

UNITED STATES DEPARTMENT OF COMMERCE

DANIEL C. ROPER, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

Bureau of Standards

AUG 29 1938

FUEL OILS

(FOURTH EDITION)

COMMERCIAL STANDARD CS12-38

(Supersedes CS12-35)

Effective Date for New Production, May 31, 1938



A RECORDED STANDARD OF THE INDUSTRY

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1938

PROMULGATION
of
COMMERCIAL STANDARD CS12-38
for
FUEL OILS
(Fourth Edition)

On January 9, 1929, a joint conference of representative refiners, distributors, and consumers of fuel oil, manufacturers of oil burners, and general interests adopted a recommended standard for domestic and industrial fuel oils, which was accepted in writing by the industry and published as Commercial Standard CS12-29. In 1933, and again in 1934, upon recommendation of the standing committee to keep the standard abreast of progress, revisions were adopted and issued as CS12-33 and CS12-35, respectively.

On February 25, 1938, at the recommendation of the standing committee, a revision of CS12-35, drafted by Technical Committee E of American Society for Testing Materials Committee D-2, was circulated for acceptance. The industry has since accepted and approved for promulgation by the United States Department of Commerce, through the National Bureau of Standards, the revised standard as shown herein.

The standard became effective for new production on May 31, 1938, subject to the expiration of the then existing contracts.

Promulgation recommended.

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

Promulgated.

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

Promulgation approved.

Daniel C. Roper,
Secretary of Commerce.

FUEL OILS

(Fourth Edition)

COMMERCIAL STANDARD CS12-38

SCOPE

1. These specifications cover five grades of fuel oil for various types of fuel oil burning equipment.

GENERAL REQUIREMENTS

2. The fuel oils herein specified shall be hydrocarbon oils free from acid, grit, and fibrous or other foreign matter likely to clog or injure the burner or valves. If required, the oil shall be strained by being drawn through filters or wire gauze of 16 meshes to the inch. (U. S. Standard Sieve 16, ASTM designation 1,190 micron.) The clearance area through the strainers shall be at least twice the area of the suction pipe, and the strainers shall be in duplicate.

DETAIL REQUIREMENTS¹

3. The various grades of fuel oil shall conform to the detailed requirements shown in table 1. It is the intent of these classifications that failure to meet any requirement of a given grade does not automatically place an oil in the next lower grade unless in fact it meets all requirements of the lower grade.

METHODS OF TEST

4. The requirements enumerated in these specifications shall be determined in accordance with the following methods of testing of the American Society for Testing Materials, except as may be required under paragraph 5.

FLASH POINT

5. *Minimum*.—The flash point, instrument, and method for determining minimum flash point shall be those legally required for the locality in which the oil is sold. In absence of legal requirements, the minimum flash point shall be determined in accordance with the standard method of test for flash point by means of the Pensky-Martens closed tester, ASTM Designation: D 93-36.

6. *Maximum*.—Standard method of test for flash point by means of the Pensky-Martens closed tester, ASTM Designation: D 93-36.

¹ The technical requirements of this commercial standard are identical in substance with ASTM Tentative Specifications for Fuel Oils D 396-38T.

TABLE 1.—Detailed requirements for fuel oils ^a

Num- ber	Grade ^b Description of fuel oil	Flash point (°F)		Pour and sediment (°F)	Water and sediment (%)	Carbon residue (percent)	Ash (per- cent)	Distillation temperatures (°F)				Viscosity seconds	
		Min	Max					10 per- cent point	90 per- cent point	End point	Max	Min	Max
1	Distillate oil for use in burners requiring a kerosene fuel.	100 or legal	165	• 15	Trace	0.05 on 10% residuum ^d	—	410	—	• 560	—	—	—
2	Distillate oil for use in burners requiring a distillate volatile fuel.	110 or legal	190	• 15	0.05	.25 on 10% residuum ^e	—	440	600	—	—	—	—
3	Distillate oil for use in burners requiring a low viscosity fuel.	110 or legal	230	• 20	.10	.15 straight	—	—	675	• 600	—	55	—
5	Oil for use in burners requiring a medium viscosity fuel.	130 or legal	—	—	1.00	—	0.10	—	—	—	—	60	40
6	Oil for use in burners equipped with pre- heaters permitting a high viscosity fuel.	150	—	—	^b 2.00	—	—	—	—	—	—	—	300
													45

^a Recognizing the necessity for low sulfur fuel oils used in connection with heat-treatment, non-ferrous metal, glass and ceramic furnaces and other special uses, a sulfur requirement may be specified in accordance with the following table.

Grade of fuel oil	Sulfur (maximum) Percent
1	—
2	0.5
3	.5
5	.75
6	No limit
	No limit

Other sulfur limits may be specified only by mutual agreement between the buyer and seller.

^b It is the intent of these classifications that failure to meet any requirement of a given grade does not automatically place an oil in the next lower grade unless in fact it meets all requirements of the lower grade.

^c Lower or higher pour points may be specified whenever required by conditions of storage or use. However, these specifications shall not require a pour point lower than 90° F. under any conditions.

^d For use in other than screw-type blue flame burners carbon residue on 10 percent residuum may be increased to a maximum of 0.12 percent. This limit may be specified by mutual agreement between the buyer and seller.

^e The maximum end point may be increased to 590° F. when used in burners other than screw-type blue flame burners.

To meet certain burner requirements the carbon residue limit may be reduced to 0.15 percent on 10 percent residuum.

^f The minimum distillation temperature of 600° F. for 90 percent may be waived if API gravity is 30 or lower.

^g Water by distillation, plus sediment by extraction. Sum, maximum 2.0 percent. The maximum sediment by extraction shall not exceed 0.50 percent. A deduction in quantity shall be made for all water and sediment in excess of 1.0 percent.

POUR POINT

7. Standard method of test for cloud and pour points, ASTM Designation: D 97-34.

WATER AND SEDIMENT

8. *Water and sediment*.—(For grades 1 to 5, inclusive.) Standard method of test for water and sediment in petroleum products by means of centrifuge, ASTM Designation: D 96-35.

9. *Water by distillation*.—(For grade 6.) Standard method of test for water in petroleum products and other bituminous materials, ASTM Designation: D 95-30.

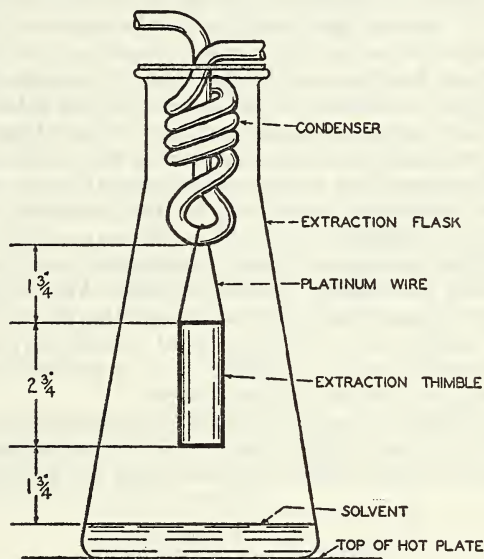


FIGURE 1.—Extraction apparatus for determination of sediment.

