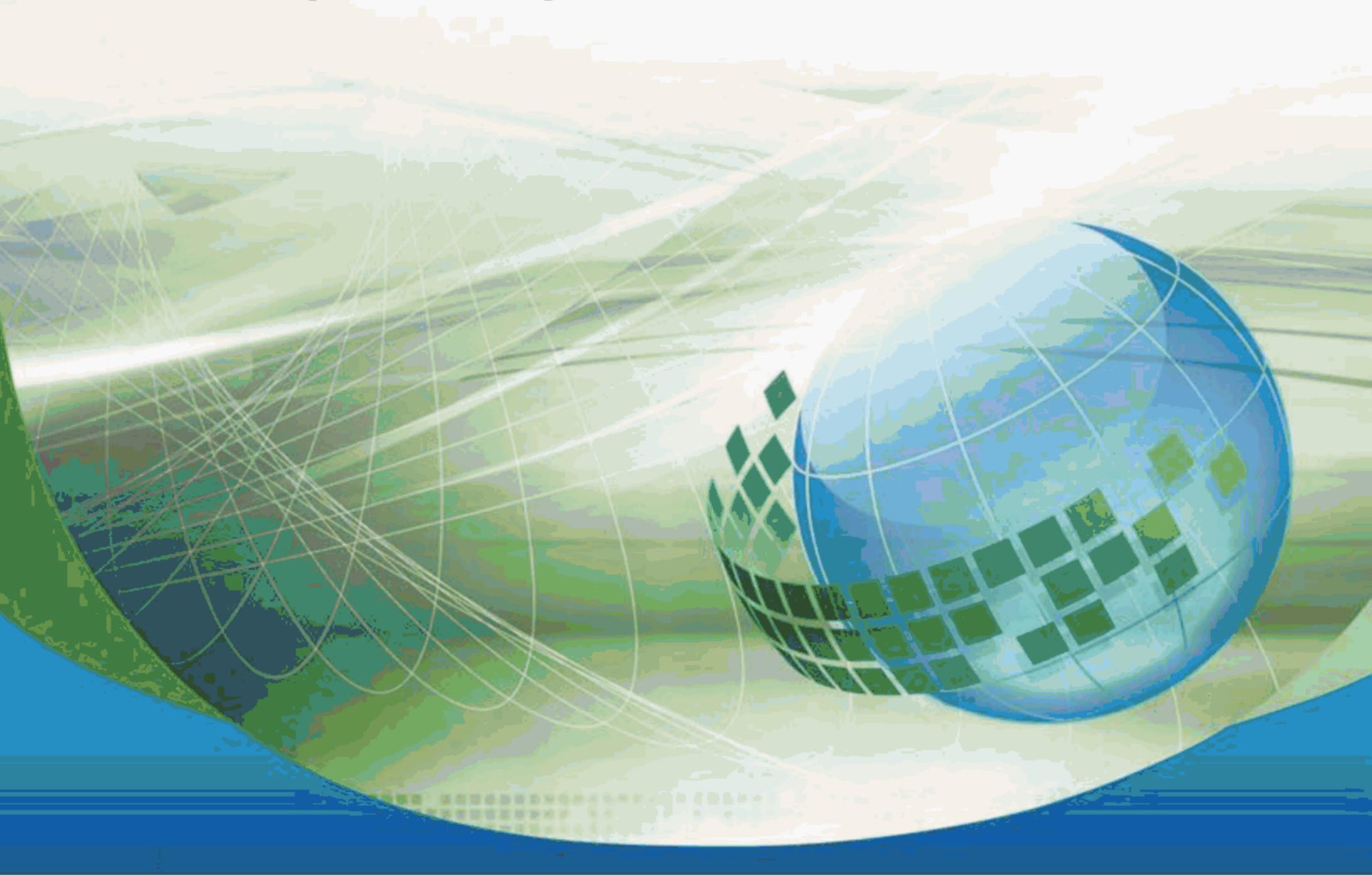




**ASME A112.19.1-2013/
CSA B45.2-13**

Enamelled cast iron and enamelled steel plumbing fixtures



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Standards Update Service

ASME A112.19.1-2013/CSA B45.2-13 July 2013

Title: *Enamelled cast iron and enamelled steel plumbing fixtures*

Pagination: **33 pages** (xii preliminary and 21 text), each dated **July 2013**

To register for e-mail notification about any updates to this publication

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ASME A112.19.1-2013/CSA B45.2-13
***Enamelled cast iron and enamelled
steel plumbing fixtures***



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*Published in July 2013 by CSA Group
A not-for-profit private sector organization
5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6
1-800-463-6727 • 416-747-4044*

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The American Society of Mechanical Engineers
(ASME)
Two Park Avenue
New York, NY 10016-5990
USA
www.asme.org

ISBN 978-0-7918-6909-3

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The 2013 edition of this Standard is being issued with an automatic addenda subscription service. The use of addenda allows revisions made in response to public review comments or committee actions to be published as necessary.

Published in July 2013 by CSA Group
A not-for-profit private sector organization
5060 Spectrum Way, Suite 100
Mississauga, Ontario, Canada
L4W 5N6
1-800-463-6727 • 416-747-4044

Visit the CSA Online Store at shop.csa.ca

ISBN 978-1-77139-052-1

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Preface

This is the second edition of ASME A112.19.1/CSA B45.2, *Enamelled cast iron and enamelled steel plumbing fixtures*.

This Standard replaces ASME A112.19.1/CSA-B45.2, *Enamelled cast-iron and enameled steel plumbing fixtures*, published in 2008.

This edition of ASME A112.19.1/CSA B45.2 includes the following:

- (a) **Table 1** has been updated to include additional defects;
- (b) deletion of the following definitions:
 - (i) Lifting;
 - (ii) Orange peel;
 - (iii) Pinhole; and
 - (iv) Pop-off;
- (c) amendment of the definition for “Lump”;
- (d) shower outlet dimensions have been added;
- (e) alternative slip resistant coverage has been added;
- (f) the warpage test has been amended for clarity;
- (g) the flange test has been amended to make it consistent with other standards; and
- (h) other editorial changes were made for better clarification.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the ASME/CSA Joint Harmonization Task Group on Plumbing Fixtures, under the jurisdiction of the ASME Standards Committee on Plumbing Materials and Equipment and the CSA Technical Committee on Plumbing Fixtures. The CSA Technical Committee operates under the jurisdiction of the CSA Strategic Steering Committee on Construction and Civil Infrastructure. This Standard has been formally approved by the ASME Standards Committee and the CSA Technical Committee. This Standard was approved as an American National Standard by the American National Standards Institute on June 26, 2013.

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ASME A112.19.1-2013/CSA B45.2-13

Enamelled cast iron and enamelled steel plumbing fixtures

0 Introduction

0.1

This harmonized Standard was developed in response to an industry request for a Standard for evaluation of plumbing fixtures that would be acceptable for use in both Canada and the United States. Harmonized Standards for plumbing fixtures made of other materials are also available or under development.

0.2

Harmonization activities for plumbing fixtures standards were undertaken in 2004 by a Joint Harmonization Task Group (JHTG) on Plumbing Fixtures, in which the ASME and CSA plumbing fixtures committees were equally represented. The responsibility for procedural matters and final approval of technical content was assumed by technical committees at higher levels within each SDO.

1 Scope

1.1

This Standard covers enamelled cast iron and enamelled steel plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings.

1.2

This Standard covers the following plumbing fixtures:

- (a) bathtubs;
- (b) drinking fountains and water coolers;
- (c) lavatories;
- (d) shower bases; and
- (e) sinks:
 - (i) kitchen and bar sinks;
 - (ii) laundry sinks;
 - (iii) service sinks; and
 - (iv) utility sinks.

1.3

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; “may” is used to express an option or that which is permissible within the limits of the standard; and “can” is used to express possibility or capability.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

1.4

SI units are the units of record in Canada. In this Standard, the yard/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application; however, each system is to be used independently. Combining values from the two measurement systems can result in non-conformance with this Standard.

All references to gallons are to U.S. gallons.

For information on the unit conversion criteria used in this Standard, see [Annex A](#).

