

U. S. DEPARTMENT OF COMMERCE

DANIEL C. ROPER, Secretary

NATIONAL BUREAU OF STANDARDS

LYMAN J. BRIGGS, Director

MIRRORS

(Second Edition)

Bureau of Standards

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Supersedes CS27-30

Effective date for new production, August 20, 1936



A RECORDED STANDARD OF THE INDUSTRY

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PROMULGATION
of
COMMERCIAL STANDARD CS27-36
for
MIRRORS
(Second Edition)

On June 12, 1930, a joint conference of representative manufacturers, distributors, and users of plate-glass mirrors adopted a commercial standard for plate-glass mirrors which was subsequently accepted by the industry and promulgated as Commercial Standard CS27-30. Following experience with this standard, the standing committee recommended revision to include "shock" or common window-glass mirrors and to eliminate AA and no. 3 quality plate-glass mirrors. 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 is effective for new production beginning August 20, 1936.

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.

MIRRORS

(Second Edition)

COMMERCIAL STANDARD CS27-36

PURPOSE

1. This standard of quality is established as a basis of common understanding for the industry and to assist commercial users of mirrors and ultimate mirror purchasers to distinguish between the various qualities offered for sale. By adoption of this standard it is hoped that interest may be increased in the use of higher quality mirrors, and that shipping costs, packing charges, and other expenses incident to exchange merchandise, which occur through misunderstanding between buyer and seller, may be eliminated.

SCOPE

2. This commercial standard includes plate-glass mirrors made from polished plate glass, as well as so-called "shock" mirrors 6 by 8 inches and larger made from common window glass, which have previously been known as common glass, sheet glass, crystal, or shock mirrors.

USES

3. Because of their high polish, flatness, and uniform thickness, plate-glass mirrors produce a true reflection of the objects before them and should, therefore, be used where true and undistorted reflection is essential or desired.

4. Window glass is not ground and polished and has a characteristic surface waviness which presents distortions that are accentuated when the glass is silvered, thus preventing a true reflection of the objects viewed in such mirrors. Window glass, accordingly, finds its chief use in mirrors of relatively small size.

GENERAL REQUIREMENTS

5. All mirrors sold as of commercial standard quality shall be serviceable mirrors equaling or exceeding the quality designated for each grade.

6. Since the central area of the mirror comes in the direct line of vision, it is of greater importance and, therefore, defects occurring therein are more serious than those appearing in the outer area.

7. On mirrors to be fitted into frames, small chips on the edge shall not be considered as defects, provided they are at least one-eighth inch smaller than the width of the frame rabbet.

DETAIL REQUIREMENTS

PLATE-GLASS MIRRORS

8. Plate-glass mirrors are of three distinct grades designated as "A", no. 1, and no. 2, based on the presence of certain defects which generally follow existing grades of plate glass, which are known respectively as silvering, mirror glazing, and glazing qualities. No. 1 and no. 2 quality mirrors constitute the bulk of production. The small remaining production constitutes the finest product of the industry, known as "A" Quality, a special classification for the most discriminating trade.

9. The several grades designated below shall comply with the requirements specified. For description of terms see glossary on page 4 and for the method of inspection see page 4.

"A" Quality.—The central area of mirrors of this quality shall be free from major defects, but may contain well scattered fine seed and short faint hair lines, when not grouped, and occasionally very light short finish visible only on close inspection. The outer area, in addition, may contain seed and short faint scratches when not grouped.

No. 1 Quality.—The central area of mirrors of this quality may contain scattered seed, faint hair lines, and light short finish. The outer area, in addition, may contain short scratches and occasional strings not over 2 inches long.

No. 2 Quality.—Mirrors of this quality may contain the following defects: Numerous scattered seed, occasional coarse seed, light reams, strings, light scratches, short finish if not torn, hair lines if not too densely grouped, and bull's eye if not visible from front inspection.

SHOCK MIRRORS

10. Shock or common window-glass mirrors are manufactured in one quality only based upon defects found in window glass. They are available in single strength and double strength, but are sometimes made of window glass of greater thickness than double strength. Shock mirrors are made of common window glass known in the trade as "A" quality, the lower grades being unsatisfactory for silvering purposes.

11. The defects permitted in shock or common window-glass mirrors are faint strings or lines, slight burns, small seeds, small blisters, and light scratches. No mirror shall contain all of these defects, and those present may not be grouped when in the central area of the mirror. Strings, lines, or burn specks shall not be of such intensity that they are visible when observing the mirror at an angle greater than 30° between the line of sight and the glass. Waves shall not be visible at an angle greater than 20° with the glass. Blisters shall not exceed one-fourth inch in length, unless they occur near the edge of the mirror. In general, the central area of the mirror shall be practically free from defects, and the appearance of the mirror as a whole shall be such that there is no perceptible interference with the reflection of the object as long as one is not looking at the mirror at an acute angle. This standard does not apply to shock mirrors smaller than 6 by 8 inches.