10. *Sediment by extraction*.—(For grade 6.) Sediment in fuel oil by extraction. ASTM Designation: D 473-38T. The method is as follows:

10a. *Apparatus*.—The extraction apparatus, figure 1, shall consist of the following:

Extraction flask.—An Erlenmeyer flask of 1-liter capacity.

Condenser.—A block-tin coil condenser as shown in figure 1.

Extraction thimble.—An alundum (porous grade) thimble,² 1 inch in diameter by 2 3/4 inches in height, weighing not less than 15 nor more than 17 g. The thimble shall be suspended from the condenser coil by means of a platinum wire so that it hangs approximately 1 3/4 inches above the extracting solvent and 1 3/4 inches below the condenser coil.

Source of heat.—A suitable source of heat to vaporize benzol, such as a steam bath or electric hot plate.

² Alundum thimbles listed as No. 5163 RA 98 by the Norton Co., Worcester, Mass., have proved satisfactory.

10b. *Procedure*.—The alundum thimble before use shall be given a preliminary extraction, allowing the solvent to drip from the thimble for at least 1 hr. The thimble shall then be dried for 1 hr at a temperature of 105° to 110° C, cooled to room temperature, and weighed to the nearest 0.0001 g. This extraction shall be repeated until the weights of the thimble, after two successive extractions, do not differ by more than 0.0002 g. Approximately 10 g of the sample³ shall be placed in the thimble and the weight determined to the nearest 0.01 g. The thimble shall be placed in the extraction apparatus and the sample extracted with 90-percent benzol until the solvent dropping from the thimble is colorless.⁴ The rate of extraction shall be such that the surface of the mixture of oil and benzol in the thimble does not rise higher than to within $\frac{3}{4}$ inch of the top. After the extraction is completed the thimble shall be dried for 1 hr at 105° to 110° C, cooled, and weighed to the nearest 0.0001 g. The extraction shall be repeated, allowing the solvent to drip from the crucible for at least 1 hr but not longer than 1 $\frac{1}{4}$ hr, the thimble dried, cooled, and weighed as above. This extraction for a 1-hr period shall be repeated, if necessary, until the weights of the dried thimble and sediment after two successive extractions do not differ by more than 0.0002 g. For referee tests a new extraction thimble shall be used. For routine tests thimbles may be used for a number of successive determinations on different samples, the extraction to constant weight for one determination being considered as the preliminary extraction for the succeeding determination. When the accumulation of sediment becomes objectionable and the combustible portion is removed by heating to a dull red heat (preferably in an electric furnace), the thimble shall be subjected to a preliminary extraction before being used for another determination.

10c. *Reproducibility of results*.—With proper attention to details of methods of procedure, check results by the same operator should not deviate from the mean value by more than the following amounts:

Sediment (percent)	Deviation from mean value (percent)
0.00 to 0.25	± 0.01
.26 to .50	± .02

CARBON RESIDUE

11. Standard method of test for carbon residue of petroleum products (Conradson carbon residue), ASTM Designation: D 189-36.

12. *Method for 10-percent residuum*.—The 10-percent residuum for the determination of carbon residue in grades 1 and 2 shall be obtained by the following adaptation of the distillation procedure described in

³ The portion of the sample taken for test shall be thoroughly representative of the sample. An estimated 10-g portion of the sample should be placed in the thimble as soon as possible after the sample has been thoroughly mixed. No attempt should be made to adjust this estimated 10-g portion to any exact predetermined amount.

⁴ When testing oils having high water content, difficulty due to clogging of the thimble with moisture may be overcome by interrupting the extraction when this occurs and drying the thimble in an oven before proceeding further with the extraction.

sections 8(b) to 10 of the standard methods of testing gas oils, ASTM Designation: D 158-28.

The 200-ml graduate used to measure the initial sample shall be used, without cleaning, to receive the distillate. The condenser outlet shall be maintained at a temperature of 32° to 40° F (0° to 4.45° C) throughout the distillation in the case of products having a distillation end point below 600° F (315° C). The standard condenser temperature of 90° to 100° F (32.2° to 37.8° C) shall be maintained for products having end points above 600° F (315° C) or in those cases where waxy distillates are obtained. The oil shall be distilled at the rate prescribed until exactly 178 ml has been collected in the graduate, then the heating shall be discontinued and the condenser allowed to drain until 180 ml (90 percent of the charge to the flask) has been collected in the graduate. The graduate shall be replaced by a small Erlenmeyer flask⁵ and any final drainings caught in this flask. To this Erlenmeyer flask shall be added, while still warm, the residue left in the distillation flask and the contents shaken well. The contents of the Erlenmeyer flask then represents a 10-percent residuum from the original product. While warm enough to flow freely, approximately 10 g of the residuum shall be poured into the weighed crucible to be used in the carbon-residue test. After cooling, the sample shall be accurately weighed and the carbon residue determined in accordance with the standard method of test for carbon residue of petroleum products (Conradson carbon residue), ASTM Designation: D 189-36. The percentage of carbon residue in the residuum shall be reported as "carbon residue on 10-percent residuum."

ASH

13. Procedure for determination of ash, as described in the standard methods of analysis of grease, ASTM Designation: D 128-37. Sample shall be thoroughly mixed to insure that portion for ash determination is representative of the sample.

DISTILLATION

14. Distillation of grade 1 oil shall be made in accordance with the standard method of test for distillation of gasoline, naphtha, kerosene, and similar petroleum products, ASTM Designation: D 86-35; and of grades 2 and 3 in accordance with the standard methods of testing gas oils, ASTM Designation: D 158-28.

VISCOSITY

15. Standard methods of test for viscosity by means of Saybolt viscosimeter, ASTM Designation: D 88-36.

REFERENCES

16. Complete information regarding the procedure for making the tests specified, but not included in the above text, is to be found in the publications of the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa.

⁵ It is important that a clean Erlenmeyer flask be used for each test.

SIGNIFICANCE OF TESTS PRESCRIBED ⁶**FLASH POINT**

17. The flash point of a product may be defined as the temperature to which it must be heated in order to give off sufficient vapor to form an inflammable mixture with air. This temperature varies with the apparatus and procedure employed and consequently both must be specified when the flash point of an oil is stated.

18. The minimum flash point of oils used for fuel is usually controlled by law. When there are no legal requirements, the minimum values in the table are to be employed. Maximum values are specified for oils 1, 2, and 3 to insure the required ease of ignition.

POUR POINT

19. The pour point of an oil is the lowest temperature at which it will flow when cooled and tested under prescribed conditions. Pour point specifications are included in order that oil may be secured which will not cause difficulty in handling or in use at the lowest temperatures to which it may normally be subjected.

WATER AND SEDIMENT

20. Water and sediment are impurities which are almost entirely excluded in fuel oils 1, 2, and 3, and which are permitted in somewhat larger quantities in fuel oils 5 and 6. It is difficult to eliminate them entirely from this latter group of oils, and the advantage is not sufficient to justify the cost. Water and sediment are determined together by the centrifuge, except for grade 6.

CARBON RESIDUE

21. The carbon residue test when considered in connection with other tests and the use for which the oil is intended furnishes pertinent information and throws some light on the relative carbon-forming qualities of an oil. For medium viscosity and blended oils it is also used to detect the presence of heavy residual products.