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA Group

B125.3-12

Plumbing fittings

B651-12

Accessible design for the built environment

C22.2 No. 0.15-01 (R2012)

Adhesive labels

ASME (American Society of Mechanical Engineers)/CSA Group

ASME A112.18.1-2012/ CSA B125.1-12

Plumbing supply fittings

ASME A112.18.2-2011/ CSA B125.2-11

Plumbing waste fittings

ASME A112.19.2-2013/CSA B45.1-13

Ceramic plumbing fixtures

ASTM International (American Society for Testing and Materials)

C282-99 (2005)

Standard Test Method for Acid Resistance of Porcelain Enamels (Citric Acid Spot Test)

C346-87 (2004) e1

Standard Test Method for 45-deg Specular Gloss of Ceramic Materials

E1347-06 (2011)

Standard Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry

F462-79 (2007)

Standard Consumer Safety Specification for Slip-Resistant Bathing Facilities

ICC/ANSI (International Code Council/American National Standards Institute)

A117.1-2009

Accessible and Usable Buildings and Facilities

UL (Underwriters Laboratories Inc.)

969 (1995)

Standard for Marking and Labeling Systems

3 Definitions

The following definitions shall apply in this Standard:

Air gap — the unobstructed vertical distance, through the open atmosphere, between the lowest opening of a water supply and the flood level of the fixture.

Bathing surface — the portion of the sump of a bathtub on which, in accordance with common usage or design, a bather might step or stand while bathing or showering, and which is exclusive of ledges or rims.

Defect —

Blister — a hollow raised portion of the enamel surface of a cast iron or steel fixture.

Large blister — a blister with a dimension greater than 6 mm (0.24 in).

Medium blister — a blister whose largest dimension is between 1 and 6 mm (0.04 and 0.24 in).

Small blister — a blister whose largest dimension is less than 1 mm (0.04 in).

Chip — a blemish in the enamel exposing the undercoat or base metal.

Crack — a fracture in the surface or the substrate material of a fixture.

Craze (crazing) — separate and numerous hairlines in the enamel surface.

Note: *The lines can vary in length and can be up to several centimetres long.*

Hairline — a line within the enamel surface whose width does not exceed 0.05 mm (0.002 in).

Dimple — a depression in the enamel surface.

Lump — a raised portion of the enamel surface.

Speck — a particle of foreign matter that produces areas of contrasting colour on the enamel surface of a fixture.

Large speck — a speck with a dimension greater than 0.80 mm (0.031 in).

Medium speck — a speck whose largest dimension is between 0.40 and 0.80 mm (0.016 and 0.031 in).

Small speck — a speck whose largest dimension is greater than 0.25 mm (0.010 in) but less than 0.40 mm (0.016 in).

Spot — an area of contrasting colour.

Enamelled cast iron — a product cast from molten iron and coated with enamel fused to the metal (see Porcelain enamel).

Note: *The enamel coating is hard, glossy, opaque, and acid resistant and, in combination with the solid cast iron base, produces a rigid, durable product.*

Finish — the texture and condition of a surface (excluding colour).

Fitting — a device that controls and guides the flow of water.

Note: *See ASME A112.18.1/CSA B125.1 and CSA B125.3 for definitions of specific types of fittings.*

Fixture — a device that receives water, waste matter, or both and directs these substances into a drainage system.

Note: *See ASME A112.19.2/CSA B45.1 for definitions of specific types of fixtures.*

Flood level — the level at which water will overflow a fixture.

Inspection window — a circular opening 76 mm (3.0 in) in diameter cut into a sheet of flexible material and used to count the number of defects in the opening (see [Table 1](#)).

Lavatory — a washbowl or basin.

Slab type lavatory — a lavatory that has the mounting surface for a faucet on top of a slab and does not have an elevated back.

Ledge back — a flat elevated surface at the back of a lavatory, sink, or laundry sink, not more than 51 mm (2.0 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 centre panel suitable for mounting a supply fitting.

Porcelain enamel — a vitreous or glossy inorganic coating that is bonded to the metal by fusion at high temperature.

Rim — the unobstructed open edge of a fixture.

Satin finish — a very smooth surface with low or dull reflective properties.

Sheet steel — steel that can be satisfactorily porcelain enamelled, including the following:

- (a) special-purpose enamelling iron or steel of low metalloid and copper content that is specially manufactured and processed for the production of porcelain-enamelled fixtures;
- (b) special steels designed for porcelain-enamel application; and
- (c) cold-rolled steel.

Shelf back — a flat elevated surface at the back of a lavatory, sink, or laundry sink more than 51 mm (2.0 in) higher than the rim and extending the full length of the fixture, on the top or front of which the supply fitting can be mounted and small articles can be placed, or a similar construction with a centre panel formed into the shelf suitable for mounting a supply fitting on either a horizontal or inclined surface.

Spill level — the level at which water will flow out of one bowl into another bowl of the same fixture.

Visible surface — a surface of a fixture that is readily visible to an observer in a normal standing position after the fixture is installed.

Visible after installation — a surface that remains visible (not necessarily from a normal standing position) after the fixture is installed.

4 General requirements

4.1 General

4.1.1 Materials

All materials shall be free from deficiencies that affect the fixture's intended purpose.

4.1.2 Surface finish

Fixtures shall have a surface free from defects to the extent specified in [Table 1](#) when evaluated in accordance with [Clause 5.2](#).

4.1.3 Quality of work

Fixtures shall not have any exposed sharp or jagged edges, burrs, cracks, or other defects that might affect their use and serviceability (see [Clause 5.2](#)).

4.1.4 Wall brackets

Wall brackets shall be used when slab-type lavatories are supported by cast iron legs.

4.2 Cast iron thickness

Cast iron shall be at least 3 mm (0.13 in) thick when measured at least 25 mm (1.0 in) from the edge of the fixture.

4.3 Tolerances

4.3.1 General

Unless otherwise specified in this Standard, the tolerance on dimensions of 200 mm (8 in) and greater shall be $\pm 3\%$. The tolerance on dimensions less than 200 mm (8 in) shall be $\pm 5\%$.

In this Standard, dimensions specified as "minimum" or "maximum" shall not be reduced below the specified minimum or increased above the specified maximum by application of a tolerance. If a dimensional range is specified and the word "minimum" or "maximum" does not appear, the upper and lower limits shall not be considered critical and the appropriate tolerance shall apply.

4.3.2 Apron bathtubs

The tolerance on the length of apron bathtubs shall be ± 13 mm (± 0.5 in).

4.4 Enamel

4.4.1 General

Enamelled surfaces shall be enamelled using acid-resisting enamel thoroughly fused to the cast iron or steel. The enamel shall be of uniform colour and free from defects that affect the appearance or can affect the serviceability of the fixture.

4.4.2 Specular gloss

Enamelled surfaces visible after installation shall be glossy to the extent that they shall have a 45° (0.79 rad) specular gloss of not less than 45 when tested in accordance with ASTM C346.

4.4.3 Reflectance

If the enamel is white, its reflectance shall be not less than 72% when measured in accordance with ASTM E 1347.

4.4.4 Enamel thickness

The thickness of the enamel, measured on a flat surface at least 25 mm (1.0 in) from any edge of the fixture, shall be at least 0.64 mm (0.025 in) for cast iron and 0.13 mm (0.005 in) for steel.

4.4.5 Surface treatments

Before they are enamelled, surfaces shall be treated with ground coat. After enamelling, any surface subject to rework that exposes base metal shall be factory treated with rust inhibitor. All other steel surfaces shall be treated with at least one coat of filler, ground coat, or paint.

4.5 Waste fitting openings, drainage, and overflows

4.5.1 Waste fitting openings and drainage

4.5.1.1

Fixtures shall

- (a) have a waste fitting opening (outlet), the centre of which shall be located at the lowest point of the fixture; and

(b) drain to the waste outlet.

4.5.1.2

Except when proprietary (i.e., non-standard) waste fittings are provided by the manufacturer, the dimensions of waste outlets shall be as shown in [Figure 1](#).

4.5.1.3

Factory-supplied waste fittings shall comply with ASME A112.18.2/ CSA B125.2.

4.5.2 Overflows

4.5.2.1 Provision and positioning

Overflows in lavatories and sinks may be provided at the option of the manufacturer. When overflows are provided, the manner in which they are positioned shall be at the option of the manufacturer.

4.5.2.2 Cleaning

When provided, overflows in sinks intended for food preparation (e.g., kitchen and bar sinks) shall not be concealed and shall be accessible for disassembly and cleaning after installation.

