

Commercial Standard

CS77-51

SUPERSEDES CS77-48

Enameled Cast-Iron Plumbing Fixtures

A RECORDED VOLUNTARY STANDARD OF THE TRADE

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CHARLES SAWYER, Secretary

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Office of Industry and Commerce

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IN COOPERATION WITH
NATIONAL BUREAU OF STANDARDS
A. V. ASTIN, ACTING DIRECTOR

Enameled Cast-Iron Plumbing Fixtures

(THIRD EDITION)

[Effective December 20, 1951]

1. PURPOSE

1.1 The purpose of this commercial standard is to establish minimum standard specifications, definitions, inspection rules, types, and sizes of standard items, and methods of test for enameled cast-iron plumbing fixtures for the guidance of manufacturers, distributors, and users of these products. By general acceptance and use of the standard, and by certifying conformity with the requirements, essential quality is maintained, for the promotion of fair competition and greater consumer acceptance, to the mutual advantage of all concerned.

2. SCOPE

2.1 This standard provides minimum requirements for enameled cast-iron plumbing fixtures such as bathtubs, lavatories, kitchen sinks, laundry trays, drinking fountains, and similar fixtures, as well as types and sizes of standard items. Requirements include material, thickness, warpage, enameling, acid resistance, inspection rules, and marking.

3. GENERAL REQUIREMENTS

3.1 *Material of base.*—The metal base shall be one-piece high-grade cast iron, strong, sound, true to form, and free from porosity or any other defects which may affect the serviceability of the fixtures.

3.2 *Thickness of base metal.*¹—The cast-iron base shall have a thickness of not less than $\frac{1}{8}$ in. at any point 1 in. or more from any edge.

3.3 *Enameling.*—The enameled surface of each fixture shall be coated with vitreous enamel applied by the dry process, and thoroughly fused to the cast-iron base. There shall be no appearance of inadequate covering. The enamel shall be glossy and free from flaws which affect the appearance or may affect the serviceability of the fixture. The thickness of the enamel, as measured on a flat surface at least 1 in. from any edge, shall be not less than 0.025 in.¹ Blemishes shall be limited in accordance with the inspection rules herein. The unenameled surface of each fixture shall be treated with one coat of filler, ground coat, or paint.

¹ The thickness of the enamel may be determined conveniently, without damaging the fixture, by using a thickness gage for nonmagnetic coatings on a magnetic base. The thickness of the cast-iron base may be determined by subtracting the thickness of the enamel from the total calipered thickness.

3.3.1 Acid-resisting enamel shall be acid resisting throughout the entire enamel thickness and shall pass successfully the tests specified in paragraph 7.2.

3.4 *Warpage*.—Warpage of edges set against wall or floor, and edges of roll-rim and flat-rim sinks, where set into cabinets or counter tops, shall not exceed $\frac{1}{16}$ inch per foot when tested according to the method given in paragraph 7.1. Warpage of all other edges shall not exceed $\frac{3}{32}$ inch per foot when tested according to the same method.

3.5 *Dimensional tolerances*.—Fixtures shall conform to the specified dimensions, subject to a variation of not more than plus or minus 3 percent, except where dimensions are specified as "maximum," "minimum," or "approximate." Where an approximate dimension is given, the nearest commercial equivalent size, within plus or minus 5 percent of the dimension given, is intended, so as to provide for minor size variations between manufacturers as well as for ordinary manufacturing variations. The tolerance on length of recess bathtubs, except square baths, is plus or minus $\frac{1}{2}$ in.

3.6 *Illustrations*.—Illustrations shown herein for various fixtures are for convenience in locating dimensions, and are not intended to indicate designs.

3.7 *Colored ware*.—In addition to white, four basic colors are recognized as standard, namely, green, blue, ivory, and peach-brown. The exact color furnished is determined by each manufacturer, in accordance with his individual production problems.

3.8 *Standard types and sizes*.—The types and sizes of enameled cast-iron plumbing fixtures listed under "Detail Requirements" are recognized as standard, excepting those which are recommended for elimination (printed in smaller type within brackets). Other types and sizes which may be cataloged or otherwise offered for sale are not classed as standard.

4. DETAIL REQUIREMENTS

BATHTUBS

4.1 *Bathtub outlet dimensions*.—The standard dimensional limits for the finished outlets (after enameling) of enameled cast-iron bathtubs for $1\frac{1}{2}$ -in. drain fittings are as set forth in figure 1.

4.2 *Bathtub overflows*.—The standard dimensions for overflow outlets to suit $1\frac{1}{2}$ -in. drains for $4\frac{1}{2}$ -, 5-, and $5\frac{1}{2}$ -ft. recess double-shell bathtubs, and for 5- and $5\frac{1}{2}$ -ft. corner double-shell bathtubs are as shown in figure 2.

4.3 *Single-shell bathtubs*.

Recess single-shell bathtubs with right or left outlet: 5-ft. length is standard. (Fig. 3.)

[The elimination of $4\frac{1}{2}$ - and $5\frac{1}{2}$ -ft. recess single-shell bathtubs is recommended.]

[The elimination of all single-shell corner bathtubs is recommended.]

4.4 *Double-shell bathtubs*.

(a) Right or left corner double-shell bathtubs with outlet on concealed end: 5- and $5\frac{1}{2}$ -ft. lengths are standard. (Figs. 2 and 4.)

(b) Right or left corner double-shell bathtubs with outlet on exposed end: 5- and 5½-ft. lengths are standard. (Figs. 2 and 5.)

(c) Right or left recess double-shell bathtubs: 4½-, 5- and 5½-ft. lengths are standard. (Figs. 2 and 6.)

[The elimination of 6-ft. right and left recess double-shell bathtubs is recommended.]

(d) Recess double-shell square-pattern bathtubs with integral seat or seats and with right or left outlet: Approximately 48 in. square is standard. (Fig. 7.)

(e) Corner double-shell square-pattern bathtubs with integral seat or seats and with right or left outlet: Approximately 48 in. square is standard. (Fig. 8.)

4.5 *Roll-rim bathtubs on legs*: Sizes 4½'×30'' and 5'×30'' are standard. (Fig. 9.)

[The elimination of 4'×26'', 4½'×26'', 5'×26'', 5½'×26'', 4'×30'', 5½'×30'', and 6'×30'' sizes of roll-rim bathtubs on legs is recommended.]

[Bathtub bases. The elimination of all bathtub bases is recommended.]

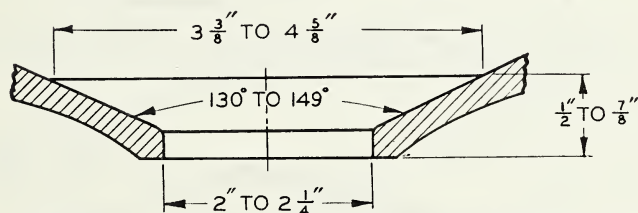


FIGURE 1. *Enameled cast-iron bathtubs—outlet dimensions for 1½-in. drain fitting.*

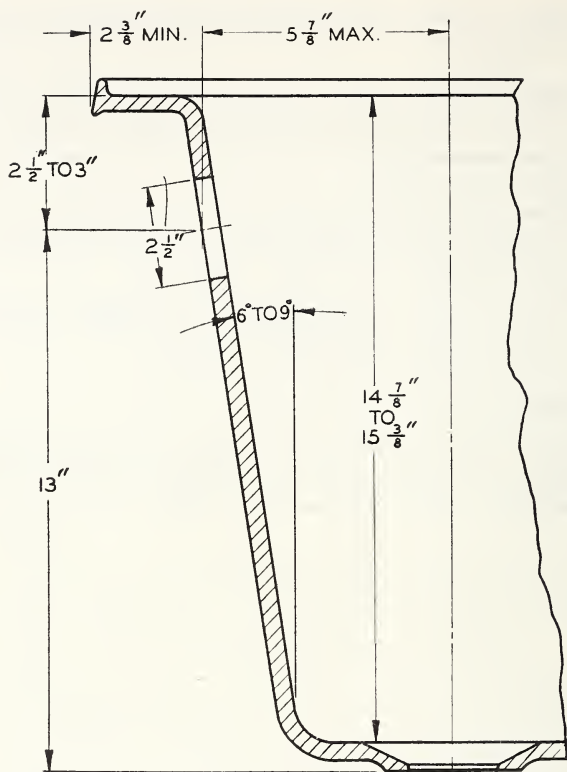


FIGURE 2. Overflows of $4\frac{1}{2}$ -, 5-, and $5\frac{1}{2}$ -ft. recess double-shell bathtubs, and of 5- and $5\frac{1}{2}$ -ft. corner double-shell bathtubs. (See par. 4.2.)

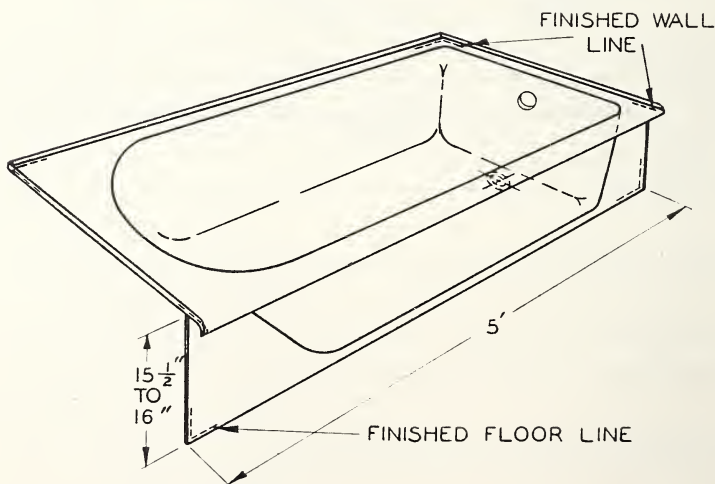


FIGURE 3. Recess single-shell bathtubs with right or left outlet. (See par. 4.3.)