ASH

22. The ash test is used to determine the amount of noncombustible impurities in the oil. These impurities come principally from the natural salts present in the crude oil, or from the chemicals that may be used in refinery operations although they may also come from scale and dirt picked up from containers and pipes. Some ash-producing impurities in fuel oils cause rapid deterioration of refractory materials in the combustion chamber, particularly at high temperatures; some are abrasive and destructive to pumps, valves, control equipment, and other burner parts. Ash specifications are included in order to minimize these operating difficulties as far as practicable.

⁶ For a more comprehensive description of the significance of tests on petroleum products see "The Significance of Tests of Petroleum Products," latest revised edition, published by the American Society for Testing Materials.

DISTILLATION

23. Laboratory distillation of a sample under prescribed conditions gives an index of the volatility of the oil. The 10- and 90-percent points represent, respectively, the temperatures at which 10 and 90 percent of the sample are distilled. The end point is the maximum temperature recorded by the distillation thermometer at the end of the distillation.

24. The 10-percent point serves as an index of the ease of ignition of the oil; the 90-percent point and the end point are specified to make sure that the oil will volatilize and burn completely and produce a minimum amount of carbon.

VISCOSITY

25. The viscosity of an oil is the measure of its resistance to flow. Maximum limits are placed on this property because of its effect upon the rate at which oil will flow through pipe lines and upon the degree of atomization that may be secured in any given equipment.

26. Viscosity is measured as the time in seconds required for a definite volume of oil to pass through a small tube of specified dimensions at a definite temperature. Viscosity decreases rapidly as temperature increases, and preheating makes possible the use of oils of relatively high viscosity at normal temperatures. The Saybolt universal viscosimeter is used for fuel oils of fairly low viscosity and the Saybolt furol viscosimeter for more viscous oils.

CERTIFICATION

27. In order that purchasers of fuel oil may become familiar with the significance of grading of fuel oils and purchase fuels for the various types of burners with confidence, it is recommended that the following statement be used on invoices, contracts, sales literature, etc.:

The ----- Co. certifies this fuel oil to meet all requirements for grade ---- as specified in Commercial Standard CS12-38, issued by the National Bureau of Standards, of the United States Department of Commerce.

EFFECTIVE DATE

The standard became effective for new production on May 31, 1938, subject to the expiration of existing contracts.

STANDING COMMITTEE

The standing committee now consists of representatives of refiners, fuel oil distributors, burner manufacturers, and consumer organizations. The membership includes a number of members of Technical Committee E of American Society for Testing Materials Committee D-2. The function of this committee 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 the Division of Trade Standards, National Bureau of Standards, which acts as secretary for the standing committee.

Producers and Distributors:

R. T. GOODWIN (chairman), Shell Union Oil Corporation, 50 West 50th Street, New York, N. Y.

R. M. BARTLETT, Gulf Oil Corporation, Gulf Building, Pittsburgh, Pa.

K. E. DEROSAY, Sun Oil Co., 1608 Walnut Street, Philadelphia, Pa.

S. H. HULSE, Standard Oil Development Co., P. O. Box 246, Elizabeth, N. J.

J. B. TERRY, Standard Oil Company of California, Standard Oil Building, San Francisco, Calif.

Burner Manufacturers:

W. A. MATHESON, Delco Frigidaire Conditioning Division, General Motors Corporation, 224 West 57th Street, New York, N. Y.

M. A. POWERS, Timken Silent Automatic Division, Timken Detroit Axle Co., 100-400 Clark Avenue, Detroit, Mich.

T. B. STILLMAN, Babcock & Wilcox Co., 85 Liberty Street, New York, N. Y.

Fuel Oil Distributors:

F. E. SPENCER, Spencer Petroleum Co., 616 South Michigan Avenue, Chicago, Ill. Representing Burning Oil Distributors Association.

C. B. ACE, 45 Lincoln Park, Newark, N. J. Representing Fuel Oil Distributors Association of New Jersey.

CARL SHIELDS, Petroleum Heat and Power Co., 511 Fifth Avenue, New York, N. Y.

W. H. BUTLER, Home Fuel Oil Co., Peoples' Bank and Trust Co. Building, Passaic, N. J.

Users:

T. W. HARRIS, JR., E. I. du Pont de Nemours & Co., Wilmington, Del. Representing National Association of Purchasing Agents.

Mrs. CARL WEBER ILLIG, JR., 7 Union Street, Onset, Mass. Representing National Council of Women.

Consumer Safety:

J. H. WITTE, Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Ill.

Secretary:

F. W. REYNOLDS, Division of Trade Standards, National Bureau of Standards, Washington, D. C.

HISTORY OF PROJECT

General conference.—The manufacturers of oil burners and many petroleum refiners had long felt the need of uniform specifications for fuel oils. The American Oil Burner Association assumed the initiative in this matter and developed specifications for six grades of fuel oils with the cooperation of the American Society for Testing Materials and the American Petroleum Institute.

In order to bring these specifications into broader use the cooperation of the National Bureau of Standards was requested. Anticipating the benefits to be derived from a commonly understood basis of quality, all interests of the industry freely participated in a well-attended general conference held in New York City, January 9, 1929, and upon recommendation of this conference the standard was accepted as an everyday guide for the production, sale and use of fuel oils. The standard was published as Domestic and Industrial Fuel Oils, Commercial Standard CS12-29, and was reaffirmed on December 10, 1930, and again on December 29, 1931.

First revision.—On June 21, 1932, a meeting of the standing committee, which had been broadening to coincide exactly with section 1 of Technical Committee C of American Society for Testing Materials Committee D-2 representing the producers, distributors, users of fuel oils, and general interests, was held to discuss the need for revising the commercial standard. The committee approved a revision which was formally submitted to letter ballot. The revision embodied a number of minor changes to bring it in line with current practice in the industry, and included a table showing the permissible sulfur content for each grade when the oils are to be used for special purposes.

The revised standard was endorsed by practically all of the larger refiners, by many oil distributors and consumers, as well as the manufacturers of oil burners. It was published as Fuel Oils (second edition), Commercial Standard CS12-33 and became effective May 1, 1933.

Second revision.—As a result of improvements in oil burners and a need for limitations which would eliminate as far as practicable, overlapping of oil grades, the standing committee on June 25, 1934, approved for submission to letter ballot a revised draft which set maximum as well as minimum limits for certain characteristics, inserted requirements for carbon residue and ash, and increased the viscosity for grades 3 and 4. Following acceptance by a satisfactory majority, the success of the revision was announced on December 14, 1934, and the standard became effective 60 days later, as CS12-35.

Third revision.—A general demand by the industry for a reduction of the number of grades to be stocked by refiners and distributors led the standing committee to recommend the adoption of a revision drafted by Technical Committee E of American Society for Testing Materials Committee D-2 which reduced the number of grades to five, by the elimination of grade 4. Accompanying adjustments were made in the characteristics of the remaining grades, principally in the direction of greater volatility and fluidity. This recommended revision was circulated to the industry for acceptance on February 25, 1938, and the establishment of the revision was announced on May 31, 1938, becoming effective with the announcement.



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, D. C.

Gentlemen:

Having considered the statements on the reverse side of this sheet, we accept the Commercial Standard CS12-38 as our standard of practice in the

Production ¹

Distribution ¹

Use ¹

of fuel oils.