4.6 Additional requirements for lavatories and sinks — Openings and mounting surfaces for supply fittings

4.6.1

When provided, openings and mounting surfaces for lavatory and sink supply fittings shall be as shown in [Figures 2 to 6](#), except when proprietary (i.e., non-standard) supply fittings are provided by the manufacturer.

4.6.2

Factory-supplied lavatory and sink supply fittings shall comply with ASME A112.18.1/CSA B125.1.

4.6.3

Mounting surfaces for supply fittings that rely on an air gap for backflow protection shall be not more than 13 mm (0.5 in) below the flood level rim.

Note: Care should be taken to ensure that the minimum air gap specified in ASME A112.18.1/CSA B125.1 or in the applicable plumbing code is not compromised when supply fittings are installed on fixtures with mounting surfaces below the flood level rim.

4.7 Additional requirements for bathtubs and shower bases

4.7.1 Minimum dimensions for bathtubs

The minimum dimensions for bathtubs shall be as shown in [Figure 7](#).

4.7.2 Slope to the waste outlet

Bathtubs and shower bases shall have a maximum slope of 4% to the waste outlet.

Note: There should be a minimum slope of 1% to the waste outlet.

4.7.3 Flanges

Bathtubs and shower bases intended for installation against a wall shall incorporate a flange raised at least 8 mm (0.3 in) above the rim. The flange shall be

- (a) integral with the bathtub or shower base;
- (b) added to an island tub or shower base in the factory; or

- (c) field installed using a flange kit that complies with [Clause 5.4](#) and includes all necessary parts and fasteners.

Fixtures using field-installed flanges shall be marked in accordance with [Clause 6.3](#).

Note: Flanges are also referred to as beads.

4.7.3.1

The raised flange shall be

- (a) integral with the bathtub or shower base;
- (b) added to an island tub or shower base in the factory; or
- (c) field installed using a flange kit that complies with [Clause 5.4](#). Fixtures using field-installed flanges shall be marked in accordance with [Clause 6.3](#) and shall include all necessary parts and fasteners.

4.7.4 Slip-resistant surfaces

The slip-resistant surfaces of bathtubs and shower bases shall comply with ASTM F462 and have the dimensions shown in [Figure 8](#). Alternative slip resistant patterns shall be considered acceptable provided coverage begins within 50 mm (2.0 in) of the basin radius as shown in [Figure 8\(d\)](#).

4.8 Additional requirements for drinking fountains

4.8.1

Drinking fountains shall

- (a) include a supply fitting, which shall be at least 25 mm (1.0 in) above the flood level rim; and
- (b) comply with the dimensions shown in [Figure 9](#).

Note: Drinking fountain supply fittings are also known as drinking fountain bubblers.

4.8.2

Factory-supplied drinking fountain supply fittings shall comply with ASME A112.18.1/CSA B125.1, including the toxicity requirements.

Note: ASME A112.18.1/CSA B125.1 includes toxicity and lead content requirements.

4.9 Accessible design fixtures

Fixtures designed to be accessible shall comply with the dimensional requirements specified in CSA B651 or ICC/ANSI A117.1, as applicable.

5 Test methods

5.1 Acid resistance test

5.1.1 Procedure

The acid resistance test shall be conducted as follows:

- (a) Prepare a solution made of 1 part citric acid crystals to 10 parts water, by weight.
- (b) Store the solution for at least 3 h at a temperature of 27 ± 6 °C (80 ± 10 °F).
- (c) Apply the solution to clean areas of the enamel, in pools consisting of several drops.
- (d) Cover the solution with a watch glass and hold it in place for 15 ± 2 min.
- (e) At the end of the 15 ± 2 min period, wash and dry the enamel.

5.1.2 Performance

The acid resistance of the enamel shall comply with the Class A requirements of ASTM C282.

5.2 Surface examination

5.2.1 Procedure

Visible surfaces shall be examined for defects by the unaided eye at a distance of approximately 610 mm (2 ft), using a light source of partially diffused daylight supplemented, if necessary, with diffused artificial light, giving an illuminance on the surface between 1076 and 2152 lx (100 and 200 foot-candles).

Note: *Unaided eye includes vision assisted by corrective lenses normally worn by the person inspecting the specimen.*

5.2.2 Performance

Defects shall not exceed the maximum specified in [Table 1](#) (see [Clause 4.1.2](#)). Some waviness in an enamelled surface is unavoidable and shall not be cause for rejection.

5.3 Warpage test

5.3.1 Procedure

The specimen shall be placed on a flat and level surface to ascertain the amount of deviation from the horizontal plane that exists at its edges.

A feeler gauge of a thickness equal to the total warpage allowed in [Clause 5.3.2](#) shall not slide under the specimen unless forced.

If the specimen rocks on two opposite corners, the horizontal plane shall be determined by placing a feeler gauge, as thick as the total warpage allowed, under a corner that does not touch the plane and then forcing the specimen down on this gauge. A second feeler gauge of the same thickness shall not slide under the specimen at any other point.

5.3.2 Performance

When measured in accordance with [Clause 5.3.1](#), the warpage at

- (a) the edges of the fixture that are set against the wall or floor, or into cabinets or countertops, shall not exceed 5 mm/m (0.06 in/ft); and
- (b) all other edges of the fixture shall not exceed 7.5 mm/m (0.09 in/ft).

5.4 Field-installed tiling-flange seal test

5.4.1 Procedure

The tiling-flange seal test shall be conducted as follows:

- (a) Set up the specimen in accordance with the manufacturer's instructions.
- (b) Apply a continuous water spray to the flange seal at the joint with the fixture as follows:
 - (i) using a 30° full jet spray nozzle;
 - (ii) for 30 min;
 - (iii) from a distance of 1.2 m (4 ft) from the face of the spray nozzle;
 - (iv) at an angle of 45°;
 - (v) at a flow rate of 11.4 L/min (3.0 gpm); and
 - (vi) at a temperature of 40 ± 5 °C (104 ± 9 °F).
- (c) Inspect the specimen for water transmission through the joint to the back of the flange.

Note: *Full Jet®, narrow angle 30° series, part No. 1/2 GG 3030, manufactured by Spraying Systems Co., North Avenue at Schmale Road, P.O. Box 7900, Wheaton, IL, 60189, has been used for this test.*

5.4.2 Performance

There shall be no water leakage through the flange and fixture joint.

5.5 Overflow test

5.5.1 Procedure

The overflow test shall be conducted as follows:

- (a) Install the specimen using a waste fitting that complies with ASME A112.18.2/ CSA B125.2.
- (b) Supply water to the specimen at the maximum flow rate specified in ASME A112.18.1/CSA B125.1 for flow rate testing of a supply fitting appropriate for the specimen. If the specimen is a laundry or utility sink, the rate of water supply to the major compartment shall be at least 15 L/min (4 gpm) and to the minor compartment (if any) at least 9 L/min (2.4 gpm).
- (c) Close the waste outlet.
- (d) Measure the elapsed time from the onset of water flowing into the overflow opening until the water begins to flow over the flood level of the specimen.

5.5.2 Performance

The specimen shall drain for at least 5 min from the onset of water flowing into the overflow opening, without overflowing its flood level rim.

5.6 Structural integrity tests for enamelled steel bathtubs, lavatories, and sinks

5.6.1 Bathtubs

5.6.1.1 Apparatus

The apparatus for testing the structural integrity of bathtubs shall be as follows:

- (a) three micrometer dial gauges graduated to 0.03 mm (0.001 in);
- (b) a loading device capable of applying a 1.3 kN (292 lbf) load without shock to the centre of the specimen bottom; and
Note: *Calibrated weights or a suitable mechanical or hydraulic load applicator may be used.*
- (c) a 130 × 250 mm (5 × 10 in) pad to distribute the load over a 32 500 mm² (50.0 in²) area. The pad shall consist of a sheet of sponge rubber 19 mm (0.75 in) thick (Shore A durometer of 8 to 14), topped with a plate of plywood or stiffer material having a minimum thickness of 19 mm (0.75 in). The thickness of this plate shall be such that there is not more than 0.25 mm (0.01 in) deflection of the ends when the load is applied.