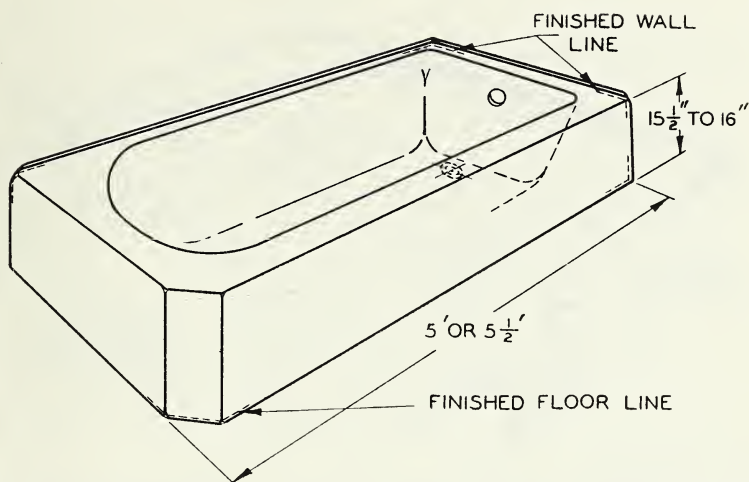


FIGURE 4. *Right or left corner double-shell bathtubs with outlet on concealed end. (See par. 4.4 (a) and fig. 2.)*

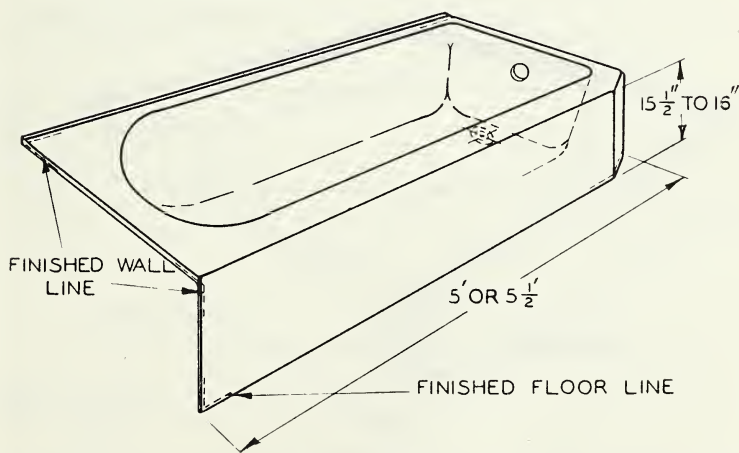


FIGURE 5. *Right or left corner double-shell bathtubs with outlet on exposed end. (See par. 4.4 (b) and fig. 2.)*

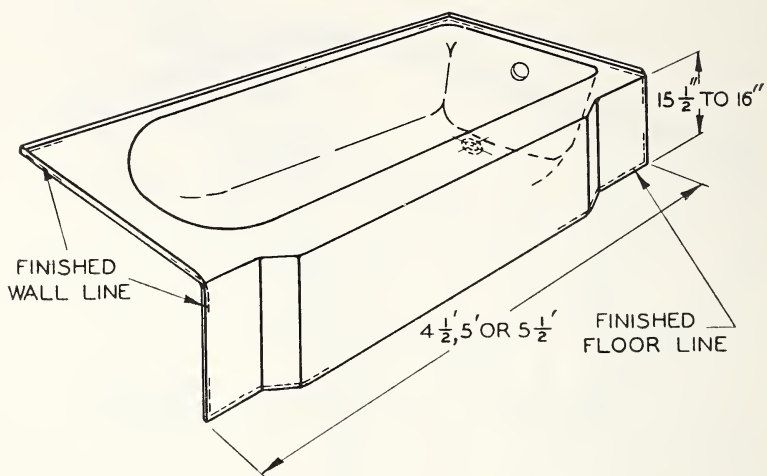


FIGURE 6. Recess double-shell bathtubs, right or left outlet. (See par. 4.4 (c) and fig. 2.)

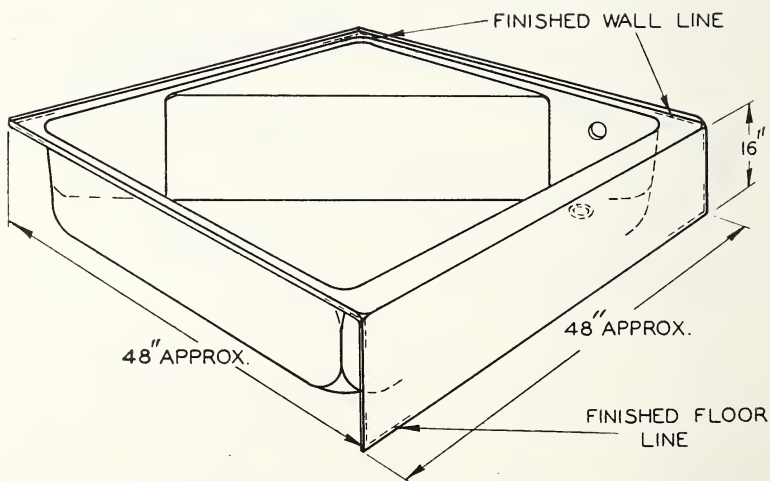


FIGURE 7. Recess double-shell square-pattern bathtubs with integral seat or seats and with right or left outlet. (See par. 4.4 (d).)

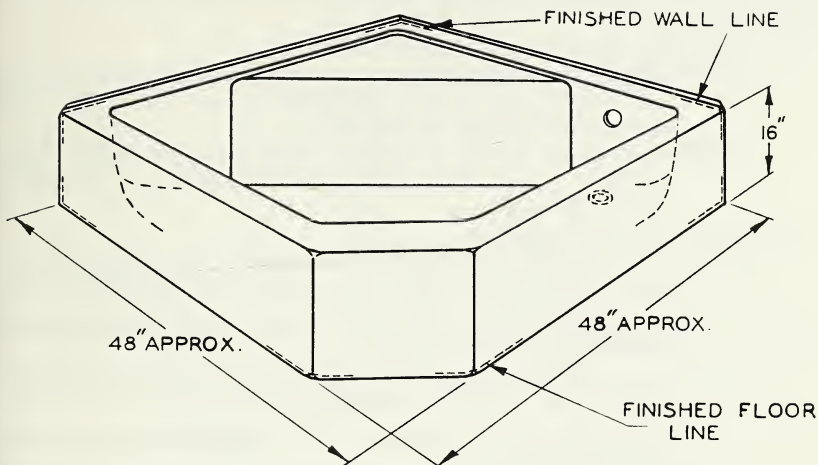


FIGURE 8. *Corner double-shell square-pattern bathtubs with integral seat or seats and with right or left outlet. (See par. 4.4 (e).)*

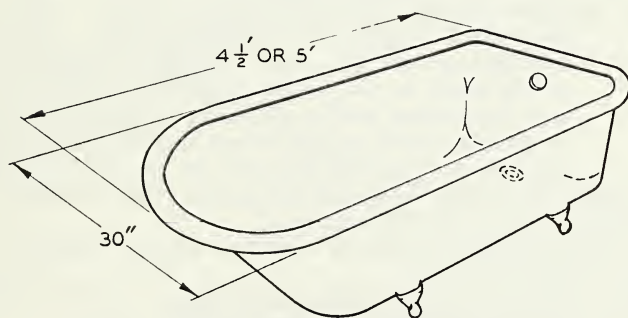


FIGURE 9. *Roll-rim bathtubs on legs. (See par. 4.5.)*

LAVATORIES

4.6 *Lavatory outlet dimensions.*—The standard dimensional limits for outlets of enameled cast-iron lavatories with overflow are as set forth in figure 10.

4.7 *Apron lavatories with straight back.*

(a) Straight-front apron lavatories with straight back: Sizes 19''×17'', 20''×18'', 21''×18'', and 22''×19'' are standard. (Figs. 11 and 12.)

(b) Round-front apron lavatories with straight back: Sizes 19''×17'' and 26''×14'' (space saver) are standard. (Figs. 13 and 14.)

4.8 *Apron corner lavatories.*

(a) Apron corner lavatory with straight back: One size, approximately 16''×16'', is standard. (Fig. 15.)

[The elimination of all other sizes of apron corner lavatories with straight back is recommended.]

(b) Apron corner lavatory with shelf back: One size, approximately 16''×16'', is standard. (Fig. 16.)

[Roll-rim lavatories with straight back. The elimination of all sizes is recommended.]

[Corner roll-rim lavatories with straight back. The elimination of all sizes is recommended.]

4.9 *Faucet-hole spacing.*

(a) Center-set fittings. The standard faucet-hole spacing for center-set fittings is 4 in. center to center, in the top, in the front, in a recessed center panel, or in front of the shelf or the ledge in either shelf-back or ledge-back lavatories, and in lavatories with or without back.

(b) Separate faucets and combination fittings. The standard faucet-hole spacing for separate faucets and combination fittings is 8 in. center to center, in top of or in front of the shelf or the ledge in either shelf-back or ledge-back lavatories, and in all staple-pattern lavatories with or without back, except where impracticable and where commercial practice requires 10- or 12-in. spacing.

4.10 *Height of backs.*—For all lavatories with straight backs a height of back of 3½ to 7 in. is standard.

4.11 *Apron slab-type lavatory (without back):* Size 24''×20'' is standard. (Fig. 17.)

4.12 *Shelf-back lavatories with apron:* Sizes 19''×17'', 21''×18'', 22''×19'', and 24''×18'' are standard. (Fig. 18.)

NOTE.—These lavatories are also made in varying sizes ranging from 13''×13'' to 24''×18'' for wall, leg, and cabinet assembly; and up to 26''×14'' in several space saver sizes.

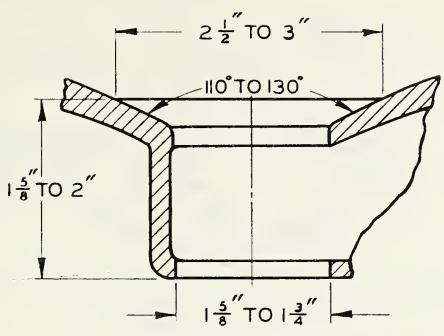
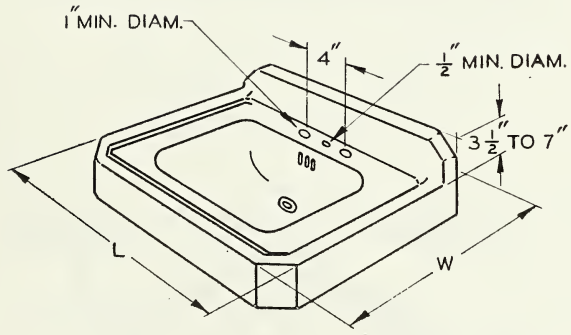
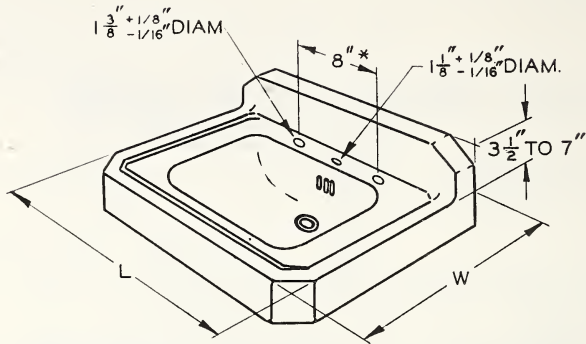


FIGURE 10. *Enameled cast-iron lavatories with overflow—outlet dimensions.*



STANDARD DIMENSIONS	
L	W
19"	17"
20"	18"
21"	18"
22"	19"

FIGURE 11. *Straight-front apron lavatories with straight back for center-set fittings. (See par. 4.7 (a).)*

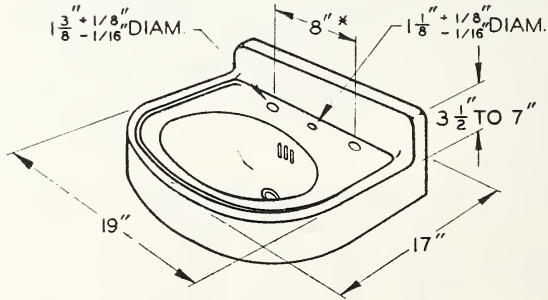


STANDARD DIMENSIONS

L	W
19"	17"
20"	18"
21"	18"
22"	19"

* MAY BE 10" OR 12"

FIGURE 12. *Straight-front apron lavatories with straight back for separate faucets or combination fittings. (See par. 4.7 (a).)*



* MAY BE 10" OR 12"

FIGURE 13. *Round-front apron lavatories, 19 in. by 17 in., with straight back. (See par. 4.7 (b).)*

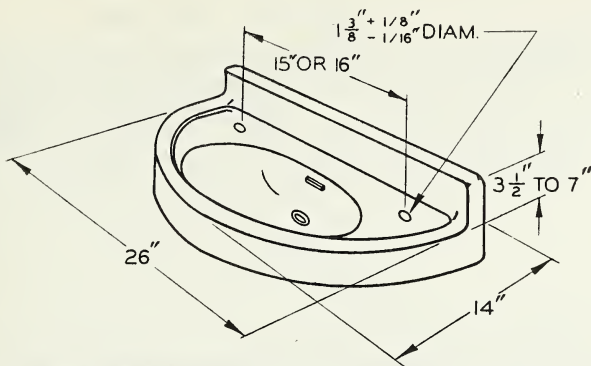


FIGURE 14. *Round-front apron lavatories, 26 in. by 14 in., with straight back.* (See par. 4.7 (b).)