STANDARD THICKNESSES

12. Plate-glass mirrors of commercial standard quality shall be between three-sixteenths and five-sixteenths of an inch thick. If specific thicknesses are ordered, a variation of one thirty-second inch plus or minus the given thickness shall be allowed.

13. Shock mirrors of commercial standard quality may be had in three distinct thicknesses, known as single strength, double strength, and heavy, as shown in table 1.

TABLE 1.—*Thicknesses of shock mirrors*

| Classification | Thickness ¹ | | Number of lights per inch | | Average weight in ounces per square foot |
|----------------------|------------------------|-------------|---------------------------|---------|--|
| | Minimum | Maximum | Minimum | Maximum | |
| | <i>Inch</i> | <i>Inch</i> | | | |
| Single strength..... | 0.080 | 0.100 | 10.0 | 12.5 | 18.5 |
| Double strength..... | .111 | .125 | 8.0 | 9.0 | 24.5 |
| Heavy..... | .176 | .205 | 5.0 | 5.5 | 39.0 |

¹The thickness measured at various points on an individual mirror shall not vary more than half the difference indicated between minimum and maximum thickness for the three classifications given.

SILVERING

14. All plate-glass mirrors of commercial standard quality shall be silvered in an approved manner and guaranteed for a period of 1 year from the date of manufacture, unless the mirrors are subject to unusual conditions, such as open weather, moist walls, steamed rooms, direct sunlight, or similar conditions.

15. Shock mirrors are not guaranteed as to silvering.

QUALITY DESIGNATION AND GUARANTEE

16. For the guidance of the buying public, and the protection of the mirror manufacturer, each commercial standard grade mirror may be labeled in the color designated below, with the following statement for each particular grade:

PLATE-GLASS MIRRORS

17. Red for "A" quality.

Blue for no. 1 quality.

Green for no. 2 quality.

"We guarantee this mirror to be manufactured of polished plate glass and to be of "-----" ¹ quality as specified in Commercial Standard CS27-36, issued by the National Bureau of Standards, United States Department of Commerce."

(Name of manufacturer)

¹ Indicate whether of "A", no. 1, or no. 2 quality.

SHOCK MIRRORS

18. Yellow.

"We guarantee this mirror to be made of-----
 -----² common window glass in accordance with
 Commercial Standard CS27-36, issued by the National
 Bureau of Standards, United States Department of
 Commerce."

 (Name of manufacturer)

19. The above plan of certifying the quality of mirrors to the ultimate purchaser is made effective by members of the Mirror Manufacturers Association through a label in the form illustrated in figure 1.



FIGURE 1.—Certification label of the Mirror Manufacturers Association

METHOD OF INSPECTION

20. It is desirable that a uniform method of inspection be followed since the distance from the mirror being examined, the angle between it, and the line of sight, and the intensity of light, all affect the visibility of imperfections.

21. Accordingly, the mirror should be examined in indirect daylight of medium intensity with the inspector's eye on a level with the center of the plate and about 36 inches away.

GLOSSARY OF TERMS

Blisters.³—Elongated bubbles or seeds, elliptical in shape. This form of bubble is common to window glass. The method of manufacture draws out practically all bubbles in one direction.

Bubbles.—Gas inclusions, generally spherical and brilliant in appearance and larger than one thirty-second of an inch in diameter.

Open bubbles. Those which have been broken into by grinding, leaving a hemispherical hole in the glass surface. Also referred to as shot holes.

Bull's-eye.—A wave or depression in the glass causing distortion of the image.

Burns.⁴—Small projections or indentations on the surface appearing as an area of small specks, together with some destruction of the

² Indicate whether single strength, double strength, or heavy window glass.

³ Applies to shock mirrors only.

⁴ See footnote 3.

surface polish. An imperfection occurring during the pattering of window glass caused by flattening furnaces becoming too hot.

Central area.—That portion of the mirror considered to form an oval or circle centered on the piece, the axes or diameters of which do not exceed 80 percent of the over-all dimension.

*Cords.*⁵—Heavy strings incorporated in the sheet, occurring without any regularity of direction, and appearing to be of considerable thickness rather than on the surface.

Feathers.—Streaks or areas of finely divided opaque foreign material mixed with numerous small bubbles or seed which appear as a mass of specks. They are due to the inclusion of foreign material in the batch or to incomplete skimming of the pot before pouring.

Fire cracks.—Small cracks penetrating the surface of the plate, usually the shape of short-hooked crescents, caused by sudden heating or chilling of the glass surface.