5.6.1.2 Set-up

The specimen shall be mounted in a wood frame simulating normal installation, as follows:

- (a) The frame shall allow for clearance under the specimen for the dial gauges.
- (b) The manufacturer's installation instructions shall be used for spacing the 2 × 4 dimensional lumber of the frame and for fastening the specimen to the frame. If such instructions are not available, the specimen shall be fastened along the flange to each stud of the frame by 38 mm (1.5 in) long Number 6 steel wood screws using 10 mm (0.38 in) steel washers. The spacing of the studs in the frame shall be not greater than 406 mm (16 in) between centres.
- (c) The top of the frame shall be at least 305 mm (12 in) higher than the top of the installed specimen.
- (d) If legs or other component parts of the specimen are within 3 mm (0.13 in) of the floor line after installation, rigid vertical support shall be provided.
- (e) If the front apron of the specimen is not touching the test frame, the apron shall be supported in a continuous bed of plaster of Paris.

5.6.1.3 Procedure

The structural test for bathtubs shall be conducted as follows:

- (a) Maintain the temperature of the test area and specimen at 24 ± 6 °C (75 ± 10°F).
- (b) Inspect the finished surface of the specimen for cracks and other defects. Note all defects and damage.

- (c) Centre the distribution pad over the horizontal centrelines of the specimen waste outlet with the 254 mm (10 in) dimension along the length of the waste outlet. Determine the waste outlet centrelines by using its average length and width.
- (d) Place the three micrometer dial gauges on a rigid base beneath the longitudinal centreline of the waste outlet, with one gauge directly beneath the centre of the distribution pad and the other two within 51 mm (2.0 in) of each end of the bottom of the waste outlet.
- (e) Ensure that the areas where the tips of the gauges bear on the specimen are sufficiently flat and smooth that a small lateral movement of the specimen will not change the gauge reading by more than 0.03 mm (0.001 in).
- (f) Prepare the bearing areas by grinding the undersurface or by rigidly fastening a small, flat, level plate to the specimen.
- (g) If the waste outlet of the specimen interferes with the placement of the gauges, insert a standard spud into the outlet and use the flat surface on the spud for gauge bearing.
- (h) Preload the specimen by applying a load of 1.3 kN (292 lbf) on the centre of the distribution pad for 5 min. Remove the load and take the initial dial gauge readings.
- (i) Reload the specimen using the 1.3 kN (292 lbf) load and take gauge readings immediately following the load application and again 5 min later.
- (j) Remove the load and take gauge readings immediately following removal and again 10 min later.
- (k) Calculate the average deflection of the specimen and supports by averaging the deflections measured by the two end gauges.
- (l) Calculate the centre deflection (at the waste outlet) by subtracting the average deflection calculated in Item (k) from the deflection measured by the centre gauge.
- (m) After removal of the load, inspect the surface of the specimen for cracks in accordance with [Clause 5.6.3](#). Note any other damage resulting from the testing.

5.6.1.4 Performance

5.6.1.4.1

When examined in accordance with [Clause 5.6.3](#), bathtubs shall show no damage to the inner or outer surfaces as a result of testing. Cracking of the inner or outer surfaces, or separation of reinforcing members, shall be considered damage.

5.6.1.4.2

Centre deflection 5 min after the load specified in [Clauses 5.6.1.1](#) and [5.6.1.3](#) is applied shall be not greater than 3.18 mm (0.125 in). The residual centre deflection 10 min after the load is removed shall be not greater than 0.08 mm (0.003 in).

5.6.2 Lavatories and sinks

5.6.2.1 Apparatus

The apparatus for testing the structural integrity of lavatories and sinks shall consist of

- (a) a loading device capable of applying a 445 or 890 N (100 or 200 lbf) load without shock to the centre of the specimen bottom; and
 - Note:** *Calibrated weights or a suitable mechanical or hydraulic load applicator may be used.*
- (b) pads for distributing the load, as follows:
 - (i) for fixtures with a span of 762 mm (30.0 in) or more, a 190 × 200 mm (7.5 × 8.0 in) pad to distribute the load over a 38 700 mm² (60.0 in²) area. The pad shall consist of a sheet of sponge rubber 19 mm (0.75 in) thick (Shore A durometer of 8 to 14), topped with a plate of plywood or stiffer material having a minimum thickness of 19 mm (0.75 in); and
 - (ii) for fixtures with a span of less than 762 mm (30.0 in), a pad as specified in Item (b)(i), except that its dimensions shall be 130 × 150 mm (5 × 6 in) and it shall distribute the load over a 19 500 mm² (30.0 in²) area.

5.6.2.2 Set-up

The specimen shall be mounted in accordance with [Clause 5.6.1.2](#).

5.6.2.3 Procedure

The structural test for enamelled lavatories and sinks shall be conducted as follows:

- (a) Maintain the temperature of the test area and specimen at 24 ± 6 °C (75 ± 10 °F).
- (b) Inspect the surfaces of the specimen. Note all defects and damage.
- (c) Centre the distribution pad over the centre of the specimen bottom.
- (d) Preload the specimen as follows:
 - (i) For specimens with a span of 762 mm (30.0 in) or more, apply a load of 890 N (200 lb) at the centre of the distribution pad.
- (e) For specimens with a span of less than 762 mm (30.0 in), apply a load of 445 N (100 lb) at the centre of the distribution pad.
- (f) For double-compartment sinks, test each bowl based on its span in accordance with the applicable requirements specified in Item (i) or (ii) for a single fixture of comparable dimensions.
- (g) Leave the load in place for 5 min and then remove the load to permit the specimen to settle in the frame for 2 min.
 - (i) Reload the specimen in accordance with Item (d). Remove the load after 5 min and again permit the specimen to settle in the frame for 2 min.
- (h) Reload the specimen in accordance with Item (d). Remove the load after 10 min.
- (i) Inspect the finished surface of the specimen in accordance with [Clause 5.6.3](#).

5.6.2.4 Performance

When examined in accordance with [Clause 5.6.3](#), lavatories and sinks shall show no damage to the inner or outer surfaces as a result of structural integrity tests. Cracking of the inner or outer surfaces, or separation of reinforcing members, shall be considered damage.

5.6.3 Surface examination

The surfaces of the specimen shall be examined as follows:

- (a) Maintain the temperature of the inspection area and specimen at 24 ± 6 °C (75 ± 10 °F).
- (b) Wash the specimen with soap and water, rinse, and dry.
- (c) After drying, apply an ink solution consisting of 50% (by volume) water-soluble black ink in tap water (or an ink of a contrasting colour if the fixture is a colour other than white) with a sponge.
- (d) Wipe any excess ink solution off the surface with a damp cloth and allow the specimen to dry.
- (e) Examine the surface for chipping, cracking, crazing, or any other change in accordance with [Clause 5.2.1](#).

6 Markings, packaging, and literature

6.1 General

6.1.1

Enamelled cast iron and enamelled steel fixtures shall be marked with the manufacturer's name or registered trademark or, in the case of private labelling, the name of the customer for whom the fixture was manufactured. Additional markings shall be in accordance with [Clauses 6.3](#) and [6.4](#), as applicable.

6.1.2

Markings shall be permanent, legible, and visible after installation.

6.1.3

Acceptable means of applying permanent markings shall include firing on, etching, sand blasting, stamping with a permanent (non-water-soluble) ink, and casting in.

Adhesive labels that comply with CSA C22.2 No. 0.15 or UL 969 shall also be considered permanent when placed on a surface that is not normally submerged in water. The exposure conditions specified in Clause 7.1 of UL 969 shall apply.

6.2 Non-standard fixtures

6.2.1

Fixtures that require proprietary (i.e., non-standard) components, e.g., supply fittings or waste fittings, shall indicate, in the packaging or the accompanying literature, that such components are provided by the manufacturer.

6.2.2

Fixtures that do not comply with one or more of the dimensional requirements of this Standard shall be marked with an "N" to indicate the non-standard nature of the fixture.

Note: *This Clause is not intended to apply to fixtures that comply with none of the dimensional requirements of this Standard.*

6.2.3

Fixtures that require proprietary (i.e., non-standard) components, e.g., supply fittings, waste fittings, or water closet seats, shall be accompanied by literature that identifies the proper replacement parts.

6.3 Field-installed flanges

Bathtub and shower bases that use field-installed flanges shall have a non-permanent label stating "Do not install this fixture against a wall unless the appropriate flange is first installed".*

Flange kits shall include installation instructions.