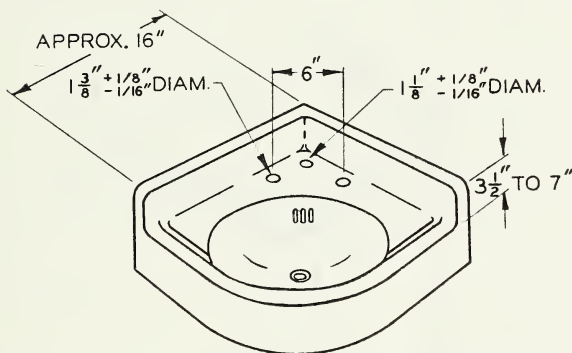


FIGURE 15. *Apron corner lavatories with straight back.* (See par. 4.8 (a).)

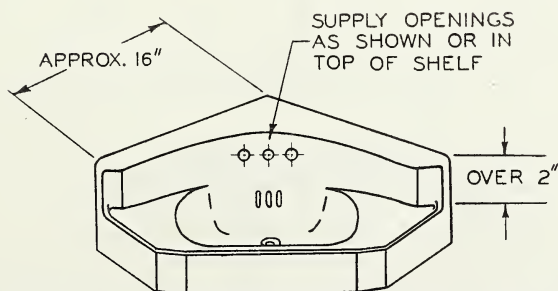


FIGURE 16. *Apron corner lavatories with shelf back.* (See par. 4.8 (b).)

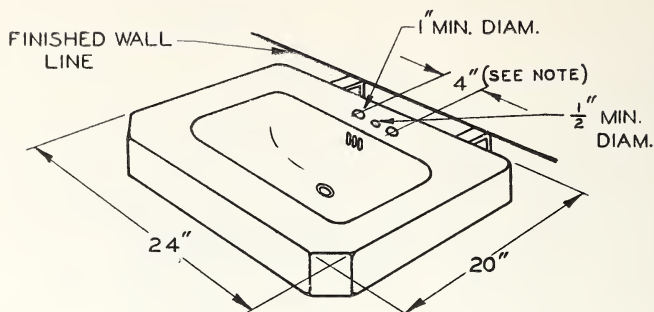
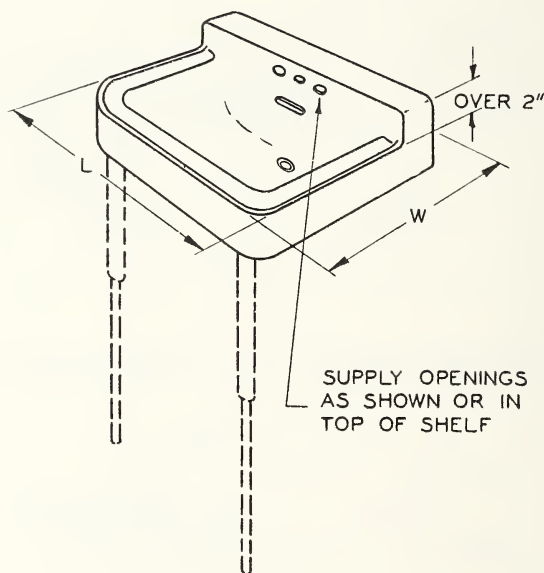


FIGURE 17. Apron slab-type lavatories. (See par. 4.11.)

NOTE.—These lavatories are made as shown for center-set fittings; they are also made for separate faucets and for combination fittings, supply openings for which are the same as for straight-front apron lavatories with straight back (fig. 12).



STANDARD DIMENSIONS

L	W	L	W
19"	17"	22"	19"
21"	18"	24"	18"

FIGURE 18. Shelf-back lavatories with apron. (See par. 4.12.)

NOTE.—These lavatories are also made in varying sizes ranging from 13 in. by 13 in. to 24 in. by 18 in. for wall, leg, and cabinet assembly; and up to 26 in. by 14 in. in several space-saver sizes.

WASH SINKS

4.13 *Roll-rim free-standing wash sinks on pedestals or standards:* 30-in. width by 8-in. depth by 4-, 5-, 6-, and 8-ft. lengths are standard. (Fig. 19.)

4.14 *Wall-hanging wash sinks with back, with or without pedestals:* Sizes 18'' \times 4', 18'' \times 5', 18'' \times 6', and 22'' \times 8' are standard. (Fig. 20.)

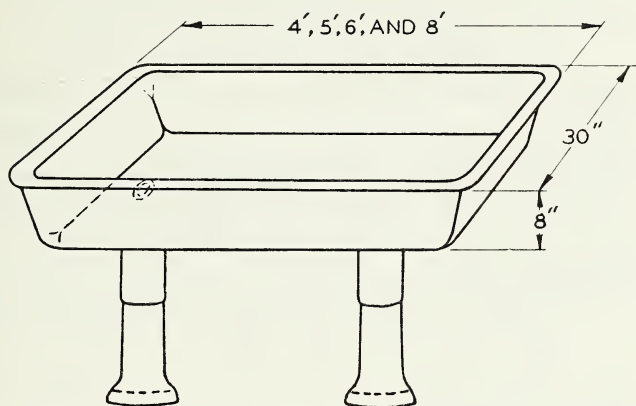
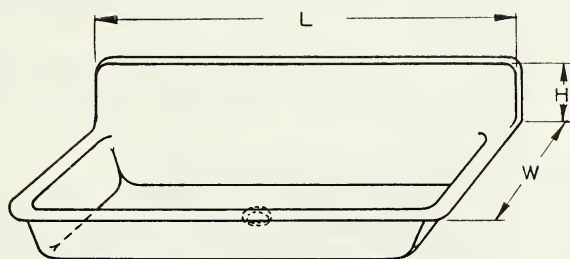


FIGURE 19. *Roll-rim free-standing wash sinks on pedestals or standards.* (See par. 4.13.)



STANDARD DIMENSIONS

L	W	H
4'	18"	8"
5'	18"	8"
6'	18"	8"
8'	22"	10"

FIGURE 20. *Wall-hanging wash sinks with back, with or without pedestals.* (See par. 4.14.)

KITCHEN SINKS

4.15 *Kitchen sink outlet dimensions.*—The standard dimensional limits for outlets of enameled cast-iron kitchen sinks are as set forth in figure 21.

4.16 *Roll-rim kitchen sinks with straight back* (for installation with or without cabinet).

- (a) Roll-rim kitchen sink with straight back and single drainboard, sink at right or left: Size 42''×20'' is standard. (Fig. 22.)

[The elimination of all other sizes of single-drainboard roll-rim kitchen sinks with straight back is recommended.]

- (b) Roll-rim double-drainboard kitchen sink with straight back: Size 60''×22'' is standard. (Fig. 23.)

[Apron kitchen sinks. The elimination of all apron kitchen sinks is recommended.]

[Corner kitchen sinks. The elimination of all corner roll-rim kitchen sinks with single drainboard is recommended.]

[“Three-eighths” kitchen sinks. The elimination of all 3-8 kitchen sinks (sinks having 8-in. back, 8-in. apron, and 8-in. depth) is recommended.]

4.17 *Ledge kitchen sinks, 22 in. wide, with back* (designed for installation over cabinets).

- (a) Ledge kitchen sink with back and single drainboard, sink at right or left: Size 42''×22'' is standard. (Fig. 24.)
- (b) Ledge kitchen sink with back and double drainboard: Sizes 54''×22'' and 60''×22'' are standard. (Fig. 25.)

4.18 *Ledge kitchen sinks, 23½ to 25 in. wide, with back* (designed for installation over cabinets).

- (a) Ledge kitchen sink with back and single drainboard, sink at right or left: Size 42''×23½'' to 25'' is standard. (Fig. 24.)
- (b) Ledge kitchen sink with back and double drainboard: Sizes 54''×23½'' to 25'', and 60''×23½'' to 25'' are standard. (Fig. 25.)
- (c) Ledge kitchen sink with back and two compartments, without drainboard: Size 42''×23½'' to 25'' is standard. (Fig. 26.)
- (d) Ledge kitchen sink with back, two compartments, and double drainboard: Sizes 60''×23½'' to 25'', 66''×23½'' to 25'', and 72''×23½'' to 25'' are standard. (Fig. 27.)

4.19 *Flat-rim ledge kitchen sinks, 21 in. wide.*

- (a) Flat-rim ledge kitchen sink without drainboard: Sizes 24''×21'' and 30''×21'' are standard. (Fig. 28.)
- (b) Flat-rim ledge kitchen sink, two compartments, without drainboard: Sizes 32''×20'' or 21'', and 42''×20'' or 21'' are standard. (Fig. 29.)
- (c) Flat-rim ledge kitchen sink with single drainboard, sink at right or left: Size 42''×21'' is standard. (Fig. 30.)
- (d) Flat-rim ledge kitchen sink with double drainboard: Size 54''×21'' is standard. (Fig. 31.)

4.20 *One-piece roll-rim kitchen sinks with back (no drainboard)*: Sizes 24"×18" and 30"×20" are standard. (Fig. 32.)

[The elimination of all other sizes of one-piece roll-rim kitchen sinks with back and no drainboard is recommended.]

[The elimination of all one-piece apron kitchen sinks with back and no drainboard is recommended.]

[Drainboards. The elimination of all separate drainboards is recommended.]

[Sink backs. The elimination of all separate sink backs is recommended.]

4.21 *One-piece flat-rim kitchen sinks with back (no drainboard)*: Size 30"×20" is standard. (Fig. 33.)

[The elimination of all end-outlet flat-rim kitchen sinks is recommended.]

4.22 *Center-outlet flat-rim kitchen sinks*: Sizes 12"×12", 24"×16", 24"×18", 30"×18", 24"×20", and 30"×20", all in one depth, are standard. Depth 6 to 8 in. (Fig. 34.)

[The elimination of all other sizes of center-outlet flat-rim kitchen sinks is recommended.]

4.23 *Flat-rim two-compartment kitchen sinks*: Sizes 32"×20" and 42"×20" or 22" are standard. (Fig. 35.)

4.24 *Standard radius*.—The standard radius of the outside corner of rims of flat-rim and ledge sinks designed for building into counter tops is 1½ in., plus or minus ⅜ in.