Hair lines.—Very faint lines on either surface of the glass.

*Lines.*⁶—Waves which extend continuously across the sheet, so that the reflection from the surface appear as a line or series of lines extending either the full width or a considerable distance across the sheet.

Major defects.—The following are considered major defects: Blisters, bubbles, bull's-eye, burns, cords, feathers, fire cracks, lines, open bubbles, ream, scratches, coarse seed, heavy seed, open seed, short finish, skim, stones, and strings.

Minor defects.—The following are considered minor defects: Fine seed, scattered seed, light short finish, and hair lines.

Plate Glass.—Transparent, flat, relatively thin glass having plane polished surfaces and showing no distortion of vision when viewing objects through it at any angle.

Ream.—An area of strings or of nonhomogeneous glass incorporated in the plate, appearing as a knotty, hairy mass, mixed with clear glass.

Scratches.—Any marking or tearing of the surface appearing as though it had been done by either a sharp or rough instrument.

Seed.—Minute bubbles less than one thirty-second inch in diameter. Seed are inherent defects in the best quality of plate glass.

Coarse seed: Minute bubbles between one sixty-fourth inch and one thirty-second inch in diameter.

Fine seed: Minute bubbles less than one sixty-fourth inch in diameter.

Heavy seed: A condition where fine or coarse seed are very numerous, such as 25 or more to the square inch.

Open seed: Those which have been broken into by grinding, leaving a hemispherical hole in the glass surface.

Scattered seed: Indicates a condition of few and occasional easily visible coarse seed. Two or three may be spaced 1 or 2 inches from each other, but one here and there at much greater distances apart is the usual intention of the term.

Shock mirrors.—Those made of common window glass, which is defined in U. S. Federal Specification DD-G-451 for Glass: Flat for Glazing Purposes, issued April 28, 1931, as "Transparent, relatively

⁵ See footnote 3.

⁶ See footnote 3.

thin, flat glass having glossy, fire finished, apparently plane and smooth surfaces, but having a characteristic waviness of surface which is visible when viewed at an acute angle or in reflected light."

Short finish.—Poor polish, or improperly finished surface which has the appearance of being slightly pitted and wavy when the surface is viewed in reflected light.

Light short finish: A condition of short finish (insufficient finish, lack of brilliancy) visible only upon close inspection.

Torn short finish: A streaked or blurred short finish.

Skim.—Streaks of dense seed with accompanying small bubbles.

Stones.—Any opaque or partially melted particles of rock, clay, or batch ingredient imbedded in the glass.

Strings.—Light, wavy transparent lines appearing as though a thread of glass had been incorporated into the sheet.

Window glass.—Transparent, relatively thin, flat glass having glossy, fire finished, apparently plane and smooth surfaces, but having a characteristic waviness of surface which is visible when viewed at an acute angle or in reflected light.

EFFECTIVE DATE

The standard became effective for new production August 20, 1936.

STANDING COMMITTEE

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

Fred H. Hagemann (chairman), The Hagemann Glass Co., 824-26 Wade St., Cincinnati, Ohio.

Wm. B. Banks, Hart Mirror Plate Co., 101 Front Avenue SW., Grand Rapids, Mich.

A. H. Brawner, W. P. Fuller & Co., 301 Mission Street, San Francisco, Calif.

Mrs. Walter S. Comly, General Federation of Women's Clubs, Port Chester, N. Y.

Miss Rosamond C. Cook (representing American Home Economics Association), University of Cincinnati, Cincinnati, Ohio.

Arthur Dole, Jr., Hooker Glass & Paint Manufacturing Co., 651 West Washington Boulevard, Chicago, Ill.

Wheeler Gilmore, Hires Turner Glass Co., 230 South Thirtieth Street, Philadelphia, Pa.

A. P. Haake, National Association of Furniture Manufacturers, 666 Lake Shore Drive, Chicago, Ill.

O. J. Hubbuch, Hubbuch Glass Co., 1855 Central Avenue, Chattanooga, Tenn.

F. Logan Porter, Logan Porter Mirror Co., High Point, N. C.

R. R. Rau, National Retail Furniture Association, 666 Lake Shore Drive, Chicago, Ill.

Robert Schrenk, Schrenk & Co., Fifteenth and Hudson Streets, Hoboken, N. J.

North Storms, National Glass Distributors Association, 2217 Tribune Tower, Chicago, Ill.

Ivan A. Bickelhaupt, Mirror Manufacturers Association, 527 Shoreham Building, Washington, D. C.

Harry H. Steidle, ex-officio secretary, National Bureau of Standards, Washington, D. C.

