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**Plumbing works — Code of practice —
Part 2: Plumbing fixtures and fixture
fittings**

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 644-2 was prepared by Technical Committee RSB/TC 17, *Urban planning*.

In the preparation of this standard, reference was made to the following standard (s):

IAPMO, 2024 *Uniform plumbing code*

The assistance derived from the above source is hereby acknowledged with thanks.

DRS 644 consists of the following parts, under the general title *Introductory element — Main element*:

- *Part 1: General*
- *Part 2: Plumbing fixtures and fixture fittings*
- *Part 3: Water supply and distribution*
- *Part 4: Sanitary and drainage system installation*
- *Part 5: Water heaters*
- *Part 6: Fuel gas piping and firestop protection*
- *Part 7: Healthcare facilities and medical gas and medical vacuum systems*
- *Part 8: Alternate water sources for non-potable applications and non-potable rainwater catchment systems*

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Committee membership

The following organizations were represented on the Technical Committee on *Urban planning* (RSB/TC 17) in the preparation of this standard.

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Institute of Engineering Rwanda (IER)

Ministry of Infrastructure (MININFRA)

Rwanda Housing Authority (RHA)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

Rwanda Plumbers Organization (RPO)

Rwanda Polytechnic – Kigali College

Rwanda Polytechnic – Musanze College

Rwanda Transport Development Agency (RTDA)

Rwanda Utility Regulatory Authority (RURA)

Rwanda Water Resources Board (RWB)

University of Rwanda – College of Science and Technology (UR-CST)

Water and Sanitation Corporation (WASAC)

Water for People

Rwanda Standards Board (RSB) – Secretariat

Plumbing works — Code of practice — Part 2: Plumbing fixtures and fixture fittings

1 Scope

This Draft Rwanda Standard provides recommendations and guidelines for materials, design and installation requirements for plumbing fixtures and fixture fittings. It also provides guidance on the minimum number of plumbing fixtures required based on occupancy.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D4068, *Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane*

ASTM D4551, *Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane*

RS EAS 1017-3, *Sanitary appliances (vitreous china) — Specification — Part 3: Wash basin*

ISO 31600, *Water efficiency labelling programmes — Requirements with guidance for implementation*

UL 749, *Household Dishwashers*

UL 921, *Commercial Dishwashers*

UL 399, *Drinking Water Coolers*

UL 430, *Waste Disposers*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in DRS 644-1 apply.

4 Symbols (and abbreviated terms)

PVC: Polyvinyl Chloride

ABS: Acrylonitrile Butadiene Styrene

Lpf: Litre per flush

WSFU: water supply fixture unit

5 Requirements

5.1 Materials

Plumbing fixtures and fixture fittings shall be constructed of dense, durable, non-absorbent and corrosion resistant materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces.

5.2 Installation

5.2.1 Fixtures shall be installed in accordance with the manufacturer's installation instructions.

5.2.2 Plumbing fixtures shall be installed in a manner to afford easy access for repairs and cleaning.

5.2.3 Pipes from fixtures shall be run to the nearest wall.

5.2.4 Where a fixture comes in contact with the wall or floor, the joint between the fixture and the wall or floor shall be made watertight

5.2.5 Floor-outlet or floor-mounted fixtures shall be rigidly secured to the drainage connection and to the floor, where so designed, by screws or bolts of copper, copper alloy, or other equally corrosion-resistant material.

5.2.6 Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet or bidet shall be set closer than 15 inches (381 mm) from its center to a side wall or obstruction or closer than 30 inches (762 mm) center to center to a similar fixture. The clear space in front of a water closet, lavatory, or bidet shall be not less than 24 inches (610 mm). No urinal shall be set closer than 12 inches (305 mm) from its center to a side wall or partition or closer than 24 inches (610 mm) center to center.

NOTE The installation of paper dispensers or accessibility grab bars shall not be considered obstructions.

5.2.7 Wall-hung fixtures shall be rigidly supported by metal supporting members so that no strain is transmitted to the connections. Floor-affixed supports for off-the-floor plumbing fixtures for public use shall conform to ASME A112.6.1M. Framing-affixed supports for off-the-floor water closets with concealed tanks shall conform to ASME A112.6.1M. Flush tanks and similar appurtenances shall be secured by approved non-corrosive screws or bolts.