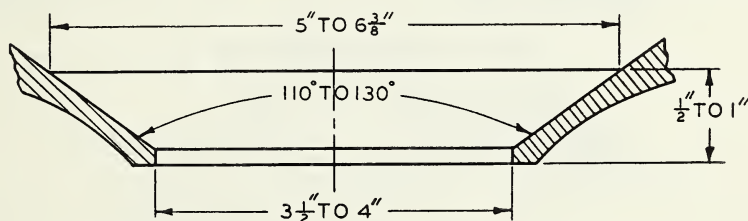


FIGURE 21. *Enameled cast-iron kitchen sinks—outlet dimensions.*

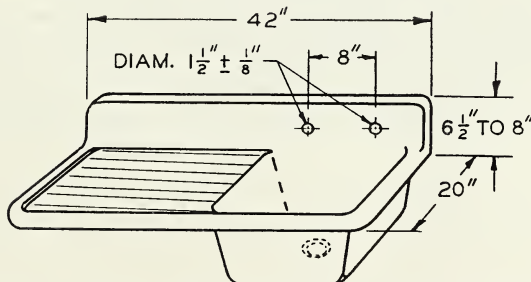


FIGURE 22. *Roll-rim kitchen sinks with straight back and single drainboard, sink at right or left. (See par. 4.16 (a).)*

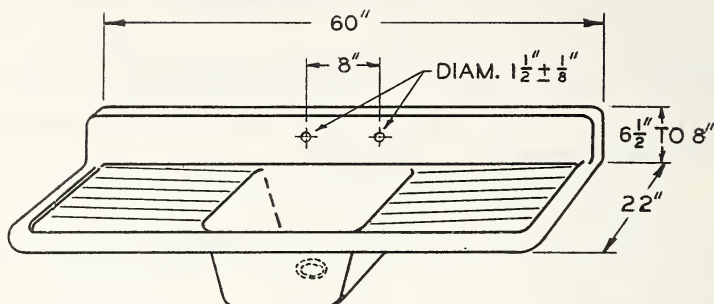


FIGURE 23. Roll-rim double-drainboard kitchen sinks with straight back. (See par. 4.16 (b).)

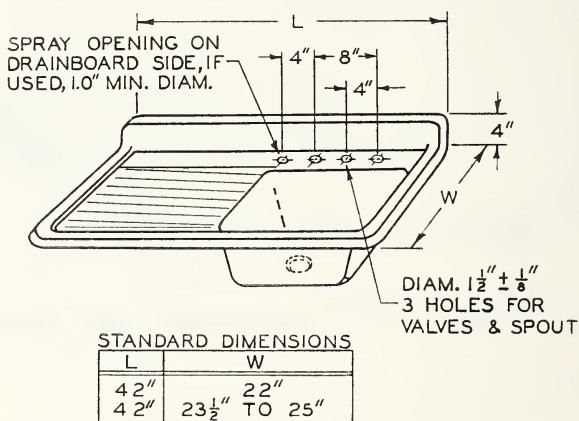
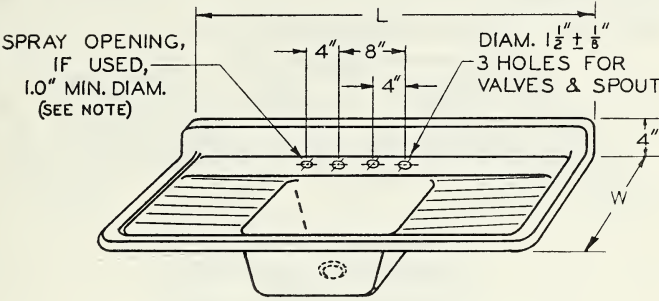


FIGURE 24. Ledge kitchen sinks with back and single drainboard, sink at right or left (designed for installation over cabinets). (See pars. 4.17 (a) and 4.18 (a).)



STANDARD DIMENSIONS

L	W
54"	22"
54"	23½" TO 25"
60"	22"
60"	23½" TO 25"

FIGURE 25. Ledge kitchen sinks with back and double drainboard (designed for installation over cabinets). (See pars. 4.17 (b) and 4.18 (b).)

NOTE.—The location of spray opening is optional, to right or left, in accordance with manufacturer's usual practice.

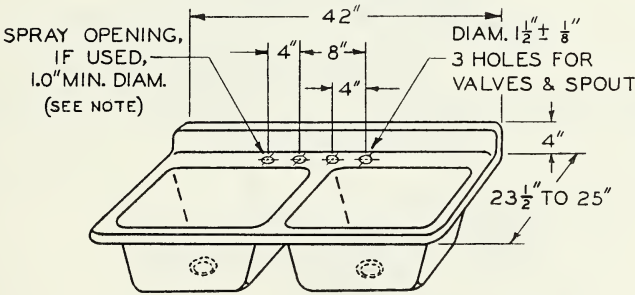
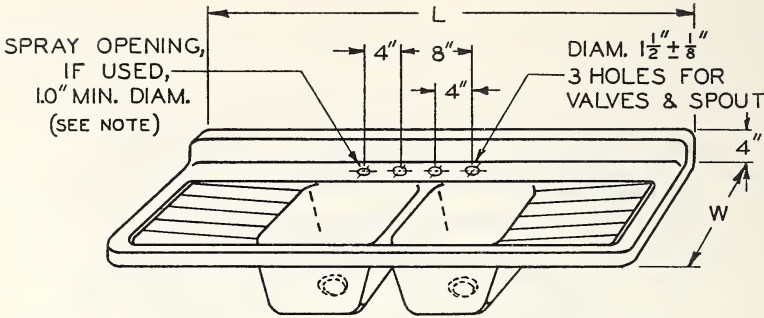


FIGURE 26. Ledge kitchen sinks with back and two compartments (designed for installation over cabinets). (See par. 4.18 (c).)

NOTE.—The location of spray opening is optional, to right or left, in accordance with manufacturer's usual practice.

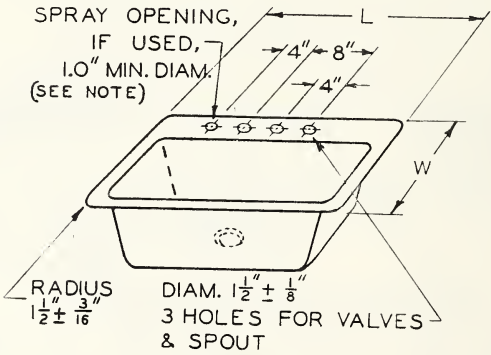


STANDARD DIMENSIONS

L	W
60"	23 1/2" TO 25"
66"	23 1/2" TO 25"
72"	23 1/2" TO 25"

FIGURE 27. Ledge kitchen sinks with back, two compartments, and double drain-board (designed for installation over cabinets). (See par. 4.18 (d).)

NOTE.—The location of spray opening is optional, to right or left, in accordance with manufacturer's usual practice.



STANDARD DIMENSIONS

L	W
24"	21"
30"	21"

FIGURE 28. Flat-rim ledge kitchen sinks. (See par. 4.19 (a).)

NOTE.—The location of spray opening is optional, to right or left in accordance with manufacturer's usual practice.

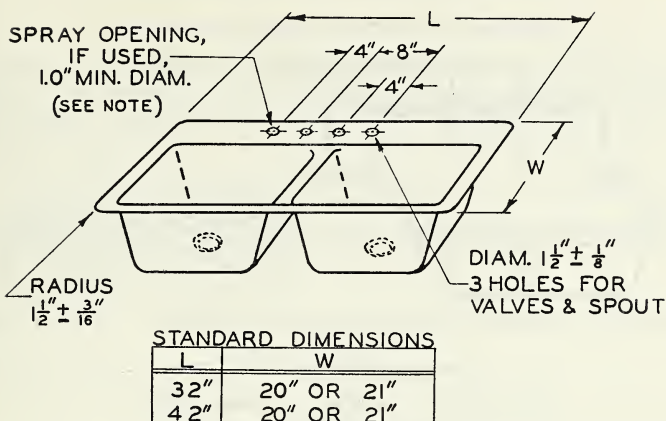


FIGURE 29. Flat-rim ledge kitchen sinks, two compartments. (See par. 4.19 (b).)

NOTE.—The location of spray opening is optional, to right or left, in accordance with manufacturer's usual practice.

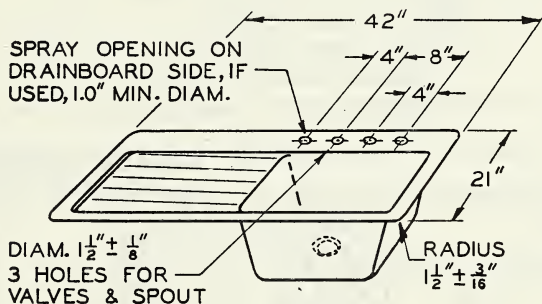


FIGURE 30. Flat-rim ledge kitchen sinks with single drainboard, sink at right or left. (See par. 4.19 (c).)

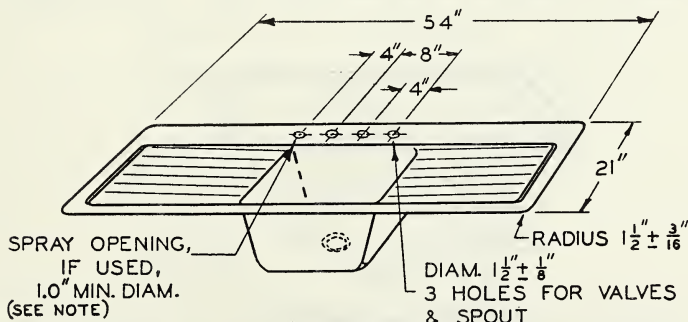


FIGURE 31. Flat-rim ledge kitchen sinks with double drainboard. (See par. 4.19 (d).)

NOTE.—The location of spray opening is optional, to right or left, in accordance with manufacturer's usual practice.

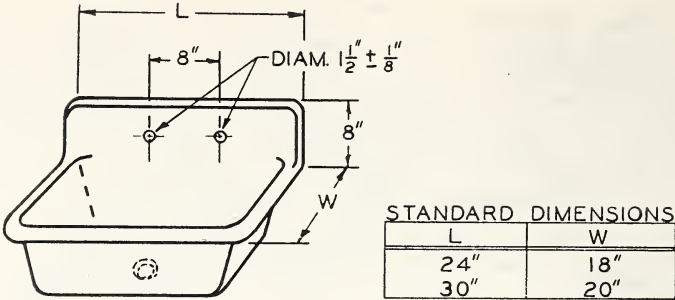


FIGURE 32. One-piece roll-rim kitchen sinks with back. (See par. 4.20.)

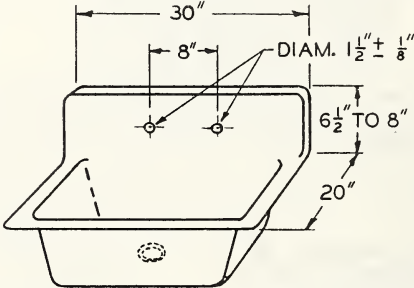


FIGURE 33. One-piece flat-rim kitchen sinks with back. (See par. 4.21.)

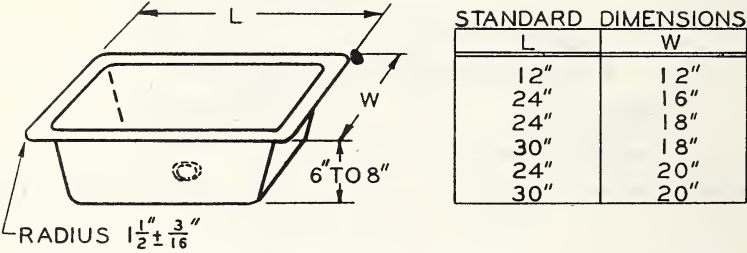


FIGURE 34. Center-outlet flat-rim kitchen sinks. (See par. 4.22.)