HISTORY OF PROJECT

Pursuant to a request of the Mirror Manufacturers Association, a general conference of manufacturers, distributors, users, and others interested, was held in Cincinnati, Ohio, on June 12, 1930, to consider the establishment of standards of quality for plate-glass mirrors. The conference adopted a specification covering five grades of plate-glass mirrors and recommended its acceptance by the industry. After formal acceptance by a large part of the industry, the standard was promulgated as Commercial Standard CS27-30 which became effective December 15, 1930.

FIRST REVISION

At the suggestion of the Mirror Manufacturers Association, the standing committee recommended revision of the commercial standard to include "shock" or common window-glass mirrors and to eliminate AA and no. 3 quality plate-glass mirrors. The recommended revision was circulated to the industry on July 9, 1936, for written acceptance, with the result that the revised standard was accepted and authorized by the industry for publication as Commercial Standard CS27-36.

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 CS27-36 as our standard of practice in the

Production.¹ Distribution.¹ Use of mirrors.¹

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)

Title

Company

Street address

City and State

¹ Please designate which group you represent by drawing lines through the other two. 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

Individuals and organizations listed below have indicated, in writing, acceptance of this specification as their standard of practice in production, distribution, or use, but such endorsement does not signify that they may not find it necessary to deviate from the standard, nor does it signify that the producers so listed guarantee all of their products to conform with the requirements of this standard.

ASSOCIATIONS

| | |
|--|--|
| American Home Economics Association, Washington, D. C. (In principle.) | National Association of Furniture Manufacturers, Chicago, Ill. (In principle.) |
| American Institute of Architects, The, Washington, D. C. (In principle.) | National Council of Women, Committee on Consumer Interests, Belmont, Mass. (In principle.) |
| American Specification Institute, Chicago, Ill. | National Retail Furniture Association, Chicago, Ill. |
| Mirror Manufacturers Association, Washington, D. C. | |

FIRMS

| | |
|--|---|
| Acme Specialty Manufacturing Co., The, Toledo, Ohio. | Behrend, Jacob, Philadelphia, Pa. |
| Aetna Glass and Mirror Works, Brooklyn, N. Y. | Belknap Glass Co., C. C. Seattle, Wash. |
| Akron Mirror and Glass Co., The, Akron, Ohio. | Benton Glass Co., Benton Harbor, Mich. |
| Albano Co., Inc., The, New York, N. Y. | Berkowitz, J. E., Philadelphia, Pa. |
| Allen, Harris C., San Francisco, Calif. | Betz Co., Frank S., Hammond, Ind. |
| Allison & Allison, Los Angeles, Calif. | Beuttler & Arnold, Sioux City, Iowa. |
| Altfillisch, Chas., Decorah, Iowa. | Bial, George F., Hasbrouck Heights, N. J. |
| American Fixture and Showcase Co., St. Louis, Mo. | Bierfeld Co., Louis, Chicago, Ill. |
| American Mirror Co., Milwaukee, Wis. | Big Rapids Furniture Manufacturing Co., Big Rapids, Mich. |
| American Mirror Works, Bulter, Pa. | Billings, A. W. K., Jr., Boston, Mass. |
| Andres, Jones, Biscoe & Whitmore, Boston, Mass. | Binswanger & Co., Inc., Memphis, Tenn. |
| Angelus Furniture Manufacturing Co., Los Angeles, Calif. | Binswanger & Co., Inc., Richmond, Va. |
| Art Plate Glass and Mirror Works, Baltimore, Md. | Birmingham Paint and Glass Co., Birmingham, Ala. |
| Asheim, Leonard, Bridgeport, Conn. | Bishop, Horatio W., Los Angeles, Calif. |
| Auler, Jensen & Brown, Oshkosh, Wis. | Blithe, Wesley Leshner, Philadelphia, Pa. |
| Austell Cabinet Co., Austell, Ga. | Bogner, Harry, Milwaukee, Wis. |
| Backus, Frederick C., Buffalo, N. Y. | Bonfoey Co., Cleveland, Ohio. |
| Badger Mirror Co., Milwaukee, Wis. | Bostock Rhoades & Co., Inc., New York, N. Y. |
| Bailey & Sharp Co., Hamburg, N. Y. | Boston Mirror Co., Boston, Mass. |
| Barney, Wm. Pope, Philadelphia, Pa. | Boston Store, Inc., The, Colorado Springs, Colo. |
| Barthmaier, Eugene V., Philadelphia, Pa. | Brainerd, Harry B., New York, N. Y. |
| Bauhan, Rolf W., Princeton, N. J. | Brazer, Clarence W., Chester, Pa. |
| Beacon Plate and Window Glass Co., Brookline, Mass. | Brocton Furniture Co., Inc., Brocton, N. Y. |
| | Broude Co., W. S., Chicago, Ill. |