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_____

(Kindly typewrite or print the following lines)

Name and title_____

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 two. 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 the industry. 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 industry 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 branches of the industry 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 companies representing a satisfactory majority of production, the success of the project is announced. If, however, in the opinion of the standing committee of the industry 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 specification as their standard of practice in the production, distribution, and use of fuel oils. 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 to conform with the requirements of this standard. Therefore specific evidence of quality certification should be obtained where required.

ASSOCIATIONS

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| <p>American College of Surgeons, Chicago, Ill.
 Associated Factory Mutual Fire Insurance Cos., Boston, Mass.
 Associated General Contractors of America, Inc., Washington, D. C. (In principle.)
 Board of Fire Underwriters of the Pacific, San Francisco, Calif. (In principle.)
 Fuel Oil Distributors Association of New Jersey, Newark, N. J.
 Heating & Piping Contractors District of Columbia Association, Inc., Washington, D. C.
 National Council of Women, Consumer Interests, Belmont, Mass.
 National Warm Air Heating & Air Conditioning Association, Columbus, Ohio. (In principle.)
 Oil Burner Institute, Inc., New York, N. Y. (In principle.)
 Overlook Hospital Association, Summit, N. J.</p> | <p>American Gas Machine Co., Inc., Albert Lea, Minn.
 American Lava Corporation, Chattanooga, Tenn.
 American Lubricants, Inc., Buffalo, N. Y.
 American Oil Products Co., Somerville, Mass.
 American Petroleum Co., Cleveland, Ohio.
 American Potash & Chemical Corporation, Trona, Calif.
 American Smelting & Refining Co., Federated Metals Division, Chicago, Ill.
 American Thermos Bottle Co., The, Norwich, Conn.
 Amsco Refining Co., Corpus Christi, Tex.
 Anchor Post Fence Co., Fluid Heat Division, Baltimore, Md.
 Andale Co., Philadelphia, Pa. (In principle.)
 Anderson-Prichard Refining Corporation, Oklahoma City, Okla.
 Apex Motor Fuel Co., Chicago, Ill.
 Argo Oil Corporation, Detroit, Mich.
 Arkansas Fuel Oil Co., Shreveport, La.
 Arrow Petroleum Co., Oak Park, Ill.
 Atlantic Refining Co., The, Philadelphia Pa.
 Atlas Pipe Line Corporation, Shreveport, La.
 Aurora Gasoline Co., Detroit, Mich.
 Automatic Burner Corporation, Chicago, Ill.
 Automatic Oil Heating Corporation, Harrisburg, Pa.
 Automatic Products Co., Milwaukee, Wis.
 Babcock & Wilcox Co., The, New York, N. Y.
 Baker Oil Burner Products, Denver, Colo.
 Baker Perkins Co., Inc., Saginaw, Mich.</p> |
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FIRMS

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| <p>Acme Oil Burner Co., Inc., Cedar Rapids, Iowa.
 Aetna Oil Service, Inc., Louisville, Ky.
 Agnew & Co., Inc., John P., Washington, D. C.
 Ajax Petroleum Products Co., Cleveland, Ohio.
 Alco Products, New York, N. Y.
 Alleghany Refiners, Inc., Bolivar, N. Y.
 Allen Engineering Co., Baltimore, Md.
 Allen Manufacturing Co., Nashville, Tenn.
 Alliance Brass & Bronze Co., The, Alliance, Ohio.
 Allied Engineering Co., Cleveland, Ohio.
 Allied Oil Corporation, New York, N. Y.
 Almy Water Tube Boiler Co., Providence, R. I.</p> | <p>American Gas Machine Co., Inc., Albert Lea, Minn.
 American Lava Corporation, Chattanooga, Tenn.
 American Lubricants, Inc., Buffalo, N. Y.
 American Oil Products Co., Somerville, Mass.
 American Petroleum Co., Cleveland, Ohio.
 American Potash & Chemical Corporation, Trona, Calif.
 American Smelting & Refining Co., Federated Metals Division, Chicago, Ill.
 American Thermos Bottle Co., The, Norwich, Conn.
 Amsco Refining Co., Corpus Christi, Tex.
 Anchor Post Fence Co., Fluid Heat Division, Baltimore, Md.
 Andale Co., Philadelphia, Pa. (In principle.)
 Anderson-Prichard Refining Corporation, Oklahoma City, Okla.
 Apex Motor Fuel Co., Chicago, Ill.
 Argo Oil Corporation, Detroit, Mich.
 Arkansas Fuel Oil Co., Shreveport, La.
 Arrow Petroleum Co., Oak Park, Ill.
 Atlantic Refining Co., The, Philadelphia Pa.
 Atlas Pipe Line Corporation, Shreveport, La.
 Aurora Gasoline Co., Detroit, Mich.
 Automatic Burner Corporation, Chicago, Ill.
 Automatic Oil Heating Corporation, Harrisburg, Pa.
 Automatic Products Co., Milwaukee, Wis.
 Babcock & Wilcox Co., The, New York, N. Y.
 Baker Oil Burner Products, Denver, Colo.
 Baker Perkins Co., Inc., Saginaw, Mich.</p> |
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- Baldwin Locomotive Works, The, Philadelphia, Pa.
 Ballard Oil Co. of Hartford, Inc., Hartford, Conn.
 Ballard Oil & Equipment Co. of Maine, Portland, Maine.
 Baltimore & Ohio Railroad Co., Baltimore, Md.
 Baptist State Hospital, Little Rock, Ark.
 Barber Co., Inc., The, Philadelphia, Pa.
 Barnsdall Refining Corporation, Tulsa, Okla.
 Bartlett & Snow Co., The, C. O., Cleveland, Ohio.
 Bastian Morley Co., Inc., LaPorte, Ind.
 Behr-Manning Corporation, Troy, N. Y.
 Bennett Corporation, W. M., Omaha, Nebr.
 Bennis & Sons, Inc., Edward F., Germantown, Philadelphia, Pa.
 Bergen, New Jersey, County of, Board of Freeholders, Hackensack, N. J.
 Berks Engineering Co., Reading, Pa. (In principle.)
 Berry Asphalt Co., Chicago, Ill.
 Beshore & Co., Chas., Marion, Ind.
 Bethlehem Foundry & Machine Co., Bethlehem, Pa.
 Bethlehem Steel Co., Bethlehem, Pa.
 Beyer & Fortner, Inc., Lewisburg, Pa.
 Bird Oil Burners, Minneapolis, Minn.
 Blithe, Wesley Leshner, Philadelphia, Pa.
 Bonded Oil System, Inc., Boston, Mass.
 Booth, George T., Buffalo, N. Y.
 Borden Co., Manufacturing Division, New York, N. Y.
 Boston Gear Works, Inc., Quincy, Mass.
 Boswell Oil Co., Cincinnati, Ohio.
 Bowers Bros. Co., Philadelphia, Pa.
 Bradford Oil Refining Co., Bradford, Pa.
 Bradford Penn Refining Corporation, Clarendon, Pa.
 Braun Bros. Oil Co., Inc., Winnetka, Ill.
 Brazer, Clarence W., New York, N. Y.
 Bristol Brass Corporation, The, Bristol, Conn.
 Brodhead, F. A., Atlantic City, N. J.
 Brust, Peter, Milwaukee, Wis.
 Buckeye Iron & Brass Works, Dayton, Ohio.
 Burkart-Schier Chemical Co., Chattanooga, Tenn.
 California, University of, Division of Agricultural Engineering, Davis, Calif.
 California, University of, College of Agriculture, Davis, Calif.
 Callaway Fuel Co., Milwaukee, Wis.
 Camden Heating Co., Camden, N. J.
 Canfield Oil Co., The, Cleveland, Ohio.
 Cannon Electric, Inc., Salisbury, Md.
 Cantelou Petroleum Products, S. D., Cleveland, Ohio.
 Capitol Coal Corporation, New York, N. Y.
 Carborundum Co., The, Niagara Falls, N. Y.
 Carpenter Steel Co., The, Reading, Pa.
 Castle & Co., A. M., Chicago, Ill.
 Cavalier Corporation, Chattanooga, Tenn.
 Celluloid Corporation, Newark, N. J.
 Center St. Fuel Co., Milwaukee, Wis.
 Centex Petroleum Co., Tulsa, Okla.
 Chalmers Oil Burner Co., Minneapolis, Minn.
 Champlin Refining Co., Enid, Okla.
 Chapman Coal Co., W. J., Baltimore, Md.
 Chesebrough Manufacturing Co. Cons'd., New York, N. Y.
 Chicago, City of, Department of Weights and Measures, Chicago, Ill. (In principle.)
 Child, Harry C., Sayre, Pa.
 Children's Country Home, Westfield, N. J.
 Christian & Co., B. W., Delavan, Wis.
 Cia Minera de Penoles, S. A., Monterrey, Nuevo Leon, Mexico.
 Cities Service Oil Co. (Refining Division), Tulsa, Okla.
 Cities Service Oil Co., (Delaware), Bartlesville, Okla.
 Claflin-Summer Coal Co., Worcester, Mass.
 Cleveland & Son, Frank, Long Valley, N. J.
 Coen Co., San Francisco, Calif.
 Coleman, J. E., Red Bank, N. J.
 Colonial Beacon Oil Co., Inc., Boston, Mass.
 Col-Tex Refining Co., Oklahoma City, Okla.
 Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.
 Combustion Sales Corporation of New Jersey, Union City, N. J.
 Commerce Petroleum Co., Chicago, Ill.
 Conklin & Sons Co., Madison, Wis.
 Connecticut General Life Insurance Co., Hartford, Conn.
 Conradis Co., Inc., Wm., Washington, D. C.
 Consumers Petroleum Co., Chicago, Ill.
 Continental Baking Co., New York, N. Y.
 Continental Refining Co., Oil City, Pa.
 Controlled Heat Co., Watertown, N. Y.
 Cooks Oil Co., Oakland, Calif.
 County Seat Plumbing Supply Co., Inc., White Plains, N. Y.
 Coverall Service & Supply Co., Inc., Buffalo, N. Y.
 Cox & Sons Co., The, Bridgeton, N. J. (In principle.)
 Crane & Page, Binghamton, N. Y.
 Crescent Insulated Wire & Cable Co., Trenton, N. J.