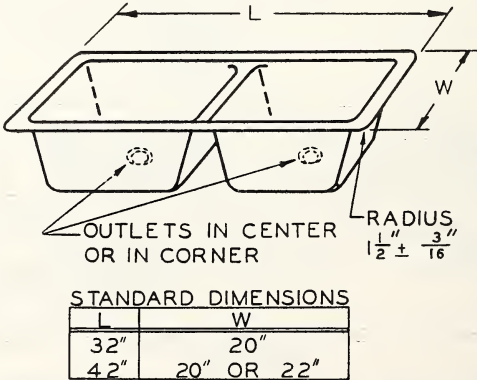


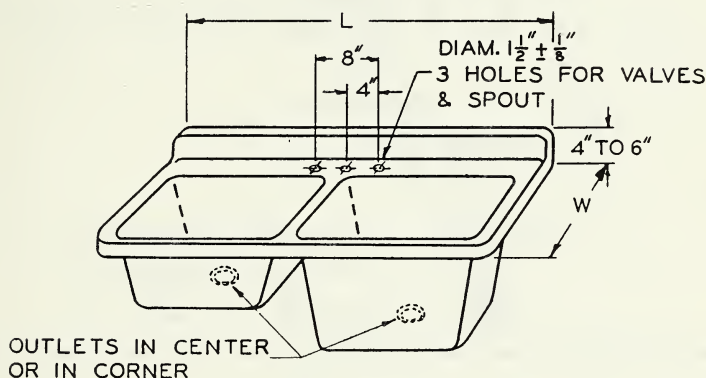
FIGURE 35. Flat-rim two-compartment kitchen sinks. (See par. 4.23.)

COMBINATION[SINKS AND LAUNDRY TRAYS

4.25 *Rim ledge sink and laundry tray combinations with back, sink at right or left* (designed for installation over cabinets or on legs): Sizes 42"×24" or 25", 48"×24" or 25", and 50"×24" or 25" are standard. (Fig. 36.)

[The elimination of all apron sink and laundry tray combinations with back is recommended.]

4.26 *Flat-rim sink and laundry tray combinations, reversible*: Size 42"×20" is standard. (Fig. 37.)



STANDARD DIMENSIONS

L	W
42"	24" OR 25"
48"	24" OR 25"
50"	24" OR 25"

FIGURE 36. *Rim ledge sink and laundry tray combinations with back, sink at right or left* (designed for installation over cabinets or on legs). (See par. 4.25.)

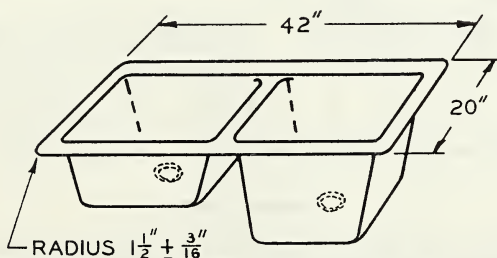


FIGURE 37. *Flat-rim sink and laundry tray combinations, reversible*. (See par. 4.26.)

SERVICE SINKS

4.27 *Roll-rim service sinks with back, on trap standard:* Sizes 22'' \times 18'' and 24'' \times 20'' are standard. (Fig. 38.)

[The elimination of all other sizes of roll-rim service sinks with back, on trap standards, is recommended.]

[The elimination of all flat-rim and roll-rim service sinks without back, with trap standards, is recommended.]

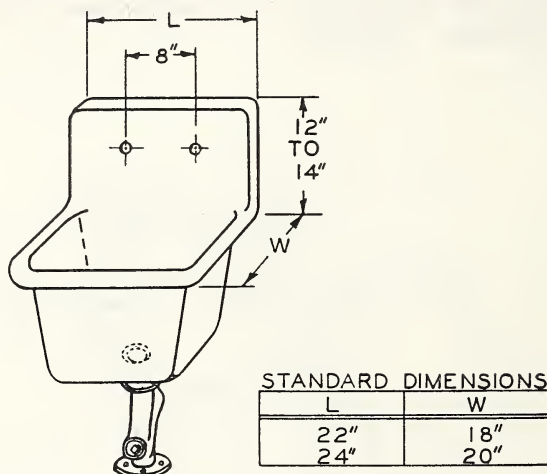


FIGURE 38. Roll-rim service sinks with back, on trap standard. (See par. 4.27.)

SUMP SINKS

4.28 *Flat-rim sump sinks:* Sizes 16'' \times 16'' \times 10'' and 20'' \times 16'' \times 10'' or 12'' are standard. (Fig. 39.)

[The elimination of all other sizes of flat-rim sump sinks is recommended.]

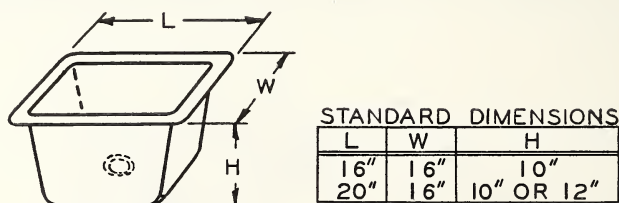


FIGURE 39. Flat-rim sump sinks. (See par. 4.28.)

LAUNDRY TRAYS

4.29 *Laundry tray outlet dimensions.*—The standard dimensional limits for outlets of enameled cast-iron laundry trays are as set forth in figure 40.

4.30 *Roll-rim laundry trays with back.*

(a) Roll-rim laundry tray with back, single compartment:
Size 27'' or 28'' \times 26'' is standard. (Fig. 41.)

(b) Roll-rim laundry tray with back, double compartment:

Size 53"×26" is standard. (Fig. 42.)

4.31 Ledge laundry trays with double compartment: Size 48"×25" is standard. (Fig. 43.)

4.32 Flat-rim laundry trays: Size 24"×20" is standard. (Fig. 44.)

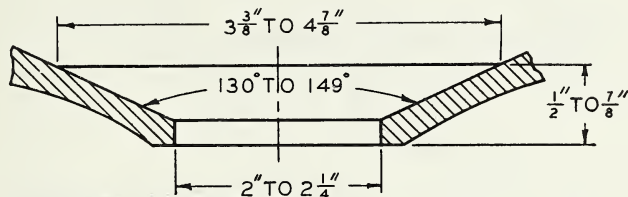


FIGURE 40. Enameled cast-iron laundry trays—outlet dimensions.

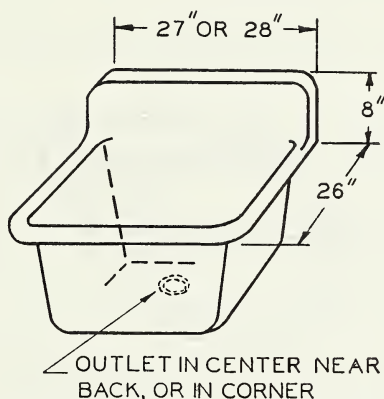


FIGURE 41. Roll-rim laundry trays with back, single compartment.
(See par. 4.30 (a).)

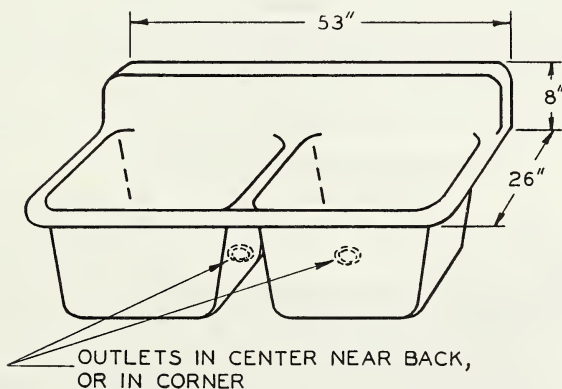


FIGURE 42. Roll-rim laundry trays with back, double compartment.
(See par. 4.30 (b).)

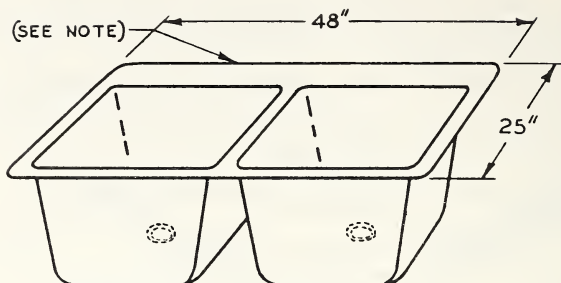


FIGURE 43. *Ledge laundry trays with double compartment. (See par. 4.31.)*

NOTE.—If ledge is drilled for supply openings, the diameters and spacing are the same as for sink and tray combinations, figure 36.

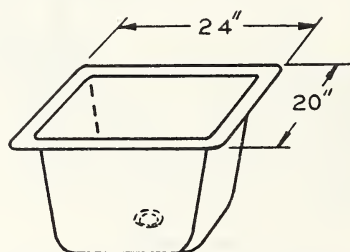


FIGURE 44. *Flat-rim laundry trays. (See par. 4.32.)*

URINALS

4.33 *Trough urinals with back, and with or without lip: 3-, 4- and 6-ft. lengths are standard. (Fig. 45.)*

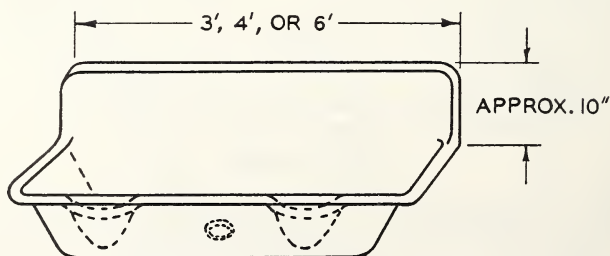


FIGURE 45. *Trough urinals with back, and with or without lip. (See par. 4.33.)*

5. DEFINITIONS

- 5.1 *Enameled cast iron (as applied to plumbing fixtures).*—A product cast from molten iron and coated with vitreous enamel fused to the metal. The enamel coating is hard, glossy, and opaque, and, in combination with the solid cast-iron base, produces a rigid, durable product.
- 5.2 *Inspection window.*—A circular opening 3 in. in diameter cut from a small sheet of any flexible material, such as rubber or paper, for convenience in sliding over irregular surfaces to determine segregation. A segregation is a collection of blemishes within the inspection window greater than permitted by table 1.
- 5.3 *Flaws.*
Cracked fixture.—A fixture with a rupture extending through both the casting and enamel.
Craze.—A crack in the enamel surface.
Lift.—An area of metal base from which the enamel has separated.
Pinhole.—A hole which extends through the enamel to the metal base.
- 5.4 *Blemishes.*
Dimple.—A slight depression in the enamel surface.
Lump.—A raised portion of the enamel surface.
Specks.—Particles of foreign matter which produce a colored portion of the surface.
Small: $\frac{1}{100}$ to $\frac{1}{64}$ in. in maximum dimension.
Medium: Over $\frac{1}{64}$ to $\frac{1}{32}$ in. in maximum dimension.
Large: Over $\frac{1}{32}$ to $\frac{1}{16}$ in. in maximum dimension.
Waviness.—The appearance of irregular surface in the glaze. Some waviness in an enamel surface is unavoidable and is not cause for rejection.
- 5.5 *Ledge back.*—A flat ledge at the back of a lavatory, sink, or laundry tray, not more than 2 in. higher than the rim and extending the full length of the fixture, on which the supply fitting can be mounted and small articles can be placed; or a similar construction with a center panel suitable for mounting a supply fitting.
- 5.6 *Shelf back.*—A flat elevation at the back of a lavatory, higher than 2 in. above the rim and extending the full length of the fixture, on the top or front of which the supply fitting can be mounted and on which small articles can be placed; or a similar construction with a center panel formed into the shelf suitable for mounting a supply fitting.