**The equivalent French wording is «Ne pas fixer cet appareil au mur à moins que la bride appropriée n'ait été préalablement installée».*

6.4 Packaging

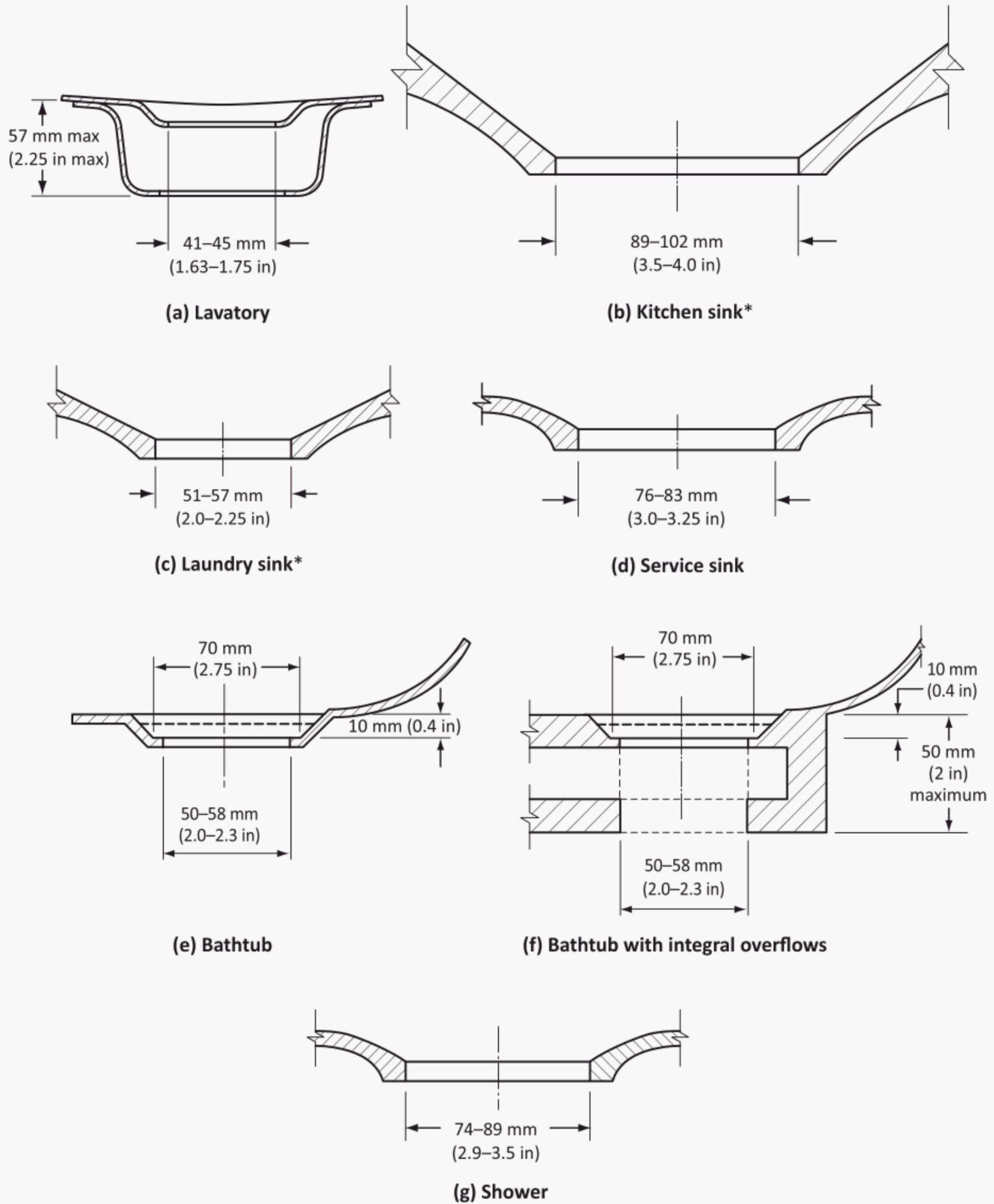
Packaging for enamelled cast iron and enamelled steel plumbing fixtures shall be marked with the

- (a) manufacturer's name or registered trademark or, in the case of private labelling, the name of the customer for whom the fixture was manufactured; and
- (b) model number.

Table 1
Maximum allowable number of defects on fixtures
(See Clauses 3, 4.1.2, and 5.2.2.)

Defect	Maximum number per inspection window	Maximum number per fixture
Spot	4	No limit
Small speck	4	No limit
Medium speck	2	8
Large speck	1	5
Dimple	2	8
Lump	2	8
Large blisters	0	0
Medium blisters	0	0
Small blisters	2	4
Cracks	0	0
Chips	0*	0*

**Chips measuring 2.5 mm (0.10 in) or less in their largest dimension that are located on caulked surfaces or in the nailing flange area, and intended to be covered by sheathing, shall be disregarded.*



*Waste outlets for bar sinks may have a diameter of 51–57 mm (2.0–2.25 in) or 89–102 mm (3.5– 4.0 in).

Figure 1
Waste outlet dimensions
 (See Clause 4.5.1.2.)

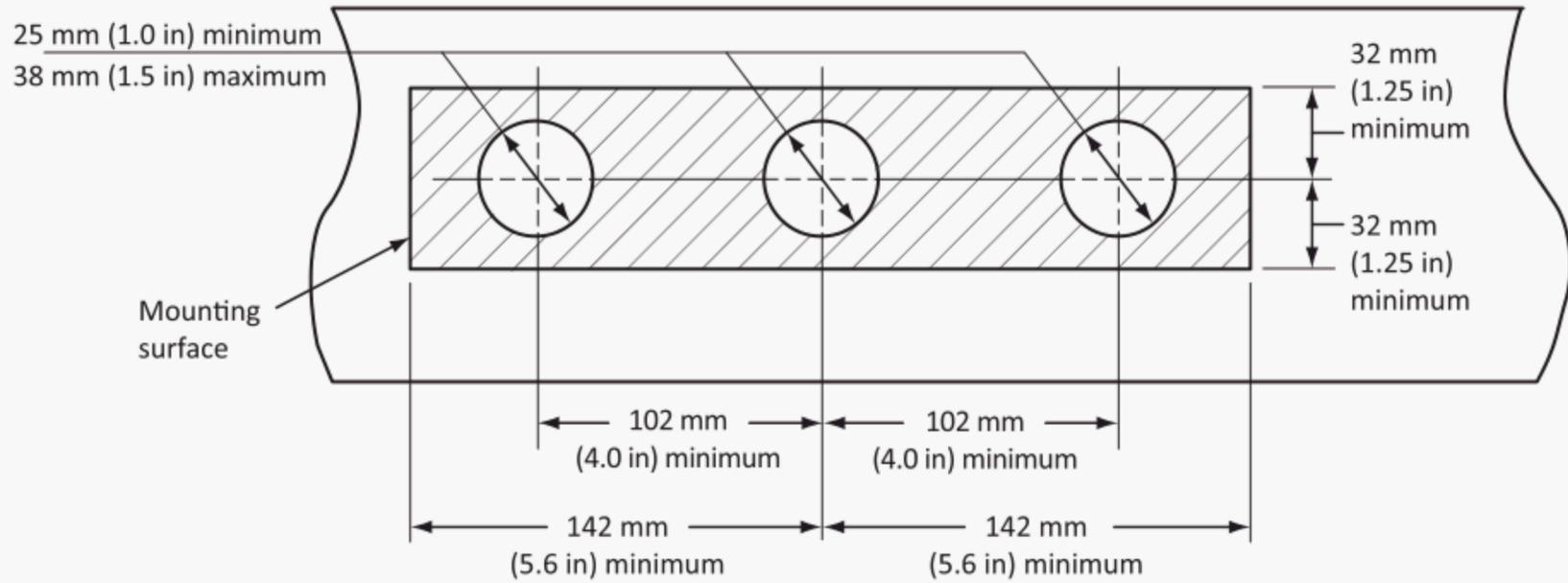
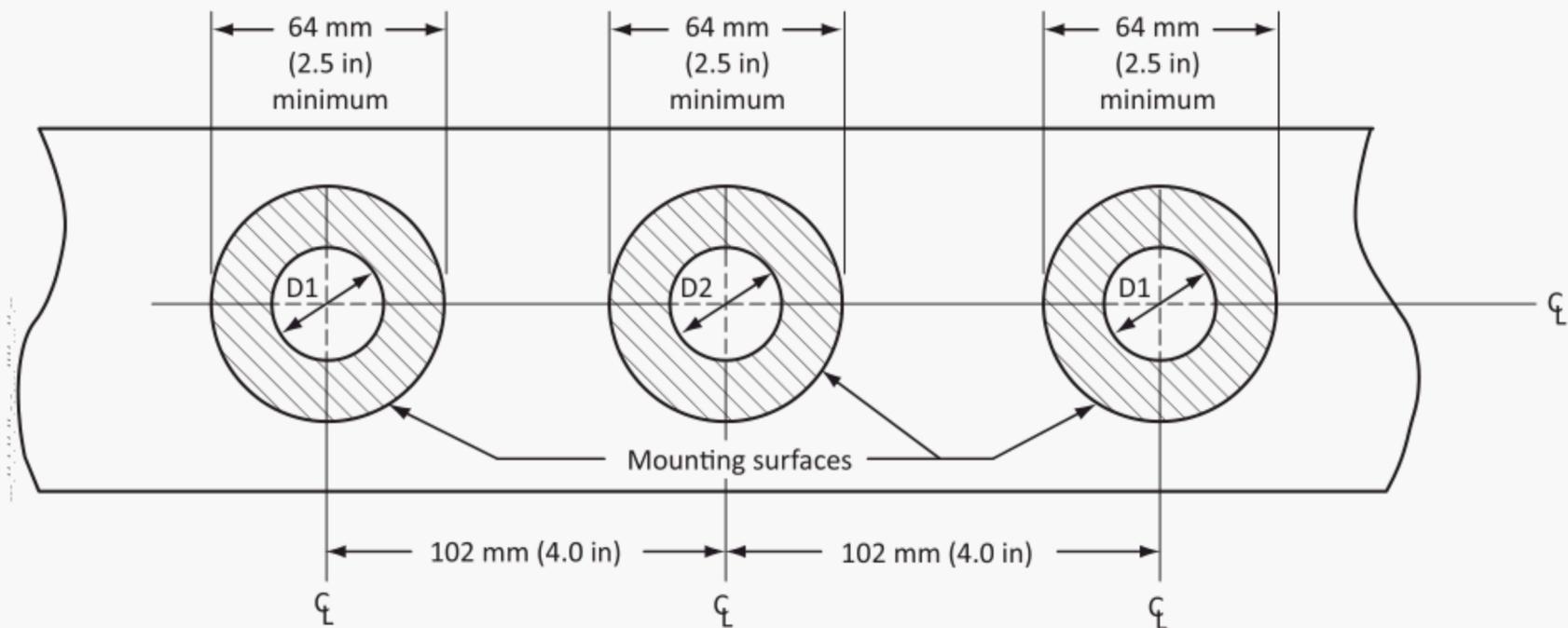