- Cross Co., Henry H., Chicago, Ill.
 Crown Central Petroleum Corporation, Baltimore, Md.
 Crystal Oil Refining Corporation, Shreveport, La.
 Crystal Oil Works Co., Rouseville, Pa.
 Cut Bank Refining Co., Cut Bank, Mont.
 De Jarnette, Charles W., Des Moines, Iowa.
 De Lavel Separator Co., The, Poughkeepsie, N. Y.
 Deep Rock Oil Corporation, H. N. Greis as Trustees for, Chicago, Ill.
 Deep Rock Oil Corporation, Cushing, Okla.
 Deffer Corporation, Harry R., Buffalo, N. Y.
 Delta-Star Electric Co., Chicago, Ill.
 Derby Oil Co., Wichita, Kans.
 Dexter & Blethen, Dover-Foxcroft, Maine.
 Dexter Folder Co., Pearl River, N. Y.
 Diesel Supply Co., Joplin, Mo.
 Dietel, George J., Buffalo, N. Y.
 D'Ippolito Oil Co., Vineland, N. J.
 Dixie Fuel & Supply Co., Detroit, Mich.
 Dodge & Morrison, New York, N. Y.
 Dodge-Taylor Co., Rockville Centre, L. I., N. Y.
 Dome Oil Co., Inc., Washington, D. C.
 Domestic Sales Co., Perth Amboy, N. J.
 Dorsey, Inc., Francis C., Baltimore, Md.
 Eagle Petroleum Co., St. Louis, Mo.
 Eastman Kodak Co., Kodak Park Works, Rochester, N. Y.
 Ebasco Services, Inc., New York, N. Y. (In principle.)
 Economy Service, Inc., East Orange, N. J.
 Economy Stations, Inc., Hamilton, Ohio.
 Edge Moor Iron Works, Inc., Edge Moor, Del.
 Edwards, Inc., John, Brooklyn, N. Y.
 Eldorado Refining Co., The, Eldorado, Kans.
 Electric Boat Co., Groton, Conn.
 Electro Refractories & Alloys Corporation, Lackawanna, N. Y.
 Electrol, Inc., Clifton, N. J.
 Elm Coal & Oil Corporation, Mount Vernon, N. Y.
 Emerys' Sons, Inc., Thos., Cincinnati, Ohio.
 Eureka Petroleum Co., Inc., Kansas City, Mo.
 Excelsior Oil Corporation, Mount Vernon, N. Y.
 Fair-Chester Oil Co., Inc., Port Chester, N. Y.
 Falley Petroleum Co., Chicago, Ill. (In principle.)
 Farmers Union Central Exchange, Inc., South St. Paul, Minn.
 Filer & Stowell Co., The, Milwaukee, Wis.
 First National Oil Corporation, Long Island City, N. Y.
 Fisler, A. W., Glassboro, N. J.
 Florence Stove Co., Gardner, Mass.
 Frankenberg-Rich Eng. Co., Inc., Mount Vernon, N. Y.
 Franklin Creek Refining Corporation, Franklin, Pa. (In principle.)
 Freedom Oil Works Co., The, Freedom, Pa.
 Frontier Engineering Corporation, Buffalo, N. Y.
 Frontier Fuel Oil Corporation, Buffalo, N. Y.
 Fuel Engineering Co. of New York, New York, N. Y. (In principle.)
 General Motors Corporation, Cleveland Diesel Engine Division, Cleveland, Ohio.
 General Motors Sales Corporation, Delco-Frigidaire Conditioning Division, New York, N. Y. and Dayton, Ohio.
 General Petroleum Corporation, Elizabeth, N. J.
 General Petroleum Corporation of California, Los Angeles, Calif.
 Gerhardt, W. F., Richmond, Va.
 Gilbert & Barker Manufacturing Co., Springfield, Mass.
 Gilmore Oil Co., Los Angeles, Calif.
 Glascock Stove & Manufacturing Co., Greensboro, N. C.
 Gray Industrial Laboratories, Newark, N. J.
 Green Foundry & Furnace Works, Des Moines, Iowa.
 Greenwood Eng. Co., Inc., Glenarm, Md.
 Griffith-Consumers Co., Washington, D. C.
 Gulf Oil Corporation, Pittsburgh, Pa.
 Gulf Refining Co., Pittsburgh, Pa.
 Gustafson Bros. Oil Co., Chicago, Ill.
 Hacket-Stevenson Co., Inc., Patchogue, N. Y.
 Hagan Co., George J., Pittsburgh, Pa.
 Hancock Oil Co. of California, The, Long Beach, Calif.
 Harbor Fuel Co., Inc., Glen Cove, N. Y.
 Harker Plumbing & Heating Co., Duluth, Minn.
 Harris, Jay, New York, N. Y.
 Harvard University, Cambridge, Mass.
 Heil Co., The, Milwaukee, Wis.
 Heller & Durand, Inc., Newark, N. J.
 Hendricks' Son, John S., Stockton, N. J.
 Hoffman Fuel Co., The Michael, Bridgeport, Conn.
 Home Oil Co. of Rochester, Rochester, Minn.
 Home Oil & Refining Co., Great Falls, Mont.
 Homestead Valve Manufacturing Co., Coraopolis, Pa.
 Honolulu Oil Corporation, San Francisco, Calif.