- Brust, Peter, Milwaukee, Wis.
 Buechner & Orth, St. Paul, Minn. (In principle.)
 Cadillac Glass Co., Detroit, Mich.
 California, University of, Berkeley, Calif. (In principle.)
 Cameron & Co., Inc., Wm., Waco, Tex.
 Candela, Rosario, New York, N. Y.
 Cannon & Fetzer, Salt Lake City, Utah.
 Carroll, John, Atlantic City, N. J.
 Cawthra & Co., Inc., T. A., The Decorative Furnisher, New York, N. Y. (In principle.)
 Cellarius, Chas. F., Cincinnati, Ohio.
 Central Glass Co., Inc., Evansville, Ind.
 Central Glass Co., Louisville, Ky.
 Central Glass Co. of Virginia, Bristol, Va.
 Central Specialty Manufacturing Co., Chicago, Ill.
 Cervin & Stuhr, Rock Island, Ill.
 Chair and Furniture Industry, Fort Madison, Iowa.
 Chapin, Rollin C., Minneapolis, Minn. (In principle.)
 Charlotte Furniture Co., Charlotte, Mich.
 Chautauqua Cabinet Co., Mayville, N. Y.
 Child, Harry C., Sayre, Pa.
 Churchill Cabinet Co., Chicago, Ill.
 Cleland-Simpson Co., Scranton, Pa.
 Cobbledick-Kibbe Glass Co., Oakland, Calif.
 Cohen's, Washington, D. C.
 Cohn & Co., Louis, Boston, Mass.
 Conant Bros. Co., Somerville, Mass.
 Conrad & Cummings, Binghamton, N. Y. (In principle.)
 Coledge & Sons, F. J., Atlanta, Ga.
 Cooper, David M., Ambridge, Pa.
 Cram & Ferguson, Boston, Mass.
 Crane Co., Arthur D., Sparta, N. J.
 Crane & MacMahon, Inc., St. Marys, Ohio.
 Crescent Furniture Co., Warren, Pa.
 Cron-Kills Co., The, Piqua, Ohio.
 Crystal Mirror and Glass Co., St. Louis, Mo.
 Curtis Bros. & Co., Clinton, Iowa.
 Curtis Publishing Co., Cleveland, Ohio. (In principle.)
 Dauchy Co., Chas. H., Troy, N. Y.
 Davidson Studios, David, Providence, R. I.
 Davis Cabinet Co., Nashville, Tenn.
 Dearborn Glass Co., Chicago, Ill.
 DeJarnette, Charles W., Des Moines, Iowa.
 Denier Mirror and Plate Glass Co., Inc., West New York, N. J.
 Dennin Brush Co., E. A., Troy, N. Y.
 Detroit Show Case Co., Detroit, Mich.
 Devlin, Edward A., Trenton, N. J.
 Dietel & Wade, Buffalo, N. Y.
 Dillon & Lewis, Atlanta, Ga.
 Dixie Metal Products Co., Inc., Birmingham, Ala.
 Dodge & Morrison, New York, N. Y.
 Donnelly Co., Inc., J. R., Brooklyn, N. Y.
 Drexel Furniture Co., Drexel, N. C.
 Dwelle-Kaiser Co., The, Buffalo, N. Y.
 Eagle Convex Glass Specialty Co., Clarksburg, W. Va.
 Eberhardt & Co., H., Chicago, Ill.
 Ebert Furniture Co., Red Lion, Pa.
 Eclipse Glass Co., Inc., Thomaston, Conn.
 Electrical Testing Laboratories, New York, N. Y. (In principle.)
 Elias & Co., Inc., Joseph, Brooklyn, N. Y.
 Elsasser, Frederick A., Union, N. J.
 Emerson Glass Corporation, Jamestown, N. Y.
 Emery, H. G., Nyack, N. Y.
 Emery's Sons, Inc., Thos., Cincinnati, Ohio.
 Empire, Ltd., The, Rockford, Ill.
 Esser Co., T. C., Milwaukee, Wis.
 Estey Manufacturing Co., Owosso, Mich.
 Evers, Albert J., San Francisco, Calif.
 Falconer Plate Glass Corporation, Falconer, N. Y.
 Fancher Furniture Co., Salamanca, N. Y.
 Fargo Glass and Paint Co., Fargo, N. Dak.
 Farley & Loetscher Manufacturing Co., Dubuque, Iowa.
 Fitzgibbon Glass Co., Geo. H., Portland, Ore.
 Flanagan, William Columbus, Chicago, Ill.
 Flannagan, Eric G., Henderson, N. C.
 Fleming, Bryant, Wyoming, N. Y.
 Forman, Ford & Co., Minneapolis, Minn.
 Franklin Glass Corporation, Butler, Pa.
 Franklin Glass and Mirror Co., Chicago, Ill.
 French & Heald Co., Inc., Milford, N. H.
 Frewsburg Furniture Co., Inc., Frewsburg, N. Y.
 Friedman & Co., N. M., Martinsburg, Mo.
 Fries & Son Steel Construction and Engineering Co., Covington, Ky.
 Fuller & Co., W. P., San Francisco, Calif.
 Furst Bros. Co., Inc., The, Baltimore, Md.
 Galax Mirror Co., Inc., Galax, Va.
 Gall, Harry L. C., New York, N. Y.
 Garden City Mirror and Shock Works, Chicago, Ill.
 General Fireproofing Co., The, Youngstown, Ohio.