Figure 2
Opening and mounting surface dimensions
for standard 200 mm (8 in) deck fittings

(See Clause 4.6.1.)



Notes:

- (1) $D1 = 32$ to 38 mm (1.25 to 1.5 in).
- (2) $D2 = 25$ to 38 mm (1.0 to 1.5 in).
- (3) The dimensions in Notes (1) and (2) are minimums and maximums, i.e., tolerances do not apply.
- (4) The openings need not be in a straight line.

Figure 3
Opening and mounting surface dimensions for
standard 200 mm (8 in) combination fittings

(See Clause 4.6.1.)

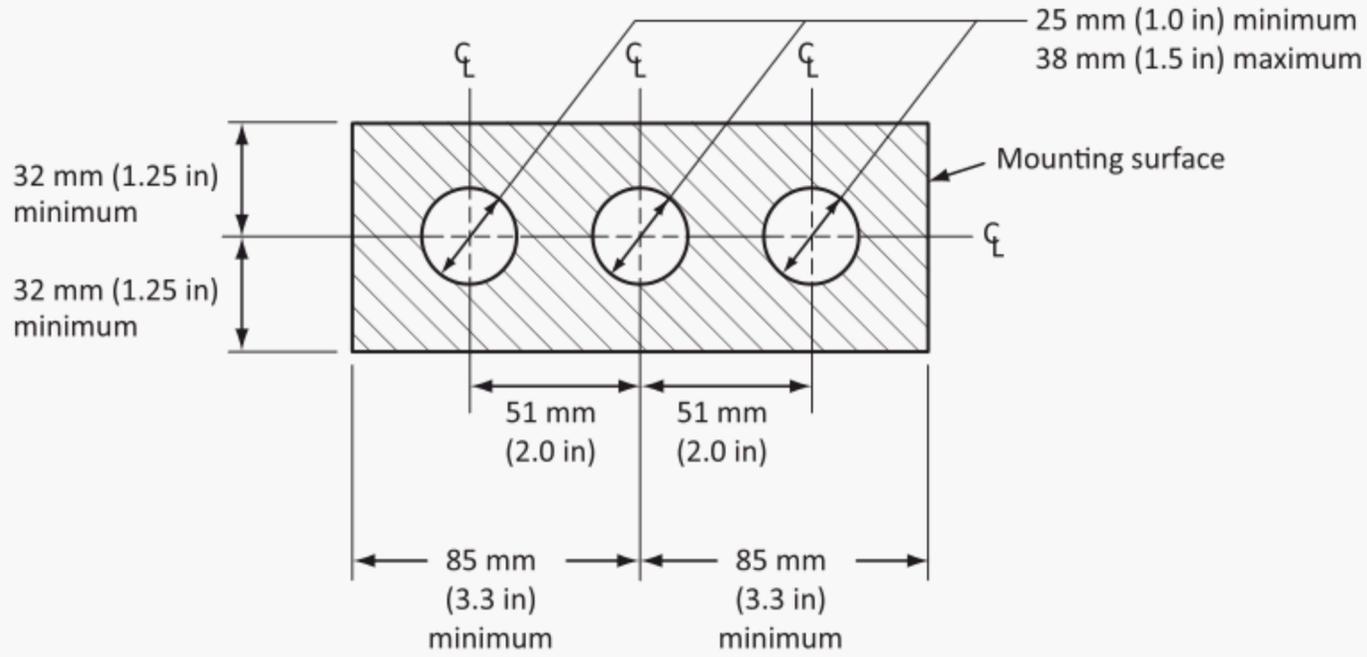
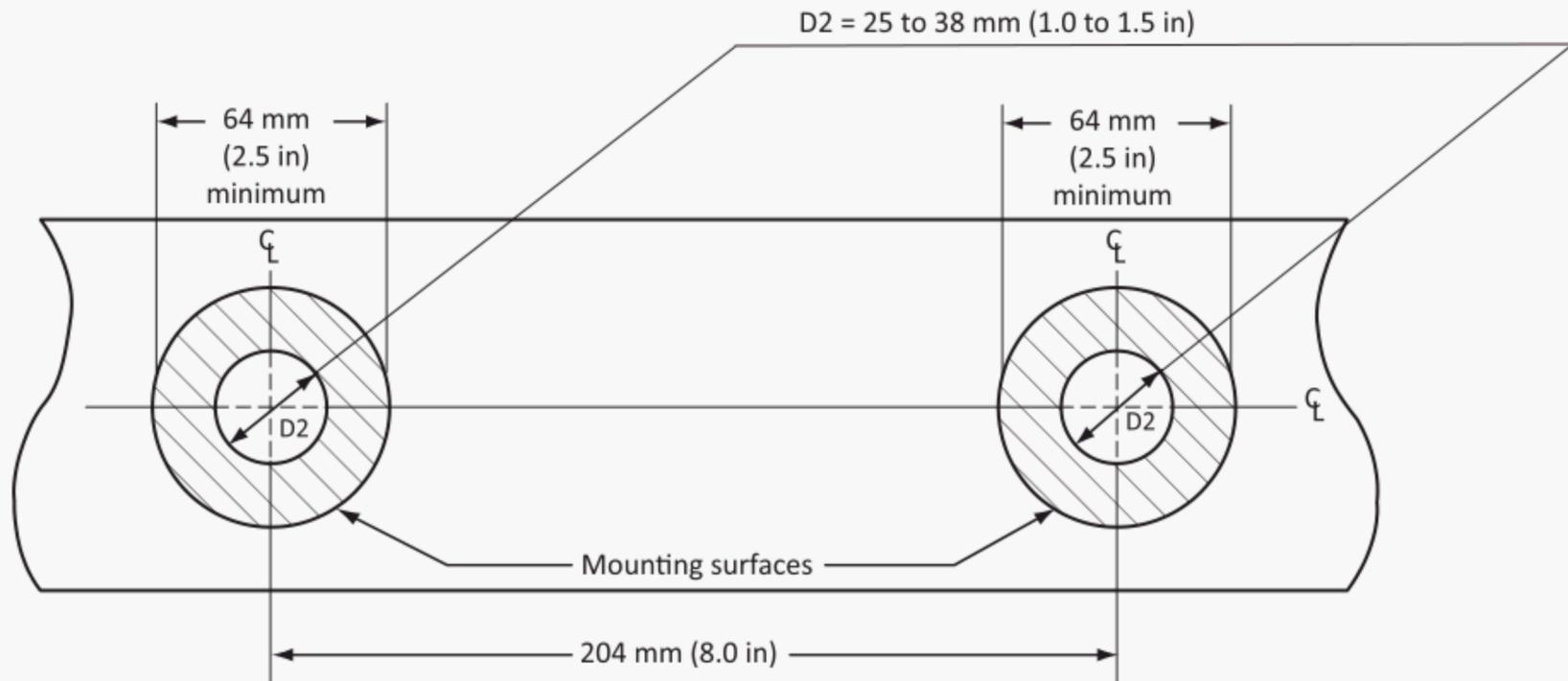