- Hooper Co., Inc., F. X., Glenarm, Md.
 Hospital Bureau of Standards & Supplies, Inc., New York, N. Y.
 Hughes Oil Co., Chicago, Ill.
 Humble Oil & Refining Co., Houston, Tex.
 Hunt Co., Robt. W., Chicago, Ill.
 Hunter Tractor & Machinery Co., Milwaukee, Wis.
 Illinois Farm Supply Co., Chicago, Ill.
 Independent Refining Co., Billings, Mont.
 Independent Sales Co., Billings, Mont.
 Indian Refining Co., Lawrenceville, Ill.
 Ingersoll-Rand Co., Phillipsburg, N. J.
 Iowa University Hospitals, Iowa City, Iowa. (In principle.)
 Jenkins Bros., Bridgeport, Conn.
 Johns Hopkins Hospital, The, Baltimore, Md.
 Johnson Co., S. T., Oakland, Calif.
 Johnson Oil Refining Co., Chicago, Ill.
 Johnston Manufacturing Co., Minneapolis, Minn.
 Jones & Co., Inc., T. A. D., New Haven, Conn.
 Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
 Kegan, Frank H., Bloomfield N. J.
 Keith Oil Corporation, Brockton, Mass.
 Kendall Refining Co., Bradford, Pa.
 Kendrick Oil Co., Tulsa, Okla.
 Kentucky Consumers Oil Co., Inc., Louisville, Ky.
 Ketcham, W. P., Babylon, N. Y.
 Ketterson, Andrew, Newburgh, N. Y.
 Kewanee Boiler Corporation, Kewanee, Ill.
 King Engineering Corporation, Ann Arbor, Mich. (In principle.)
 Kleen-Heat, Inc., Chicago, Ill.
 Krawetz, A., Chicago, Ill.
 Lafferty, R. S., Camden, N. J.
 Lefax, Inc., Philadelphia, Pa. (In principle.)
 Lennox Furnace Co., Syracuse, N. Y. (In principle.)
 Lewis Coal & Oil Co., Inc., Port Washington, N. Y.
 Ley, J. H., Plainview, Minn. (In principle.)
 Line Material Co., South Milwaukee, Wis.
 Lion Oil Refining Co., El Dorado, Ark.
 Little, Inc., Arthur D., Cambridge, Mass. (In principle.)
 Littleford Bros., Cincinnati, Ohio.
 Loizeaux Fuel Co., T. R., Plainfield, N. J.
 Long Beach, Better Business Bureau of, Long Beach, Calif. (In principle.)
 Loose-Wiles Biscuit Co., Kansas City, Mo.
 Loughborough Oil Co., Washington, D. C.
 Lupton & Sons Co., David, Philadelphia, Pa.
 Lynch Clarisey Co., Chicago, Ill.
 Mack Air Conditioning Corporation, Atlantic City, N. J.
 Mack Oil Co., Berwyn, Pa.
 Madeley, John P., Millville, N. J.
 Magnolia Petroleum Co., Dallas, Tex.
 Marine Biological Laboratory, Woods Hole, Mass.
 Maritime Oil Co., Houston, Tex.
 Maritime Petroleum Corporation, New York, N. Y.
 Master Kraft Oil Burner of Queens, Inc., Jamaica, L. I., N. Y.
 Mathers Fuel Corporation, Philadelphia, Pa.
 Mathieson Alkali Works, Inc., The, Niagara Falls, N. Y.
 May Oil Burner Corporation, Baltimore, Md.
 McCormick Estates, Chicago, Ill.
 McElligott Fuel Corporation, Waterbury, Conn.
 McIlvaine Oil Burner Co. of West County, White Plains, N. Y.
 Meenan Oil Co., Inc., New York, N. Y.
 Messer Co., Inc., The, Newark, N. J.
 Metropolitan Coal Co., Boston, Mass.
 Miami University, Oxford, Ohio.
 Mich-I-Penn Oil & Grease Co., Detroit, Mich.
 Micro-Westco, Inc., Bettendorf, Iowa.
 Milwaukee, Sewerage Commission of the City of, Milwaukee, Wis.
 Monarch Manufacturing Works, Inc., Philadelphia, Pa.
 Moore, David H., Atlantic City, N. J.
 Motor Wheel Corporation, Duo-Therm Division, Lansing, Mich.
 Mudge Co., C. T., Portland, Oreg. (In principle.)
 Multnomah, County of, Portland, Oreg.
 Nantucket Gas & Electric Co., Nantucket, Mass.
 Narberth Coal Co., Narberth, Pa.
 Nash-Kelvinator Corporation, Kelvinator Division, Detroit, Mich.
 Nassau Utilities Fuel Corporation, Roslyn, L. I., N. Y.
 National Fuel Oil Co., Chicago, Ill.
 Naylor, T. C., Binghamton, N. Y.
 Nelson, Albert L., St. Louis, Mo.
 Nelson Oil Co., Inc., Peekskill, N. Y.
 New Haven Coal Co., The, New Haven, Conn.
 New Orleans, Inc., Better Business Bureau of, New Orleans, La. (In principle.)
 New York, State of, Division of Standards & Purchase, Albany, N. Y.
 Niles Bement Pond Co., Hartford, Conn.
 Nolan Bros., N. Tarrytown, N. Y.
 Northern Equipment Co., Erie, Pa.
 Northern New Jersey Oil Co., Newark, N. J.
 Northern Oil Burner Co., Minneapolis, Minn.
 Northwestern Oil Co., Superior, Wis.