6. INSPECTION RULES

6.1 The fixture shall be examined with the eyes of the observer about 2 ft. from the surface observed. The light source shall be partially diffused daylight, supplemented if necessary with diffused artificial light, the total being of intensity approximating that usually available within a few feet of an outside window, but not in direct sunlight. No actual count or measure of blemishes should be attempted except in case of doubt, since with practice dimensional limits and numbers can readily be gaged by the eye. No flaws shall be

allowed. Some waviness in an enamel surface is unavoidable and is not cause for rejection; other blemishes shall be limited to those listed in table 1.

TABLE 1. Allowable blemishes

Description	Size or appearance	Maximum number allowed per inspection window	Maximum number allowed per fixture
Specks-----	{ Small-----	4	Not to be counted.
	{ Medium-----	2	8
	{ Large-----	1	5
Dimples-----		2	8
Lumps-----		2	8

7. METHODS OF TEST

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

7.2 Tests for acid-resisting enamel.

7.2.1 *Method of test.*—Acid-resisting enamel shall be subjected either to the lemon test or to the citric acid test, as specified below, but in cases of dispute the citric acid test shall be the umpire test. The test for subsurface acid resistance may be made at the option of the purchasing agency or the inspector.

7.2.2 *Lemon test.*—A freshly cut half of a normally ripe lemon shall be applied to a cleaned area of the enameled ware, and after 24 hours at room temperature the lemon shall be removed and the surface washed with water and wiped dry. No effect on the enamel shall be visible upon careful inspection.

7.2.3 *Citric acid test (umpire test).*—A fresh test solution made of one part citric acid crystals to 10 parts water by weight shall be applied to the surface of the enamel for 15 minutes, at the end of which period, after washing and drying, no effect of the acid on the treated area shall be visible upon careful inspection. The ware and the acid solution shall have been stored for not less than 3 hours immediately preceding the tests in atmosphere at 80° F, $\pm 10^\circ$ F, and the tests shall be made under these conditions of temperature. The test solution shall be applied to clean areas in pools consisting of several drops and covered with a watch glass to hold the solution in place.

7.2.4 *Test for subsurface acid resistance of enamel coatings on cast iron.*—The test is ordinarily made on a flat or nearly flat specimen 2 in. square cut from a fixture.

(1) Grind off the enamel so as to expose a smooth oblique section of the coating and part of the metal base. Specimens cut from the article may be ground along a cut edge. The oblique section of enamel shall be $\frac{3}{4}$ in., $\pm \frac{1}{8}$ in. (1.6 to 2.2 cm) wide. The abrasive used in grinding shall pass a No. 150 sieve and shall be moistened during grinding.

(2) Restore the gloss to the ground enamel surface by refiring just sufficiently to obtain a fire polish. The polished surface shall permit ready cleaning, with a dry cloth, of marks made by a colored wax pencil.

(3) Apply the citric acid test, as specified in paragraph 7.2.3, to the full width of the fire-polished oblique section. The cut specimens may be immersed in the test solution. After application of the test solution for 15 minutes, the treated surface shall be washed and dried.

(4) The entire oblique section shall be rubbed with a colored wax pencil, and the deposit of colored wax rubbed with a dry cloth. If the wax cannot be readily and evenly removed from all portions of the treated area of enamel by rubbing, thus indicating that the enamel has been roughened by the test solution, the enamel shall not be considered acid resisting throughout.

7.3 *Trade-mark.*—In order to fix the responsibility for quality, the enameled cast-iron plumbing fixtures shall bear the manufacturer's name, or trade-mark duly applied for or registered under the laws of the United States. All acid-resisting enameled fixtures shall bear the manufacturer's mark permanently signifying acid-resisting enamel. These marks shall be located, if possible, so as to be visible after the fixture is installed.

8. LABELING

8.1 In order that the purchaser may be assured that he is obtaining enameled cast-iron plumbing fixtures conforming to this standard, it is recommended that ware complying therewith shall bear a sticker or other label containing the following wording:

The manufacturer declares that this enameled CAST-IRON fixture complies with all the requirements and tests of Commercial Standard CS77-51, as developed by the trade under the procedure of the Commodity Standards Division, and issued by the United States Department of Commerce.

This may be followed by the manufacturer's recommendations on handling, setting, and cleaning up.

9. EFFECTIVE DATE

9.1 Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors hereinafter listed, this commercial standard was issued by the United States Department of Commerce, effective from December 20, 1951.

EDWIN W. ELY,
Chief, Commodity Standards Division.

HISTORY OF PROJECT

First edition.—On March 28, 1939, the National Bureau of Standards was requested by the Sanitary Cast Iron Enameled Ware Association to assist the industry in the establishment of a commercial standard for sanitary cast-iron enameled ware. A proposed draft submitted by the Association was circulated to other interested organizations for comment. Their composite recommendations were incorporated in an adjusted draft which was circulated on July 12, 1939, to all branches of the trade. It was widely endorsed, but before its completion, further recommendations from producers for enlargement of the standard were received. Upon approval by the standing committee, the additions were also circulated to the trade. Following receipt of sufficient written acceptances, the establishment of Commercial Standard CS77-40 was announced on April 25, 1940, as the first printed edition.

Second edition.—A recommended revision was received from the Enameled Cast Iron Plumbing Fixtures Association under date of May 13, 1946, consisting chiefly of a list of standard types and sizes of fixtures, together with recommendations to eliminate certain fixtures which appeared to be no longer needed by the trade. A change in the title was also recommended, as well as the addition of requirements on dimensional tolerances, a list of standard colors, and definitions for ledge-back and shelf-back fixtures. Upon circulation to the industry on December 29, 1947, following approval by the standing committee, the revision was accepted in writing by a satisfactory majority, and the second edition was announced on April 30, 1948, as CS77-48.

Third edition.—Further additions to the standard were recommended by the Enameled Cast Iron Plumbing Fixtures Association on May 15, 1950, with the submission of illustrations for the fixtures giving standard size dimensions and certain details for supply and outlet openings. A few modifications concerning standard sizes, tolerances, and definitions were also proposed. The proposals were modified in accordance with recommendations from manufacturers, and were further adjusted to meet recommendations of the standing committee. With the majority approval of manufacturers and the standing committee, the revision was circulated to the trade on May 10, 1951, for endorsement. Written endorsements were subsequently received from a satisfactory majority of manufacturers, distributors, and users, and the third edition, CS77-51, was announced on December 7, 1951.

Project Manager: A. S. Best, Commodity Standards Division, Office of Industry and Commerce.

Technical Adviser: J. C. Richmond, Mineral Products Division, National Bureau of Standards.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Each organization nominated its own representative. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Industry and Commerce, U. S. Department of Commerce, which acts as secretary for the committee.

A. G. ZIBELL, *Chairman*

A. G. ZIBELL, Kohler Co., Kohler, Wis.

W. O. THOMPSON, American Radiator & Standard Sanitary Corp., Pittsburgh 30, Pa.

D. J. CRANE, Eljer Co., Ford City, Pa.

W. P. KLIMENT, Crane Co., Chicago 5, Ill.

JAMES H. PEERY, Central Supply Association, Chicago 1, Ill.

ALFRED E. ELLIS, Sol Ellis & Sons, Inc., Chicago 16, Ill. (representing the National Supply Association of America, Inc.).

G. A. BAEHR, Sears, Roebuck & Co., Chicago 7, Ill. (representing the Mail Order Association of America).

BENJAMIN CADBURY, Hajoca Corp., Philadelphia 1, Pa.

R. F. WINKLER, 1016 Twentieth St., NW., Washington, D. C. (representing National Association of Master Plumbers).

LEON CHATELAIN, JR., A. I. A., Washington 6, D. C. (representing the American Institute of Architects).

ROBERT K. THULMAN, Housing and Home Finance Agency, Washington 25, D. C.

FRANKLYN A. ADAMS, State of Rhode Island, Providence 2, R. I. (representing National Association of Purchasing Agents).

F. MORGAN BROWN, Western Plumbing Officials Association, Los Angeles 32, Calif.



ACCEPTANCE OF COMMERCIAL STANDARD

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

Date_____

Commodity Standards Division,
Office of Industry and Commerce,
U. S. Department of Commerce,
Washington 25, D. C.

Gentlemen:

We believe that the Commercial Standard 77-51 constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹

of enameled cast-iron plumbing fixtures. We reserve the right to depart from it as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of authorized officer_____

(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer_____

Organization_____

(Fill in exactly as it should be listed)

Street address_____

City, zone, and State _____

¹ Underscore which one. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

TO THE ACCEPTOR

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

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

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

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

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

ACCEPTORS

The organizations listed below have individually accepted this standard for use as far as practicable in the production, distribution, testing, or purchase of enameled cast-iron plumbing fixtures. In accepting the standard, they reserved the right to depart from it as they individually deem advisable. It is expected that articles which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS

(General Support)

American Ceramic Society, Inc., The, Columbus, Ohio.
American Institute of Architects, Washington, D. C.
American Specification Institute, Chicago, Ill.
Enameled Cast Iron Plumbing Fixtures Association, Washington, D. C.
National Association of Master Plumbers, Washington, D. C.
Saginaw Association of Master Plumbers, Saginaw, Mich.
Western Plumbing Officials Association, Los Angeles, Calif.

FIRMS AND OTHER INTERESTS

Adams, Franklin O., Tampa, Fla.
Aitchison-Richmond Supply Co., St. Joseph, Mo.
Alamo Pottery, Inc., San Antonio, Tex.
Allen Plumbing Supply Co., Allentown, Pa.
American Plumbers Supply Co., The, Toledo, Ohio.
American Plumbing & Steam Supply Co., Tacoma, Wash.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Sanitary Manufacturing Co., Abingdon, Ill.
Andrews, Jones, Biscoe & Goodell, Boston, Mass.
Axtell Co., Fort Worth, Tex.
Baker Manufacturing Co., Hutchinson, Kans.
Barnes Manufacturing Co., Mansfield, Ohio.
Barthmaier, Eugene V., Philadelphia, Pa.
Basche-Sage Hardware Co., Baker, Oreg.
Bellman, Gillett & Richards, Toledo, Ohio.
Beuth, John P., Moberly, Mo.
Biggs Kurtz Co., The, Grand Junction, Colo.
Blackwell-Wielandy Co., St. Louis, Mo.
Boehm, George A., New York, N. Y.
Bovard, William R., Kansas City, Mo.
Bradenton Women's Club, Bradenton, Fla.
Bradley, J. R., Co., Inc., Reno, Nev.
Brooks-Borg, Des Moines, Iowa.
Brust & Brust, Milwaukee, Wis.
Buffalo, City of, Department of Public Works, Architectural Service, Buffalo, N. Y.
Camlet, J. Thomas, Passaic, N. J.
Canfield Supply Co., Kingston, N. Y.
Cannon & Mullen, Salt Lake City, Utah.
Carstens Bros., Ackley, Iowa.
Cedar Rapids Pump & Supply Co., Cedar Rapids, Iowa.
Cellarius, Charles F., Cincinnati, Ohio.
Central of Georgia Railway Co., Savannah, Ga.
Channel Co., Long Beach, Calif.
Chesco Co., New York, N. Y.
Chicago Vitreous Enamel Product Co., Cicero, Ill.
Cincinnati, City of, Department of Purchasing, Cincinnati, Ohio.
Closs, E., Co., Inc., Sparta, N. J.
Clow, James B., & Sons, Chicago, Ill.
Cole Supply Co., Inc., Tuscaloosa, Ala.