Figure 4
Opening and mounting surface dimensions for
standard 100 mm (4 in) centre-set fittings
 (See Clause 4.6.1.)



Note: The dimensions for $D2$ are minimum and maximum, i.e., tolerances do not apply.

Figure 5
Opening and mounting surface dimensions for standard
200 mm (8 in) combination fittings
 (See Clause 4.6.1.)

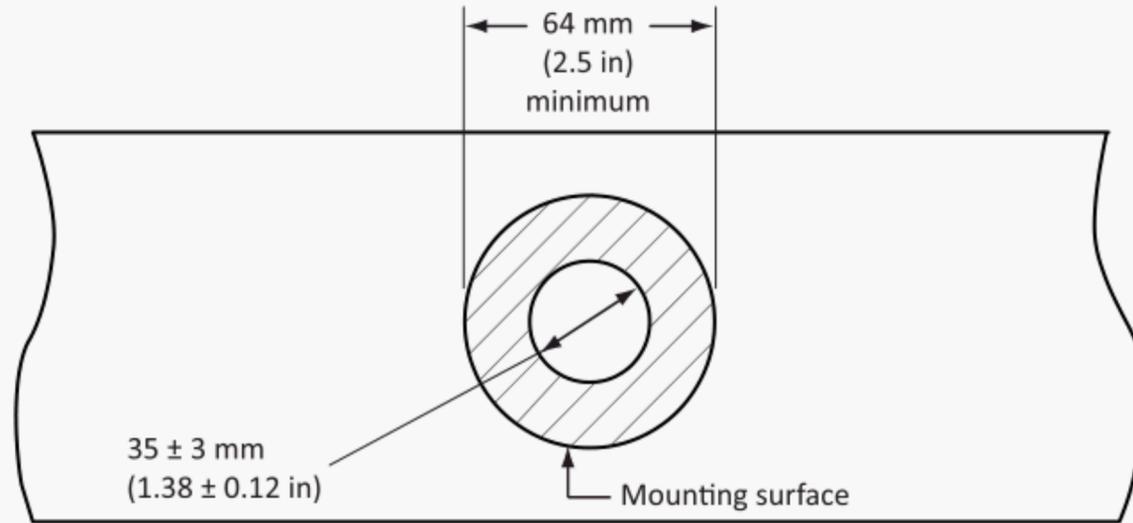
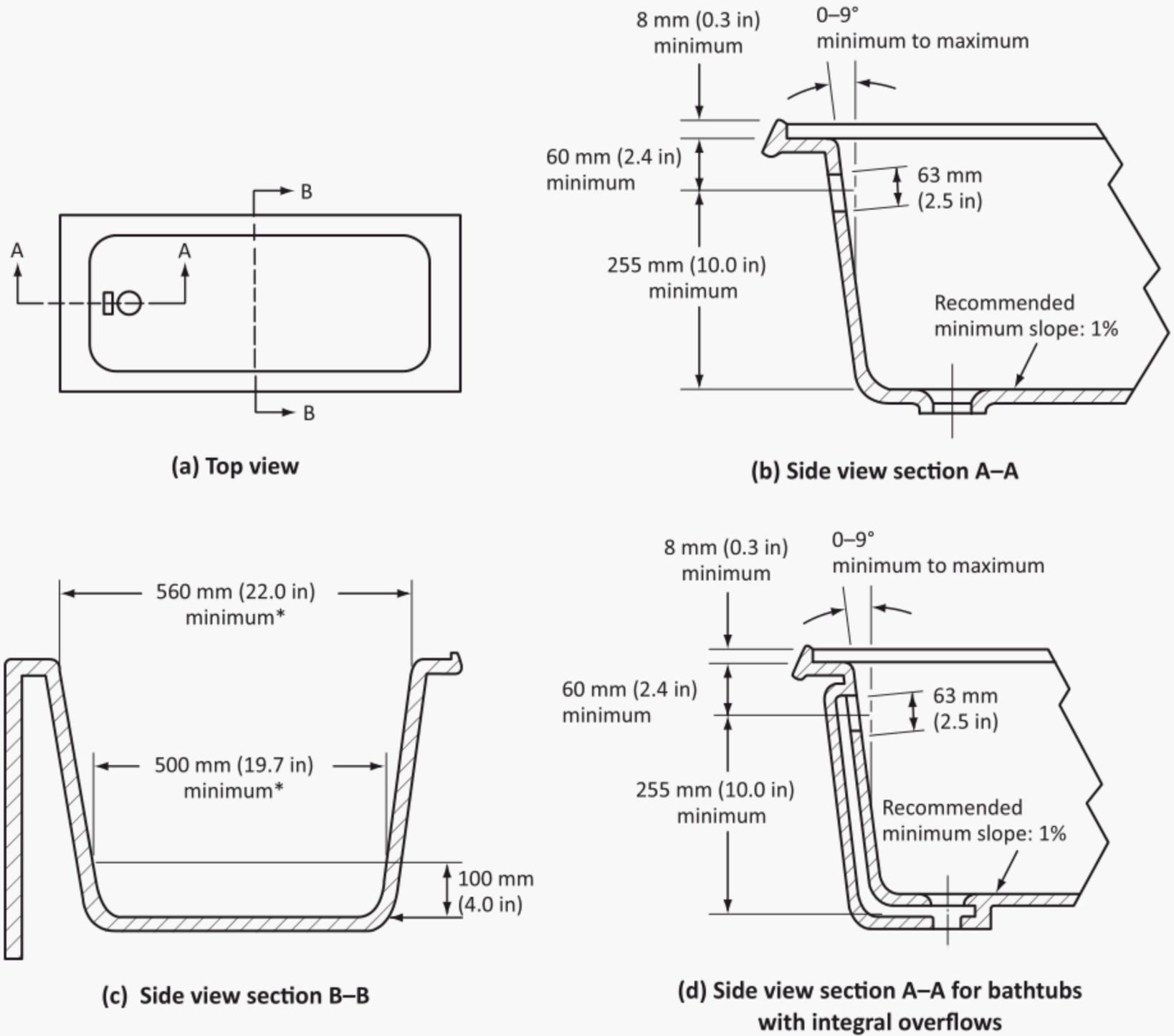


Figure 6
Opening and mounting surface dimensions
for single-mount supply fittings
(See Clause 4.6.1.)



*Minimum width at widest point in plan.

Note: These diagrams are not intended to restrict design. Alternative sizes and shapes shall be considered acceptable.

Figure 7
Dimensions for bathtubs
 (See Clause 4.7.1.)