- Nuway Corporation, The, Rock Island, Ill.
 Ohio Oil Co., The, Findlay, Ohio.
 Oil Products, Inc., West Hempstead, N. Y.
 Oilomatic Heating Co., Inc., Reading, Pa.
 Oklahoma Gas and Electric Co., Oklahoma City, Okla. (In principle.)
 Old Dutch Refining Co., Muskegon, Mich.
 Orange Memorial Hospital, Orange, N. J.
 Orr, Benjamin Neville, New York, N. Y.
 Orr & Sembower, Inc., Reading, Pa. (In principle.)
 Owens, J. M., Norristown, Pa.
 Pan-American Engineering Co., Berkeley, Calif.
 Panhandle Refining Co., Wichita Falls, Tex.
 Paragon Oil Co., Inc., Brooklyn, N. Y.
 Park Oil Co., Roanoke, Va.
 Patchogue Oil Terminal Corporation, Brooklyn, N. Y.
 Pate Oil Co., Milwaukee, Wis.
 Paterson General Hospital, Paterson, N. J.
 Peaster Oil Co., Winnetka, Ill.
 Pehrson, G. A., Spokane, Wash.
 Penn Electric Switch Co., Goshen, Ind.
 Penn Service Oil Co., Reading, Pa.
 Pennsylvania, Commonwealth of, Harrisburg, Pa.
 Pennsylvania Hospital, Philadelphia, Pa.
 Pennsylvania Oil Co., Somerville, Mass.
 Pennsylvania Oil Products Refining Co., Warren, Pa.
 Pennsylvania Refining Co., Butler, Pa.
 Pennsylvania State College, The, Engineering Experiment Station, State College, Pa.
 Pennzoil Co., The, Oil City, Pa.
 Peoples Coal & Fuel Oil Co., Phoenixville, Pa.
 Perfection Stove Co., Cleveland, Ohio.
 Permutit Co., The, Birmingham, N. J.
 Peterson Co., George C., Chicago, Ill.
 Petrol Corporation, The, Los Angeles, Calif.
 Petroleum Heat & Power Co., Inc., New York, N. Y. and Stamford, Conn.
 Petroleum Oils Corporation, Kansas City, Mo.
 Petroleum Products, Inc., Kansas City, Mo.
 Petroleum Storage Corporation, Mount Vernon, N. Y.
 Petrometer Corporation, Long Island City, N. Y. (In principle.)
 Peyton & Co., Klamath Falls, Ore.
 Pfizer & Co., Inc., Charles, New York, N. Y.
 Philadelphia Electric Co., Philadelphia, Pa.
 Phoenix Chemical Laboratory, Inc., Chicago, Ill. (In principle.)
 Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass.
 Pocomoke Foundry & Machine Works, Pocomoke City, Md.
 Portland Oil Co., Portland, Ore.
 Power Plant Engineering, Chicago, Ill. (In principle.)
 Procter & Gamble Co., Ivorydale, Ohio.
 Public Service Oil Co., Inc., Bronx, N. Y.
 Pure Oil Co., Chicago, Ill.
 Pyramid Petroleum Products Co., Kearny, N. J.
 Quality Bakers of America, New York, N. Y.
 Queens Fuel Oil Co., Inc., Howard Beach, N. Y.
 Queens Petro Co., Inc., Jamaica, N. Y.
 Quincy Oil Co., Quincy, Mass.
 R-S Products Corporation, Philadelphia, Pa.
 Ray Oil Burner Co., San Francisco, Calif.
 Reid, Jr., William H., Billings, Mont.
 Reif-Rexoil, Inc., Buffalo, N. Y.
 Renown Stove Co., Owosso, Mich.
 Republic Oil Co., Pittsburgh, Pa.
 Republic Oil Refining Co., Houston, Tex.
 Richardson & Gray, Consulting Engineers, Boston, Mass. (In principle.)
 Richfield Oil Corporation, Los Angeles, Calif.
 Rockford Drop Forge Co., Rockford, Ill.
 Rockwell Co., W. S., New York, N. Y.
 Ross Heater & Mfg. Co., Inc., Buffalo, N. Y. (In principle.)
 Royce, William, Lakeside, Mich.
 St. John's Hospital, Brooklyn, N. Y.
 Saunders Petroleum Co., Kansas City, Mo.
 Savannah Chamber of Commerce, Merchants Council, Savannah, Ga.
 Shock Independent Oil Co., Mount Joy, Pa.
 Schoeppe, Edward, Philadelphia, Pa.
 Schrafft & Sons Corporation, W. F., Charlestown, Mass.
 Schultz Co., W. R., North Scituate, Mass.
 Schutte & Koerting Co., Philadelphia, Pa.
 Seaside Oil Co., Santa Barbara, Calif.
 Sego Milk Products Co., Salt Lake City, Utah.
 Seneca Petroleum Co., Chicago, Ill..
 Seymour Mfg. Co., The, Seymour, Conn.
 Shedlov Oil Burners, Inc., Minneapolis, Minn.
 Shell Oil Co., San Francisco, Calif.
 Shell Petroleum Corporation, St. Louis, Mo.
 Shell Union Oil Corporation, New York, N. Y.
 Shellenberger—Gregg Co., Milwaukee, Wis.

- Sims Co., The, Erie, Pa. (In principle.)
- Skelly Oil Co., Eldorado, Kans.
- Sloan & Zook Co., The, Warren, Pa.
- Smith, H. E., White Plains, N. Y. (In principle.)
- Smith Co., The H. B., Westfield, Mass. (In principle.)
- Smith Oil & Refining Co., Rockford, Ill.
- Smith Paper Mills, Ltd., Howard, Cornwall, Ontario, Canada.
- Smith Utilities Inc., Warriner, Spring Valley, N. Y.
- Socony-Vacuum Oil Co., Inc., New York, N. Y.
- Socony-Vacuum Oil Co., Inc., White Star-Ohio Division, Detroit, Mich.
- Sonneborn Sons, Inc., L., Daugherty Refinery Division, Petrolia, Pa.
- South Dakota State Chemical Laboratory, Vermillion, S. Dak. (In principle.)
- Souther Engineering Co., The, Henry, Hartford, Conn. (In principle.)
- Southern Oil Service, Nashville, Tenn.
- Southern Pacific Co., San Francisco, Calif.
- Spreckels Bros. Com'l Co., (Hercules Oil Co.), San Diego, Calif.
- Sprengle Sales Co., H. H., York, Pa.
- Standard Oil Co. of California, San Francisco, Calif.
- Standard Oil Co., Inc., in Kentucky, Louisville, Ky.
- Standard Oil Co. of Louisiana, Baton Rouge, La.
- Standard Oil Co. of New Jersey, New York, N. Y.
- Standard Oil Co. (Ohio), The, Cleveland, Ohio.
- Standard Oil Co. of Pennsylvania, Philadelphia, Pa.
- Standard Oil Co. of Texas, San Francisco, Calif.
- Stanley Works, The, Bridgeport, Conn.
- Staten Island Home Utilities Co., Inc., Port Richmond, S. I., N. Y.
- Steam and Combustion Co., Chicago, Ill.
- Sterling Fuel Oil Corporation, Chicago, Ill.
- Stillman & Van Sieten, Inc., New York, N. Y. (In principle.)
- Stoetzel, Ralph E., Chicago, Ill.
- Stoll Oil Refining Co., Louisville, Ky.
- Stuart Co., W. W., Des Moines, Iowa.
- Sun Oil Co., Philadelphia, Pa.
- Sundstrand Engineering Co., Rockford, Ill.
- Superior Oil Works, Warren, Pa.
- Swarthmore Heating Service, Swarthmore, Pa.
- Sylvestre Oil Co., Inc., Mt. Vernon, N. Y.
- Synco-Flame Burner Corporation, Hartford, Conn.
- Talco Asphalt & Refining Co., Mt. Pleasant, Tex.
- Tate-Jones & Co., Inc., Leetsdale, Pa.
- Technical Publishing Co., Chicago, Ill. (In principle.)
- Texas Co., The, New York, N. Y.
- Textile Dyeing & Printing Co. of America, Inc., Fair Lawn, N. J.
- Thompson, A. W., East Stroudsburg, Pa.
- Thompson Products, Inc., Cleveland, Ohio. (In principle.)
- Tide Water Associated Oil Co., Associated Division, San Francisco, Calif.
- Timken Detroit Axle Co., Timken Silent Automatic Division, Detroit, Mich.
- Timken Roller Bearing Co., The, Canton, Ohio.
- Town and Country Oil Corporation, Mt. Vernon, N. Y.
- Trumbull Electric Mfg. Co., The, Plainville, Conn.
- Tuffley Burner Corporation, Buffalo, N. Y.
- Uhl, Jr., Otto, East Elmhurst, L. I., N. Y.
- Ultra-Penn Refining Co., Butler, Pa.
- Underwriters' Laboratories, Inc., Chicago, Ill.
- Union Oil Co. of California, Los Angeles, Calif.
- United Equipment & Supply Co., Washington, D. C.
- United Light & Power Eng. & Const. Co., Davenport, Iowa.
- United Oil Mfg. Co., Cleveland, Ohio, and Erie, Pa.
- United Refining Co., Warren, Pa.
- U. S. Industrial Alcohol Co., Baltimore, Md. (In principle.)
- U. S. Industrial Chemical Co., Inc., Baltimore, Md. (In principle.)
- Universal Oil Products Co., Chicago, Ill., and Riverside, Ill. (In principle.)
- Updike Lumber & Coal Co., The, Omaha, Nebr.
- Utah Oil Refining Co., Salt Lake City, Utah.
- Vickers Petroleum Co., Wichita, Kans.
- Vielt Co., Rockville, Md.
- Volcanic Specialties Co., The, Alliance Ohio.
- Wachter, Harry W. & Horace W., Toledo, Ohio.
- Wagner Engineering Corporation, Pittsfield, Mass.
- Walsh, William H., Chicago, Ill.
- Waltham, City of, Waltham, Mass.
- Ward Oil Co., Inc., Tarrytown, N. Y.
- Washington Gas Light Co., Washington, D. C.
- Waterside Fuel Oil Corporation, Brooklyn, N. Y.
- Waverly Oil Works Co., Pittsburgh, Pa.
- Weitzel, Cameron B., Manheim, Pa. (In principle.)