- Ginsburg Picture Frame Co., Inc., Samuel, New York, N. Y.
 Gist Cabinet Co., Inc., Kansas City, Mo.
 Glenny Glass Co., The Wm., Cincinnati, Ohio.
 Globe-Bosse-World Furniture Corporation, Evansville, Ind.
 Gotham Glass Co., New York, N. Y.
 Gray, John, Pueblo, Colo.
 Habenicht & Howlett, San Francisco, Calif.
 Hagemann Glass Co., The, Cincinnati, Ohio.
 Hahn, Stanley Worth, Arlington, Va.
 Hall & Stromquist, Chicago, Ill.
 Hansen Glass and Paint Co., Sioux City, Iowa.
 Harmon Manufacturing Co., F. S., Tacoma, Wash.
 Harper & West, Boston, Mass.
 Hart Mirror Plate Co., Grand Rapids, Mich.
 Hartford Framing Co., The, Hartford, Conn.
 Haxby & Bissell, Minneapolis, Minn.
 Helfensteller, Hirsch & Watson, St. Louis, Mo.
 Hellam Furniture Co., Hellam, Pa.
 Herrick Furniture Co., Falconer, N. Y.
 Hickman Glass and Mirror Co., Brooklyn, N. Y.
 Higgins, Charles, New York, N. Y.
 Hires Turner Glass Co., Philadelphia, Pa., Washington, D. C., Baltimore, Md., Albany and Rochester, N. Y.
 Hoke, Karl Buckingham, Toledo, Ohio.
 Holland Furniture Co., Holland, Mich.
 Holsman & Holsman, Chicago, Ill.
 Home Furniture Co., York, Pa.
 Howe-Martz Glass Co., Detroit, Mich.
 Hubbuch Glass Co., Chattanooga, Tenn.
 Illinois Art Industries, Inc., Chicago, Ill.
 Indiana Mirror Manufacturing Co., Indianapolis, Ind.
 Indianapolis Paint and Color Co., Indianapolis, Ind.
 Jacobson Picture Frame Co., Pittsburgh, Pa.
 Joerns Bros. Furniture Co., Stevens Point, Wis.
 Johnson-Gustafson, Duluth, Minn.
 Johnson, Wallwork & Dukehart, Portland, Oreg.
 Jones Decorative Glass Co., Thos., Brooklyn, N. J.
 Jones, Meredith, Seattle, Wash.
 Kahn Mirror Plate Co., St. Louis, Mo.
 Karges Furniture Co., Evansville, Ind.
 Keich & O'Brien, Warren, Ohio.
 Keller's Department Store, Liberty, N. Y.
 Kent Coffey Manufacturing Co., Le-noir, N. C.
 Keystone Glass Co., Inc., Chicago, Ill.
 Kittinger Co., Buffalo, N. Y.
 Knighton & Howell, Portland, Oreg.
 Kochs Co., Theo. A., Chicago, Ill.
 Kress & Co., S. H., New York, N. Y.
 Kruckemeyer & Strong, Cincinnati, Ohio.
 Kruissink Bros., Inc., Chicago, Ill.
 Lansburgh & Bro., Washington, D. C.
 Lawson Co., The F. H., Cincinnati, Ohio.
 Leeds & Northrup Co., Philadelphia, Pa.
 Leonard & Co., W. C., Saranac Lake, N. Y.
 Levine, Ernest, Highland Park, N. J. (In principle.)
 Libbey-Owens-Ford Glass Co., Toledo, Ohio. (In principle.)
 Liberty Mirror Works, Inc., Brackenridge, Pa.
 Limbert Co., Charles P., Holland, Mich.
 Lockwood Glass Co., Ottawa, Ill.
 Lodge, Wm. P., San Diego, Calif.
 Logan Porter Mirror Co., High Point, N. C.
 Los Angeles Art Glass Co., Los Angeles, Calif.
 Magney & Tusler, Inc., Minneapolis, Minn.
 Mann & Co., Hutchinson, Kans.
 Mason & Co., George D., Detroit, Mich. (In principle.)
 Mauran, Russell & Crowell, St. Louis, Mo.
 Metropolitan Electric Manufacturing Co., Long Island City, N. Y.
 Metropolitan Picture Frame Co., Chicago, Ill.
 Meyers, Henry H., Alameda, Calif.
 Miami Cabinet Division, The Philip Carey Co., Middletown, Ohio.
 Michigan State College, East Lansing, Mich. (In principle.)
 Milch & Son, Inc., D., New York, N. Y.
 Miller, J. R., & T. L. Pfueger, San Francisco, Calif.
 Miller & Yeager, Terre Haute, Ind.
 Modern Mirror Novelty Co., Inc., New York, N. Y.
 Monahan & Meikle, Pawtucket, R. I.
 Monitor Furniture Co., Evansville, Ind.
 Montgomery & Patteson, Charleston, W. Va.
 Montgomery Ward & Co., Chicago, Ill.
 Mooser, William, San Francisco, Calif.
 Morton Manufacturing Co., Chicago, Ill.
 Mueller Bros., Inc., Chicago, Ill.
 Mundie Jensen Bourke & Havens, Chicago, Ill.
 National Metal Products Co., Waterloo, Iowa.
 National Mirror Works, Rockford, Ill.
 Nelson, Albert L., St. Louis, Mo.
 Nelson Co., N. O., St. Louis, Mo.
 New England Mirror and Plate Glass Co., Boston, Mass.