5.2.8 Fixture connections between drainage pipes and water closets, floor outlet service sinks and urinals shall be made using an approved copper alloy, hard lead, ABS, PVC, or iron flanges caulked, soldered, solvent cemented; rubber compression gaskets; or screwed to the drainage pipe. The connection shall be bolted with an approved gasket, washer, or setting compound between the fixture and the connection. The bottom of the flange shall be set on the top of the finished floor.

5.2.9 Wall-mounted water closet fixtures shall be securely bolted to an approved carrier fitting. The approved carrier fitting shall be securely attached to the structure. The connecting pipe between the carrier fitting and the

fixture shall be an approved material and designed to accommodate an adequately sized gasket. Gasket material shall be neoprene, felt, or similar approved types.

5.2.10 Closet rings (closet flanges) for water closets or similar fixtures shall be:

- a) of an approved type and shall be copper alloy, copper, hard lead, cast-iron, galvanized malleable iron, ABS, PVC, or other approved materials.
- b) Closet rings (closet flanges) shall be approximately 7 inches (178 mm) in diameter and, where installed, shall, together with the soil pipe, present a 1 1/2 inch (38 mm) wide flange or face to receive the fixture gasket or closet seal.
- c) Caulked-on closet rings (closet flanges) shall be not less than 1/4 of an inch (6.4 mm) thick and not less than 2 inches (51 mm) in overall depth.
- d) Closet rings (closet flanges) shall be burned or soldered to lead bends or stubs, shall be caulked to cast-iron soil pipe;
- e) solvent cemented to ABS and PVC;
- f) screwed or fastened in an approved manner to other materials;
- g) adequately designed and secured to support fixtures connected thereto.

Closet bends or stubs shall be cut-off to present a smooth surface even with the top of the closet ring before the rough inspection is called.

5.2.11 screws, bolts, washers, and similar fasteners shall be of copper alloy, copper, or other listed equally corrosion-resistant materials. Screws and bolts shall be of a size and number to properly support the fixture installed.

5.2.12 Floor-mounted, back-outlet water closet bowls shall be set level with an angle of 90 degrees (1.57 rad) between the floor and wall at the centerline of the fixture outlet. The floor and wall shall have a flat mounting surface not less than 5 inches (127 mm) to the right and left of the fixture outlet centerline. The closet flange shall be secured to the wall mounting surface. Offset, eccentric, or reducing closet flanges shall not be permitted with these fixtures. The fixture shall be secured to the wall outlet flange or drainage connection and the floor by corrosion resistant screws or bolts.

5.2.13 The supply lines and fittings for every plumbing fixture shall be so installed as to prevent backflow in accordance with DRS 644-3.

5.2.14 The means of backflow prevention shall not be compromised by the designated fixture fitting mounting surface.

5.1.15 Fixtures having concealed slip joint connections shall be provided with an access panel or utility space not less than 12 inches (305 mm) in its least dimension and so arranged without obstructions as to make such connections accessible for inspection and repair.

5.2.18 Where provisions are made for the future installation of fixtures, those provided for shall be considered in determining the required sizes of the drain and water supply piping. Construction for future installations shall be terminated with a plugged fitting or fittings. Where the plugged fitting is at the point where the trap of a fixture is installed, the plumbing system for such fixture shall be complete and be in accordance with the plumbing requirements of this standard.

5.2.19 Fixed wooden, or tile wash sinks for domestic use shall not be installed in a building designed or used for human habitation. No sheet metal- lined wooden bathtub shall be installed or reconnected. No dry or chemical closet (toilet) shall be installed in a building used for human habitation unless first approved by the Competent Authority.

6 Accessible plumbing facilities

Where accessible facilities are required in applicable building regulations, the facilities shall be installed in accordance with those regulations.

- h) Plumbing fixtures and fixture fittings for persons with disabilities shall be in accordance with the relevant applicable standards.
- i) Water supply and drainpipes under accessible lavatories and sinks shall be insulated or otherwise be configured to protect against contact. Protectors, insulators, or both shall conform to ASME A112.18.9 or ASTM C1822.

7 Waste fittings and overflows

7.1 Waste fittings

Waste fittings shall conform to ASME A112.18.2/CSA B125.2, ASTM F409 or DRS 644-4 for aboveground drainage piping and fittings.