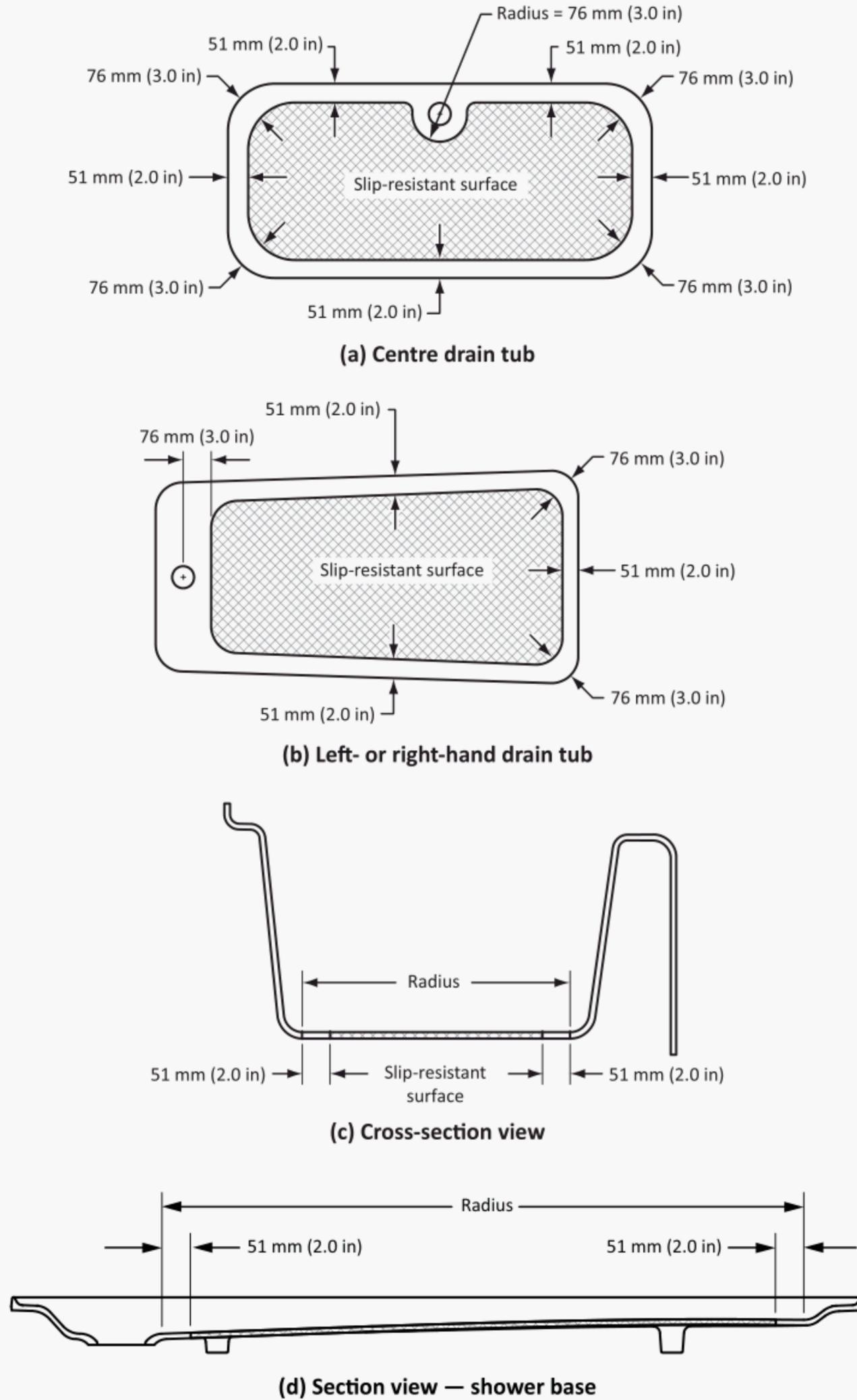
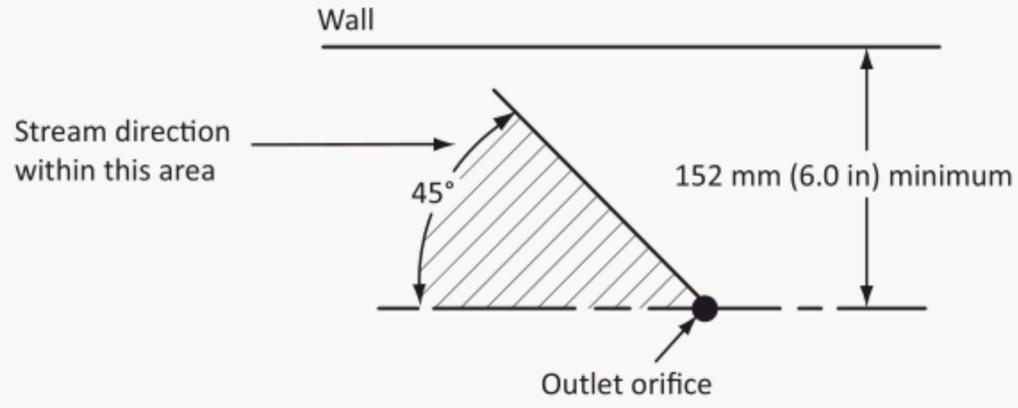
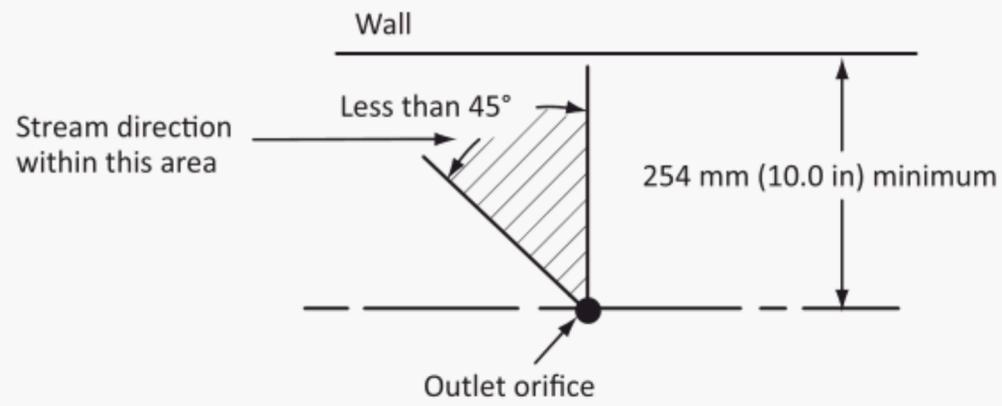


Figure 8
Slip-resistant surface dimensions for bathtubs
(See Clause 4.7.4.)



(a) Stream generally parallel with wall



(b) Stream generally toward wall

Figure 9
Clearance for drinking fountains
(See Clause 4.8.1.)

Annex A (informative)

Unit conversion criteria

Note: This Annex is not a mandatory part of this Standard.

A.1 Conversion rules

The following conversion rules are used in this Standard:

- (a) Zeros to the left of the first non-zero digit are not significant.
- (b) If the number is greater than 1, all zeros to the right of the decimal point are significant.
- (c) In multiplication and division, the original number with the smallest number of significant digits determines the number of significant digits in the product or quotient.
- (d) If an exact constant is used (e.g., 3 ft = 1 yd), it does not affect the number of significant digits in the calculated value.
- (e) If inexact constants are used (e.g., $\pi = 3.1416$), the constant with at least one more significant digit than the smallest number of significant digits in the original data is used.

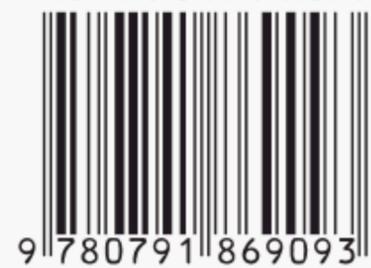
A.2 Rounding rules

The following rounding rules are used in this Standard:

- (a) The digits that follow the last significant digit are dropped if the first digit is less than 5.
- (b) If the first digit dropped is greater than 5, the preceding digit is increased by 1.
- (c) If the first digit dropped is 5 and there are non-zero digits following the 5, the preceding digit is increased by 1.
- (d) If the first digit dropped is 5 and there are only zeros following the 5, the digit is rounded to the even number (e.g., for three significant digits, 1.655000 becomes 1.66, 1.625000 becomes 1.62).
- (e) For maximums and minimums, rounding is performed within the range of the maximum and minimum values in a way that does not violate the original limits.

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ISBN 978-0-7918-6909-3



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ISBN 978-1-77139-052-1