- New Hampshire, University of, Durham, N. H.
- New Orleans, Better Business Bureau of, Inc., New Orleans, La. (In principle.)
- New York Wood Working Corporation, New York, N. Y.
- Newport Glass Co., The, Newport, Ky.
- Nicols, Lowell W., Sewickley, Pa. (In principle.)
- Northwestern Glass Co., Minneapolis, Minn.
- Nurre Co., Henry, Cincinnati, Ohio.
- Nurre Co.'s, Inc., The, Bloomington, Ind.
- Oakland Board of Education, Oakland, Calif.
- Ohio Plate Glass Co., Toledo, Ohio.
- Ohio Window Glass Co., The, Cleveland, Ohio.
- Olbrich & Golbeck Co., Chicago, Ill.
- Olson Co., J. A., Chicago, Ill.
- Original Picture Frame Co., Scranton, Pa.
- Oshkosh Mirror Plate Co., Oshkosh, Wis.
- Paidar Co., Emil J., Chicago, Ill.
- Par-Metal Products Corporation, Long Island City, N. Y.
- Parisian Novelty Co., Chicago, Ill.
- Patek Bros., Inc., Milwaukee, Wis.
- Peacock Laboratories, Inc., Philadelphia, Pa. (In principle.)
- Peaslee, Horace W., Washington, D. C.
- Pehrson, G. A., Spokane, Wash.
- Pennsylvania Furniture Co., York, Pa.
- Peoria, Better Business Bureau of, Peoria, Ill. (In principle.)
- Peridion Furniture Co., Inc., Chicago, Ill.
- Phelps & Dewees, San Antonio, Tex.
- Phenix Furniture Co., Warren, Pa.
- Pioneer Glass and Paint Co., Omaha, Nebr.
- Pittsburgh Plate Glass Co., Pittsburgh, Pa.
- Plachek, James W., Berkeley, Calif.
- Porter Mirror and Glass Co., Fort Smith, Ark.
- Porter Mirror and Glass Co., Shelbyville, Ind.
- Postlewait Glass Co., Kansas City, Mo.
- Pressed Prism Plate Glass Co., Chicago, Ill. (In principle.)
- Proudfoot, Rawson, Brooks & Borg, Des Moines, Iowa.
- Purves, Edmund R., Philadelphia, Pa.
- Quick, H. Lansing, Yonkers, N. Y.
- Rate, R. L., Monroe, Wis.
- Rather, John Thomas, Jr., Houston, Tex.
- Red Lion Furniture Co., Red Lion, Pa.
- Reid, William H., Jr., Billings, Mont.
- Richmond Cabinet Co., Richmond, Ind.
- Richmond Furniture Manufacturing Co., Richmond, Ind.
- Rock, William, Baltimore, Md.
- Roe-James Glass Co., Saint Paul, Minn.
- Rosenthal Manufacturing Co., Inc., Philadelphia, Pa.
- Rourke, Henry L., Lowell, Mass.
- Royal Glass Works Corporation, Long Island City, N. Y.
- Russell, Lance & Muri, Tacoma, Wash. (In principle.)
- Schoeppe, Edward, Philadelphia, Pa.
- Schrenk & Co., Hoboken, N. J.
- Schroeder Paint and Glass Co., Detroit, Mich.
- Schulzke, William H., Moline, Ill.
- Schwab & Palmgreen & Associates, Pittsburgh, Pa.
- Schwabacher Frey Co., San Francisco, Calif.
- Schweizer, Albert Chas., New York, N. Y.
- Scranton Better Business Bureau, Inc., Scranton, Pa. (In principle.)
- Semon Bache & Co., New York, N. Y.
- Shire, Edward I., New York, N. Y.
- Shuldiner, Inc., David, Brooklyn, N. Y.
- Simpson-Clark Glass Co., Chicago, Ill.
- Sioux Falls Paint and Glass Co., Sioux Falls, S. Dak.
- Sirrine & Co., J. E., Greenville, S. C.
- Slane Glass Co., O. W., Statesville, N. C.
- Smith, Hinchman & Grylls, Inc., Detroit, Mich.
- Smith Manufacturing Co., Geo., Chicago, Ill.
- Spencer Cardinal Corporation, Marion, Ind.
- Spratt Chair Co., Atlanta, Ga. (In principle.)
- Staats, H. Philip, Kent, Conn.
- Standard Glass and Paint Co., Des Moines, Iowa.
- Steul & Sons, Inc., Henry C., Buffalo, N. Y.
- Stoetzel, Ralph E., Chicago, Ill.
- Stroupe Mirror Co., Thomasville, N. C.
- Syndicate Glass, Inc., Indianapolis, Ind.
- Syracuse Glass Co., Syracuse, N. Y.
- Thompson Glass and Paint Co., Los Angeles, Calif.
- Toledo Desk and Fixture Co., The, Toledo, Ohio.
- Toledo Mirror and Glass Co., Toledo, Ohio.
- Toledo Plate and Window Glass Co., The, Toledo, Ohio.
- Tomlinson, Webster, Joliet, Ill.
- Trans-Lux Daylight Picture Screen Corporation, Brooklyn, N. Y.
- Trico Products Corporation, Buffalo, N. Y.
- Troxel, Pahl & Porter, Tiffin, Ohio.
- Tyre Bros. Glass and Paint Co., Los Angeles, Calif.
- Tyre, Philip S., Philadelphia, Pa.