Wells Petroleum Co., Chicago, Ill.
 West, Albert E., Boston, Mass. (In principle.)
 Western Oil Co., Somerville, Mass.
 Western Oil & Fuel Co., Minneapolis, Minn.
 Whitlock Coil Pipe Co., The, Hartford, Conn.
 Wileox Oil & Gas Co., H. F., Tulsa, Okla.
 Wilmette, Village of, Wilmette, Cook County, Ill. (In principle.)
 Wiloil Corporation, Pittsburgh, Pa.
 Wilson & Co., Inc., Chicago, Ill.
 Winkler-Koch Engineering Co., The, Wichita, Kans. (In principle.)
 Wirt Franklin Petroleum Corporation, Ardmore, Okla. (In principle.)
 Wisconsin Ice & Coal Co., Milwaukee, Wis.
 Witschy Bros. Oil Co., Scottsbluff, Nebr.

Witte Engine Works, Kansas City, Mo.
 Wolverine-Empire Refining Co., Oil City, Pa.
 Yale & Towne Mfg. Co., The, Stamford, Conn.
 Young Heat Engineering Co., Billings, Mont.
 Zindorf & Son, J. G., Annapolis, Md.

U. S. GOVERNMENT

Agriculture, U. S. Department of, Bureau of Agricultural Engineering, Washington, D. C. (In principle.)
 Interior, U. S. Department of the, National Park Service, Yellowstone National Park, Yellowstone Park, Wyo.
 National Advisory Committee for Aeronautics, Washington, D. C.
 Veterans' Administration, Washington, D. C.

COMMERCIAL STANDARDS

CS No.	Item	CS No.	Item
0-30.	The commercial standards service and its value to business.	41-32.	Surgeons' latex gloves.
1-32.	Clinical thermometers (second edition).	42-35.	Fiber insulating board (second edition).
2-30.	Mopsticks.	43-32.	Grading of sulphonated oils.
3-38.	Stoddard solvent (second edition).	44-32.	Apple wraps.
4-29.	Staple porcelain (all-clay) plumbing fixtures.	45-36.	Douglas fir plywood (domestic grades) (second edition).
5-29.	Steel pipe nipples.	46-36.	Hosiery lengths and sizes (second edition).
6-31.	Wrought-iron pipe nipples (second edition).	47-34.	Marking of gold-filled and rolled-gold-plate articles other than watch cases.
7-29.	Standard weight malleable iron or steel screwed unions.	48-34.	Domestic burners for Pennsylvania anthracite (underfeed type).
8-33.	Gage blanks (second edition).	49-34.	Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
9-33.	Builders' template hardware (second edition).	50-34.	Binders board for bookbinding and other purposes.
10-29.	Brass pipe nipples.	51-35.	Marking articles made of silver in combination with gold.
11-29.	Regain of mercerized cotton yarns.	52-35.	Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
12-38.	Fuel oils (fourth edition).	53-35.	Colors and finishes for cast stone.
13-30.	Dress patterns.	54-35.	Mattresses for hospitals.
14-31.	Boys' blouses, button-on waists, shirts, and junior shirts.	55-35.	Mattresses for institutions.
15-29.	Men's pajamas.	56-36.	Oak flooring.
16-29.	Wall paper.	57-36.	Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings.
17-32.	Diamond core drill fittings (second edition).	58-36.	Woven elastic fabrics for use in overalls (overall elastic webbing).
18-29.	Hickory golf shafts.	59-36.	Woven dress fabrics—testing and reporting.
19-32.	Foundry patterns of wood (second edition).	60-36.	Hardwood dimension lumber.
20-36.	Staple vitreous china plumbing fixtures (second edition).	61-37.	Wood-slat venetian blinds.
21-36.	Interchangeable ground-glass joints, stopcocks, and stoppers (third edition).	62-38.	Colors for kitchen accessories.
22-30.	Builders' hardware (nontemplate).	63-33.	Colors for bathroom accessories.
23-30.	Feldspar.	64-37.	Walnut veneers.
24-30.	Standard screw threads.	65-38.	Wool and part-wool fabrics.
25-30.	Special screw threads.	66-38.	Marking of articles made wholly or in part of platinum.
26-30.	Aromatic red cedar closet lining.	67-38.	Marking articles made of karat gold.
27-36.	Mirrors (second edition).	68-38.	Liquid hypochlorite disinfectant, deodorant, and germicide.
28-32.	Cotton fabric tents, tarpaulins, and covers.	69-38.	Pine oil disinfectant.
29-31.	Staple seats for water-closet bowls.	70-38.	Coal tar disinfectant (emulsifying type).
30-31.	Colors for sanitary ware.	71-38.	Cresylic disinfectants.
31-35.	Wood shingles (third edition).	72-38.	Household insecticide (liquid spray type).
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.	Fourdriner 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).		
40-32.	Surgeons' rubber gloves.		

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice in their industry, 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.