7.2 Overflows

7.2.1 Where a fixture is provided with an overflow, the overflow shall comply with the provision of 7.2.2. or 7.2.3

7.2.2 For Sinks, Lavatories, and Bathtubs, the waste shall be so arranged that the standing water in the fixture shall not rise in the overflow where the stopper is closed or remain in the overflow where the fixture is empty. The overflow pipe from a fixture shall be connected to the house or inlet side of the fixture trap.

7.2.3 For water closets and urinals, overflows on flush tanks shall be permitted to discharge into the water closets or urinals served by them.

8 Special fixtures and specialties

8.1 Water and waste connections

Baptisteries, ornamental and lily ponds, aquaria, ornamental fountain basins, and similar fixtures and specialties requiring water, waste connections, or both shall be submitted for approval to the competent authority prior to installation.

8.2 Special use sinks

Restaurant kitchen and other special use sinks shall be permitted to be made of approved-type bonderized and galvanized sheet steel of thickness not less than 0.0635 inches (1.6 mm). Sheet-metal plumbing fixtures shall be adequately designed, constructed, and braced in an approved manner to accomplish their intended purpose.

8.3 Special use fixtures

Special use fixtures shall be made of one of the following:

- 1) Soapstone
- 2) Chemical stoneware
- 3) Copper-based alloy
- 4) Nickel-based alloy
- 5) Corrosion-resistant steel
- 6) Other materials suited for the intended use of the fixture

8.4 Zinc alloy components

Zinc alloy components shall comply with applicable nationally recognized standards and shall be used in accordance with their listing.

9 Lavatories

9.1 Application

Lavatories shall conform to RS EAS 1017-3. Group wash fixtures shall conform to the requirements of 5.1. Every 20 inches (508 mm) of rim space of a group wash fixture shall be considered as one lavatory for determining the number of lavatories required in accordance with Table A.1. Lavatory assemblies with automatic soap dispensers, faucets, or hand dryers shall conform to IAPMO IGC 127 or other relevant applicable standards.

9.2 Water consumption

The maximum water flow rate of faucets shall comply with 9.2.1 and 9.2.2

9.2.1 Maximum flow rate

The maximum flow rate for public lavatory faucets shall not exceed 0.5 gpm at 60 psi (1.9 L/m at 414 kPa) and 2.2 gpm at 60 psi (8.3 L/m at 414 kPa) for private lavatory faucets.

9.2.2 Metering Faucets

Metered faucets shall deliver a maximum of 0.25 gallons (0.95 L) per metering cycle.

9.3 Limitation of hot water temperature for public lavatories

Hot water delivered from public-use lavatories shall be limited to a maximum temperature of 120 °F (49 °C). The maximum temperature shall be regulated by one of the following means:

- 7) A limiting device conforming to ASSE 1070/ASME A112.70/CSA B125.70 or other the relevant applicable standard., or
- 8) A water heater conforming to DRS 644-5.

9.4 Transient Public Lavatories

Self-closing or metering faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to service stations, train stations, airports, restaurants, and convention halls.

9.5 Waste Outlet.

Lavatories shall have a waste outlet and fixture tailpiece not less than 1¼ inches (32 mm) in diameter. Continuous wastes and fixture tailpieces shall be constructed from the materials specified in DRS 644-4. Waste outlets shall be provided with an approved stopper or strainer.

9.6 Overflow

Where overflows are provided, they shall be installed in accordance with Clause 7.2.

10 Showers

10.1 General

Manufactured shower receptors and shower bases shall conform to CSA B45.12/IAPMO Z402, CSA B45.5/IAPMO Z124 or other relevant applicable standards . Prefabricated shower enclosures shall conform to the manufacturer's instructions. Prefabricated shower enclosures shall conform to IAPMO/ANSI Z1154 or other relevant standards.

10.2 Tileable shower receptors

Tileable shower receptors and shower kits shall conform to IAPMO PS 106 or other relevant standard, and the manufacturer's instructions.

10.3 Water consumption

Showerheads shall have a maximum flow rate of not more than 2.5 gpm at 80 psi (9.5 L/m at 552 kPa). Body sprays shall have a flow rate of not more than 2.5 gpm at 80 psi (9.5 L/m at 552 kPa).

10.4 Individual shower and tub-shower combination control valves

Showers and tub-shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection for the rated flow rate of the installed showerhead. These valves and their installation at the point of use shall conform to ASSE 1016/ASME A112.1016/CSA B125.16 or other relevant applicable standards.