Consolidated Supply Co., Portland, Oreg.
Consolidated Supply Co., Inc., Kansas City, Mo.
Conwell, E. L., & Co., Philadelphia, Pa.
Cooper Supply Co., Tulsa, Okla.
Cram & Ferguson, Boston, Mass.
Dalziel Plumbing Supplies, San Francisco, Calif.
Danser Hardware & Supply Co., Weston, W. Va.
Detroit, City of, Department of Buildings & Safety Engineering, Detroit, Mich.
Detroit, City of, Department of Public Work, City Engineer's Office, Detroit, Mich.
Dick Bros., Inc., Reading, Pa.
Diller Wierman, Inc., Hanover, Pa.
Dubuque, R. A., Supply Co., St. Louis, Mo.
Du-Kane Supply Co., Pittsburgh, Pa.
Dunning, R. B., & Co., Bangor, Maine.
Eighteenth Ave. Plumbers Supply Co., Inc., Brooklyn, N. Y.
Ekroth Laboratories, Inc., Brooklyn, N. Y.
Eljer Co., Ford City, Pa.
Ellis, Sol, & Sons, Inc., Chicago, Ill.
Emery Industries, Inc., Cincinnati, Ohio.
Empire Supply Co., Inc., Visalia, Calif.
Enamel Products Co., The, Cleveland, Ohio.
Fall River Steam & Gas Pipe Co., Corp., Fall River, Mass.
Federal-Huber Co., Chicago, Ill.
Ferro Enamel Corp., Cleveland, Ohio.
Flanagan Supply Co., Oklahoma City, Okla.
Flannagan, Eric G., Henderson, N. C.
Fleck Co., Camden, N. J.
Florida Automobile & Gas Engine Co., Tampa, Fla.
Fords Porcelain Works, Perth Amboy, N. J.
Galloup Pipe & Supply Co., Battle Creek, Mich.
Gefro Supply Inc., West New York, N. J.
General Electric Co., Schenectady, N. Y.
Gibbons, M. J., Supply Co., Dayton, Ohio.
Gibson Schlemmer Co., The, Cincinnati, Ohio.
Glauber Brass, Inc., Kinsman, Ohio.
Glauber, Inc., New York, N. Y.
Gilick Supply Co., Marshalltown, Iowa.
Gordon Lumber & Supply Co., Kenosha, Wis.
Green, Raymond C., & Co., Jenkintown, Pa.
Hajoca Corp., Philadelphia, Pa.
Hanson & Gavin, Virginia, Minn.
Haralson & Mott, Fort Smith, Ark.
Hartford Plumbing Supply Inc., Hartford, Conn.
Hefley Co., The, Battle Creek, Mich.
Hill Supply Co., Clarksdale, Miss.
Hoe Supply Co., Christopher, Ill.
Hospital Bureau of Standards & Supplies, Inc., New York, N. Y.
Hubbard, S. B., Co., The, Jacksonville, Fla.
Hughes Supply Co., The, Mansfield, Ohio.
Humphreys Manufacturing Co., The, Mansfield, Ohio.
Hunting Supply Corp., Watertown, N. Y.
Illinois Supply Co., Aurora, Ill.
Inland Supply Co., Danville, Ill.
Jacobson, A. D., Plumbing & Heating Co., Inc., Kansas City, Mo.
James, W. T., Hardware & Plumbing Co., Bisbee, Ariz.
Jardine Plumbing Co., The, Chillicothe, Ohio.
Jefferson Supply Co., Pine Bluff, Ark.
Jersey Central Lines, New York, N. Y.
Johnson Hardware Co., Clarksburg, W. Va.

- Jones, John Paul, & Leonard Bindon, Seattle, Wash.
 Joughin, R. T., & Co., Inc., Tampa, Fla.
 Kahn, Albert, Associated Architects & Engineers, Inc., Detroit, Mich.
 Kamen Supply Co., Inc., Wichita, Kans.
 Kansas City Pump Co., Kansas City, Mo.
 Kansas State College, Department of Architecture & Allied Arts, Manhattan, Kans.
 Keenan Pipe & Supply Co., Los Angeles, Calif.
 Keeney Manufacturing Co., The, Newington, Conn.
 Keich & O'Brien, Warren, Ohio.
 Kelly, Frank P., & Son, Binghamton, N. Y.
 Kennedy Co., The, Cleveland, Ohio.
 Kiefaber, W. H., Co., The, Dayton, Ohio.
 Kinder Plumbing Co., Webster, Mass.
 Kinsey, H. P., Co., Easton, Pa.
 Knapp Supply Co., Inc., The, Muncie, Ind.
 Kohler Co., Kohler, Wis.
 Koller Bros. Co., The, Cleveland, Ohio.
 La Crosse Plumbing Supply Co., La Crosse, Wis.
 Lansing Supply Co., Lansing, Mich.
 Latenser, John, & Sons, Omaha, Nebr.
 Levine, Samuel, New York, N. Y.
 Loeb, Laurence M., White Plains, N. Y.
 Lyon, A. E., Co., Glendale, Calif.
 Malone Plumbing Supply Co., Pittsburgh, Pa.
 Manchester Supply Co., Manchester, N. H.
 May Supply Co., Anderson, Ind.
 McArdle & Cooney, Inc., Philadelphia, Pa.
 McArdle & Walsh, Inc., Baltimore, Md.
 McAuliffe & Burke Co., Boston, Mass.
 McGowin-Lyons Hardware & Supply Co., Mobile, Ala.
 McNeill, O. H., Plumbing & Heating, Herrin, Ill.
 Mechanical Construction Corp., Hibbing, Minn.
 Memphis Plumbing & Heating Supply Co., Memphis, Tenn.
 Meyer, F. & J., New York, N. Y.
 Michigan Supply Co., Lansing, Mich.
 Milano, M. Joseph, North Quincy, Mass.
 Miller Supply Co., Chicago, Ill.
 Miller & Vrydagh, Terre Haute, Ind.
 Milwaukee Flush Valve Co., Milwaukee, Wis.
 Mineola Plumbing Supply Co., Inc., Mineola, N. Y.
 Miner Supply Co., Red Bank, N. J.
 Monroe Company of Boston, Jamaica Plain, Mass.
 Mooser, William, San Francisco, Calif.
 Moran, Clifford, Plumbing & Heating Co., Highland Park, Ill.
 Morrison Supply Co., Fort Worth, Tex.
 Mott Bros. Co., Rockford, Ill.
 Mott Company of Pennsylvania, Philadelphia, Pa.
 Muhlenberg Bros., Wyomissing, Pa.
 Murphy Supply Co., Green Bay, Wis.
 National Plumbing Fixture Corp., Columbus, Ohio.
 National Sanitary Co., The, Salem, Ohio.
 Nebraska, University of, Lincoln, Nebr.
 Nelson Co., Detroit, Mich.
 Newar Supply Co., Chicago, Ill.
 Noland Co., Inc., Chattanooga, Tenn.
 Oklahoma, University of, School of Architecture, Norman, Okla.
 Orange Memorial Hospital, Orange, N. J.
 Paterson General Hospital, Paterson, N. J.
 Patterson, W. S., Co., Appleton, Wis.
 Patzig Testing Laboratories, Des Moines, Iowa.
 Peerless Colorado Co., Denver, Colo.
 Pennsylvania Railroad, The, Philadelphia, Pa.
 Pinski Bros. Inc., Great Falls, Mont.
 Plumbers & Factory Supplies, Inc., Columbus, Ohio.
 Plumbers' Supply Co., New Bedford, Mass.
 Plumbers Supply Co., Inc., Louisville, Ky.
 Plumbers Supply Company of St. Louis, St. Louis, Mo.
 Poekert, R. A., Pittsburgh, Pa.
 Powell Plumbing & Heating, Colfax, Wash.
 Prier Brass Manufacturing Co., Kansas City, Mo.
 Providence Pipe & Sprinkler Co., Providence, R. I.
 Rapid Plumbing Co., Rapid City, S. Dak.
 Resnikoff, Abraham, New York, N. Y.
 Ribber, George L., Detroit, Mich.
 Richmond Radiator Co., New York, N. Y.
 Roberts-Hamilton Co., Minneapolis, Minn.
 Robischon-Kiesling Contracting Corp., Houston, Tex.
 Royal Brass Manufacturing Co., The, Cleveland, Ohio.
 Rubly, William, & Sons, Indianapolis, Ind.
 Russell, Mullgardt & Schwarz, St. Louis, Mo.
 St. Louis, Board of Education, St. Louis, Mo.
 Sales, Murray W., & Co., Detroit, Mich.
 Sanitary Plumbing Co., Redlands, Calif.
 Seaford Plumbing Supply Co., Seaford, Del.
 Sears, Roebuck & Co., Chicago, Ill.
 Seekell, H. H., Ypsilanti, Mich.
 Selck, Walter E., & Co., Chicago, Ill.
 Shivers, W. M., Plumbing Supply Co., Houston, Tex.
 Shoemaker, Ted, Plumbing Co., Sebring, Fla.
 Simpson, W. H., Inc., Olean, N. Y.
 Sirrine, J. E., Co., Greenville, S. C.
 Slakey Bros., Inc., Sacramento, Calif.
 Sleeper, Harold R., New York, N. Y.
 Somerville, Thos., Co., Washington, D. C.
 Southern Pacific Co., San Francisco, Calif.
 Southern Supply Co., Inc., Baltimore, Md.
 Southside Plumbing & Heating Maintenance, Freeport, N. Y.
 Speakman Co., Wilmington, Del.
 Spiers, Archie & Allan, Inc., Newport News, Va.
 Stevens, John Howard and John Calvin 2d, Portland, Maine
 Stoetzel, Ralph, Chicago, Ill.
 Sullivan County Plumbing & Heating Supply Co., Inc., Liberty, N. Y.
 Swank Hardware Co., The, Johnstown, Pa.
 Sweet's Catalog Service, New York, N. Y.
 (General support.)
 Taggart Plumbing Co., New York, N. Y.
 Tallman Co., St. Louis, Mo.
 Taub Plumbing Supply Co., Inc., Newark, N. J.
 Taylor, Ellery Kirke, Haddonfield, N. J.
 Tennessee Mill & Mine Supply Co., Knoxville, Tenn.
 Thompson-Durkee Co., Allston, Mass.
 Thorne, Henry Calder, Ithaca, N. Y.
 Trant, Thomas, & Bro., Inc., Hartford, Conn.
 Treaty Co., The, Greenville, Ohio.
 Trimble & Lutz Supply Co., Wheeling, W. Va.
 United States Plumbing Fixture Corp., Columbus, Ohio.
 U. S. Supply Co., Wichita, Kans.
 United States Testing Co., Inc., Hoboken, N. J.
 Universal-Rundle Corp., Milwaukee, Wis.
 Van Denberg Supply Co., Rockford, Ill.
 Van Dyke & Barnes, Los Angeles, Calif.
 Virginia Polytechnic Institute, Blacksburg, Va.
 Wahpeton Plumbing & Heating Co., Wahpeton, N. Dak.
 Walker Supply Co., Trenton, N. J.
 Warburton's, Madera, Calif.
 Weber, C. L., & Co., Inc., Philadelphia, Pa.
 Weekes, John, & Son Co., Watertown, N. Y.
 Weeks, Ralph E., Co., Scranton, Pa.
 Welch, Carroll E., Huntington, N. Y.
 Welker Supply Co., The, Cleveland, Ohio.
 Westchester Square Plumbing Supply Co., Inc., Bronx, New York, N. Y.
 Western Electric Co., Inc., New York, N. Y.
 Western-Metal Supply Co., San Diego, Calif.
 Westwater Supply Co., Columbus, Ohio.
 Whitney & Ford Co., Chicago, Ill.
 Wight & Wight, Kansas City, Mo.