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| Unger, William, Bucyrus, Ohio. | Willatsen, Andrew, Seattle, Wash. |
| Union Mirror Co., Lenoir, N. C. | Williamsport Mirror and Glass Co., |
| Universal Mirror Co., Buffalo, N. Y. | Williamsport, Pa. |
| Van Pelt, John V., Patchogue, N. Y. | Winnebago Manufacturing Co., Rock- |
| Vickery, John W., St. Petersburg, Fla. | ford, Ill. |
| Virginia Polytechnic Institute, Blacks- | Wischmeyer, William F., St. Louis, |
| burg, Va. | Mo. |
| Vogeley & Lackman Co., Inc., New | Wisconsin Mirror Plate Co., Sheboy- |
| York, N. Y. | gan, Wis. |
| Wachter, Harry W., & Horace W. | Wisconsin Retail Furniture Co., Mil- |
| Wachter, Toledo, Ohio. | waukee, Wis. |
| Warren Co., Inc., The, Atlanta, Ga. | Wolfe Bros. & Co., Piney Flats, Tenn. |
| Warren Mirror Works, Warren, Pa. | Wolfensohn, Inc., S., New York, N.Y. |
| Weaver Mirror Co., Rocky Mount, Va. | Wood Glass Co., Syracuse, N. Y. |
| Weigelt Glass and Mirror Manufac- | York Mirror and Glass Co., York, Pa. |
| turing Co., Inc., St. Louis, Mo. | Youngsville Mirror Works, Youngs- |
| Werbelovsky's Son, Inc., J. H., Brook- | ville, Pa. |
| lyn, N. Y. | Zoller & Muller, New York, N. Y. |
| West End Furniture Co., Rockford, Ill. | Zummach, Inc., Wm. F., Milwaukee, |
| Widdicomb Co., John, Grand Rapids, | Wis. |
| Mich. | |

U. S. GOVERNMENT

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| District of Columbia, Government of | National Park Service, Central Design |
| the, Washington, D. C. (In prin- | Office, State Park Division, San |
| ciple.) | Francisco, Calif. |

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| CS no. | Item | CS no. | Item |
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| 1-32. | Clinical thermometers (second edition). | 34-31. | Bag, case, and strap leather. |
| 2-30. | Mopsticks. | 35-31. | Plywood. |
| 3-28. | Stoddard solvent. | 36-33. | Fourdrinier wire cloth (second edition). |
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