on waists, shirts, junior and polo shirts (made from woven fabrics) (second edition).
15-29. Men's pajamas.
16-29. Wallpaper.
17-42. Diamond core drill fittings (third edition).
18-29. Hickory golf shafts.
19-32. Foundry patterns of wood (second edition).
20-36. Staple vitreous china plumbing fixtures (second edition).
21-39. Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition).
22-40. Builders' hardware (nontemplate) (second edition).
23-30. Feldspar.
24-30. Standard screw threads.
25-30. Special screw threads.
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.
33-32. Knit underwear (exclusive of rayon).
34-31. Bag, case, and strap leather.
35-31. Plywood (hardwood and eastern red cedar).
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.
42-35. Fiber insulating board (second edition).
43-32. Grading of sulphonated oils.
44-32. Apple wraps.
45-40. Douglas fir plywood (domestic grades) (fourth 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).

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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.
65-38. Wool and part-wool fabrics.
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).
73-38. Old growth Douglas fir standard stock doors.
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

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.

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