Wilcox, Crittenden & Co., Inc., Middletown, Conn.
Willow Supply Corp., New York, N. Y.
Wisconsin River Supply Co., Wausau, Wis.
Wisconsin State Board of Health, Madison, Wis.
Wolf, Louis G., Henderson, Ky.
Wolverine Brass Works, Grand Rapids, Mich.
Woolcock Plumbing & Heating Co., Niagara Falls, N. Y.
Worthen, A. B., Co., Methuen, Mass.
Zimmer Supply Co., Youngstown, Ohio.
Zimmerman, A. C., Los Angeles, Calif.

FEDERAL GOVERNMENT AGENCIES

Agriculture, U. S. Department of, Division of Procurement and Property Management, Washington, D. C.

Army, Department of, Office of Assistant Chief of Staff, Standards Branch, Procurement Division, Washington, D. C.
General Services Administration, Public Buildings Service, Washington, D. C.
Government Printing Office, Library, Division of Public Documents, Washington, D. C. (General support.)
Housing and Home Finance Agency, Office of Administrator, Washington, D. C. (General support.)
Interior, U. S. Department of, National Capital Parks, National Park Service, Washington, D. C.
Justice, U. S. Department of, Bureau of Prisons, Washington, D. C.
Veterans' Administration, Procurement Division, Washington, D. C.

COMMERCIAL STANDARDS

CS No.
0-40. Commercial standards and their value to business.
1-52. Clinical thermometers.
2-30. Mopsticks.
3-40. Stoddard solvent.
4-29. Staple porcelain (all-clay) plumbing fixtures.
5-46. Pipe nipples; brass, copper, steel, and wrought-iron.
6-31. Wrought-iron pipe nipples. Superseded by CS5-46.
7-29. Standard weight malleable iron or steel screwed unions.
8-51. Gage blanks.
9-33. Builders' template hardware.
10-29. Brass pipe nipples. Superseded by CS5-46.
11-41. Moisture regains of cotton yarns.
12-48. Fuel oils.
13-44. Dress patterns.
14-51. Boys' sport and dress shirt (woven fabrics) size measurements.
15-46. Men's pajama sizes (made from woven fabrics).
16-29. Wallpaper.
17-47. Diamond core drill fittings.
18-29. Hickory golf shafts.
19-32. Foundry patterns of wood.
20-49. Vitreous china plumbing fixtures.
21-39. Interchangeable ground-glass joints, stopcocks, and stoppers.
22-40. Builders' hardware (nontemplate).
23-30. Feldspar.
24-43. Screw threads and tap-drill sizes.
25-30. Special screw threads. Superseded by CS24-43.
26-30. Aromatic red cedar closet lining.
27-36. Mirrors.
28-46. Cotton fabric tents, tarpaulins and covers.
29-31. Staple seats for water-closet bowls.
30-31. (Withdrawn.)
31-38. Wood shingles.
32-31. Cotton cloth for rubber and pyroxylin coating.
33-43. Knit underwear (exclusive of rayon).
34-31. Bag, case, and strap leather.
35-49. Hardwood plywood.
36-33. Fourdrinier wire cloth.
37-31. Steel bone plates and screws.
38-32. Hospital rubber sheeting.
39-37. (Withdrawn.)
40-32. Surgeons' rubber gloves.
41-32. Surgeons' latex gloves.
42-49. Structural fiber insulating board.
43-32. Grading of sulphonated oils.
44-32. Apple wraps.
45-48. Douglas fir plywood.
46-49. Hosiery lengths and sizes.
47-34. Marking of gold-filled and rolled-gold-plate articles other than watchcases.

CS No.
48-40. Domestic burners for Pennsylvania anthracite (underfeed type).
49-34. Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.
50-34. Binders board for bookbinding and other purposes.
51-35. Marking articles made of silver in combination with gold.
52-35. Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).
53-35. Colors and finishes for cast stone.
54-35. Mattresses for hospitals.
55-35. Mattresses for institutions.
56-49. Oak flooring.
57-40. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings.
58-36. Woven elastic fabrics for use in overalls (overall elastic webbing).
59-44. Textiles—testing and reporting.
60-48. Hardwood dimension lumber.
61-51. Venetian blinds (grade A, custom-made).
62-38. Colors for kitchen accessories.
63-38. Colors for bathroom accessories.
64-37. Walnut veneers.
65-43. Methods of analysis and of reporting fiber composition of textile products.
66-38. Marking of articles made wholly or in part of platinum.
67-38. Marking articles made of karat gold.
68-38. Liquid hypochlorite disinfectant, deodorant, and germicide.
69-38. Pine oil disinfectant.
70-41. Phenolic disinfectant (emulsifying type) (published with CS71-41).
71-41. Phenolic disinfectant (soluble type) (published with CS70-41).
72-38. Household insecticide (liquid spray type).
73-51. Old growth Douglas fir, Sitka spruce, and western hemlock standard stock doors.
74-39. Solid hardwood wall paneling.
75-42. Automatic mechanical draft oil burners designed for domestic installations.
76-39. Hardwood interior trim and molding.
77-51. Enameled cast-iron plumbing fixtures.
78-40. Ground-and-polished lenses for sun glasses (published with CS79-40).
79-40. Blown, drawn, and dropped lenses for sun glasses (published with CS78-40).

CS No.

- 80-41. Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
 81-41. Adverse-weather lamps for vehicles (after market).
 82-41. Inner-controlled spotlamps for vehicles (after market).
 83-41. Clearance, marker, and identification lamps for vehicles (after market).
 84-41. Electric tail lamps for vehicles (after market).
 85-41. Electric license-plate lamps for vehicles (after market).
 86-41. Electric stop lamps for vehicles (after market).
 87-41. Red electric warning lanterns.
 88-41. Liquid burning flares.
 89-40. Hardwood stair treads and risers.
 90-49. Power cranes and shovels.
 91-41. Factory-fitted Douglas fir entrance doors.
 92-41. Cedar, cypress, and redwood tank stock lumber.
 93-50. Portable electric drills (exclusive of high frequency).
 94-41. Calking lead.
 95-41. Lead pipe.
 96-41. Lead traps and bends.
 97-42. Electric supplementary driving and passing lamps for vehicles (after market).
 98-42. Artists' oil paints.
 99-42. Gas floor furnaces—gravity circulating type.
 100-47. Porcelain-enameled steel utensils.
 101-43. Blue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
 102. (Reserved for "Diesel and fuel-oil engines.")
 103-48. Rayon jacquard velour (with or without other decorative yarn).
 104-49. Warm-air furnaces equipped with vaporizing-type oil burners.
 105-48. Mineral wool insulation for low temperatures.
 106-44. Boys' pajama sizes (woven fabrics).
 107-45. (Withdrawn.)
 108-43. Treading automobile and truck tires.
 109-44. Solid-fuel-burning forced-air furnaces.
 110-43. Tire repairs—vulcanized (passenger, truck, and bus tires).
 111-43. Earthenware (vitreous-glazed) plumbing fixtures.
 112-43. Homogeneous fiber wallboard.
 113-51. Oil-burning floor furnaces equipped with vaporizing pot-type burners.
 114-43. Hospital sheeting for mattress protection.
 115-44. Porcelain-enameled tanks for domestic use.
 116-44. Bituminized-fibre drain and sewer pipe.
 117-49. Mineral wool insulation for heated industrial equipment.
 118-44. Marking of jewelry and novelties of silver.
 (E) 119-45.¹ Dial indicators (for linear measurements).
 120-48. Standard stock ponderosa pine doors.
 121-45. Women's slip sizes (woven fabrics).
 122-49. Western softwood plywood.
 123-49. Grading of diamond powder.
 (E) 124-45.¹ Master disks.
 125-47. Prefabricated homes.
 126-45. Tank-mounted air compressors.

CS No.

- 127-45. Self-contained mechanically refrigerated drinking water coolers.
 128-49. Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
 129-47. Materials for safety wearing apparel.
 130-46. Color materials for art education in schools.
 131-46. Industrial mineral wool products, all types—testing and reporting.
 132-46. Hardware cloth.
 133-46. Woven wire netting.
 134-46. Cast aluminum cooking utensils (metal composition).
 135-46. Men's shirt sizes (exclusive of work shirts).
 136-46. Blankets for hospitals (wool, and wool and cotton).
 137-51. Size measurements for men's and boys' shorts (woven fabrics).
 138-49. Insect wire screening.
 139-47. Work gloves.
 140-47. Testing and rating convectors.
 141-47. Sine bars, blocks, plates, and fixtures.
 142-51. Automotive lifts.
 143-47. Standard strength and extra strength perforated clay pipe.
 144-47. Formed metal porcelain enameled sanitary ware.
 145-47. Testing and rating hand-fired hot-water supply boilers.
 146-47. Gowns for hospital patients.
 147-47. Colors for molded urea plastics.
 148-50. Men's circular flat- and rib-knit rayon underwear.
 149-48. Utility type house dress sizes.
 150-48. Hot-rolled rail steel bars (produced from Tee-section rails).
 151-48. Body measurements for the sizing of apparel for infants, babies, toddlers, and children (for the knit underwear industry).
 152-48. Copper naphthenate wood-preservative (spray, brush, dip application).
 153-48. Body measurements for the sizing of apparel for girls (for the knit underwear industry).
 154-. (Reserved for "Wire rope.")
 155-50. Body measurements for the sizing of boys' apparel (knit underwear, shirts, trousers).
 156-49. Colors for polystyrene plastics.
 157-49. Ponderosa pine and sugar pine plywood.
 158-49. Model forms for girls' apparel.
 159-49. Sun glass lenses made of ground and polished plate glass, thereafter thermally curved.
 160-49. Wood-fiber blanket insulation (for building construction).
 161-49. "Standard grade" hot-dipped galvanized ware (coated after fabrication).
 162-49. Tufted bedspreads.
 163-49. Standard stock ponderosa pine windows, sash and screens.
 164-. (Reserved for "Concrete mixers.")
 165-50. Zinc naphthenate wood-preservative (spray, brush, dip application).
 166-50. Size measurements for men's work trousers.
 167-50. Automotive and general service copper tube.
 168-50. Polystyrene plastic wall tiles, and adhesives for their application.
 169-50. Galvanized ware fabricated from pregalvanized steel sheets.
 170-50. Cotton flour-bag (sack) towels.

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

CS No.	CS No.
171-50. Hardwood veneered doors.	178-51. Testing and rating ventilating fans (axial and propeller types).
172-50. Brass trim for water-closet bowls, tanks, and urinals (dimensional standards).	179-51. Installation of attic ventilation fans in residences.
173-50. Heavy-duty alpha-cellulose-filled melamine tableware.	180-52. Model forms for boys' apparel.
174-51. 140-F dry-cleaning solvent.	181- . (Reserved.)
175-51. Circular-knitted gloves and mittens.	182-51. Latex foam mattresses for hospitals.
176-51. Prefinished wall panels.	183-51. Boys' trouser size measurements.
177-51. Bituminous-coated metal septic tanks (single compartment, residential).	184-51. Steel fence posts—field and line type (produced from hot-rolled steel sections).

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Commodity Standards Division, Office of Industry and Commerce, U. S. Department of Commerce, Washington 25, D. C.

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