10.4.1 Gang showers

Where gang showers are supplied with a single temperature-controlled water supply pipe, it shall be controlled by a mixing valve that conforms to ASSE 1069.

10.4.2 Temperature limiting

The maximum water temperature discharging from an individual showerhead shall be limited to 120 °F (49 °C) by one of the following methods:

- 9) A shower or tub/shower combination valve conforming to ASSE 1016/ASME A112.1016/CSA B125.16 or other relevant applicable standards where either:
 - i) The valve is field-adjusted to the required maximum temperature, or
 - ii) The handle position, stop, or temperature limiting control is set in accordance with the manufacturer's instructions to the required maximum temperature.
- 10) For gang showers supplied by a single water supply pipe, a mixing valve that conforms to ASSE 1069 or other relevant applicable standards that is field-adjusted to the required maximum temperature.

10.4.3 Temperature-Actuated, Flow-Reduction Devices for Individual Fixture Fittings.

Temperature-actuated, flow-reduction devices, where installed for individual fixture fittings, shall conform to ASSE 1062 or other relevant applicable standards. Such devices shall not be used alone as a substitute for the balanced pressure, thermostatic or combination shower valves requirements or as a substitute for bathtub or whirlpool tub water temperature-limiting valves requirements.

10.5 Waste outlet

Showers shall have a waste outlet and fixture tailpiece not less than 2 inches (50 mm) in diameter. Fixture tailpieces shall be constructed from the materials specified in WDRS xxx-5, for drainage piping. Strainers serving shower drains shall comply with ASME A112.18.2/CSA B125.2.

10.6 Finished curb or threshold

Where a shower receptor has a finished dam, curb, or threshold, it shall be not less than 1 inch (25.4 mm) lower than the sides and back of such receptor. In no case, shall a dam or threshold be less than 2 inches (51 mm) or exceeding 9 inches (229 mm) in depth where measured from the top of the dam or threshold to the top of the drain. Each such receptor shall be provided with a nailing flange either integral or field installed in accordance with the manufacturer's installation instructions. The flange shall be watertight and extend vertically not less than 1 inch (25.4 mm) above the top of the sides of the receptor. The finished floor of the receptor shall slope uniformly from the sides towards the drain not less than 1/8 inch per foot (10.4 mm/m), nor more than 1/2 inch per foot (41.6 mm/m).

Thresholds shall be of sufficient width to accommodate a minimum 22 inch (559 mm) door. Shower doors shall open so as to maintain not less than a 22 inch (559 mm) unobstructed opening for egress. Where there is a shower without a threshold, the floor space within the same room shall be considered a wet location and shall comply with the requirements of the building, residential, and electrical codes.

Exceptions:

- (1) Showers in accordance with Clause 6.
- (2) A cast-iron shower receptor flange shall be not less than 0.3 of an inch (7.62 mm) in height.
- (3) For flanges not used as a means of securing, the sealing flange shall be not less than 0.3 of an inch (7.62 mm) in height.

10.7 Shower compartments

Showers compartments shall have a finished interior in accordance with the following:

- 1) Not less than 1024 square inches (0.6606 m²).
- 2) Be capable of encompassing a 30 inch (762 mm) circle.

The minimum required area and dimensions shall be measured at a height equal to the top of the threshold and a point tangent to its centerline.

The area and dimensions shall be maintained to a point of not less than 70 inches (1778 mm) above the shower drain outlet with no protrusions other than the fixture valve or valves, showerheads, soap dishes, shelves, and safety grab bars, or rails. Fold-down seats in accessible shower stalls shall be permitted to protrude into the 30 inch (762 mm) circle.

The minimum required area and dimension shall not apply for a shower receptor having overall dimensions of not less than 30 inches (762 mm) in width and 60 inches (1 524 mm) in length.

10.8 Lining for showers and receptors

10.8.1 general

Shower receptors built on-site shall be watertight and shall be constructed from approved-type dense, nonabsorbent, and noncorrosive materials.

Each such receptor shall be adequately reinforced, shall be provided with an approved flanged floor drain designed to make a watertight joint on the floor, and shall have smooth, impervious, and durable surfaces.

Shower receptors shall have the subfloor and rough side of walls to a height of not less than 3 inches (76 mm) above the top of the finished dam or threshold shall be first lined with sheet plastic, lead, or copper, or shall be lined with other durable and watertight materials.

Showers that are provided with a built-in place, permanent seat or seating area that is located within the shower enclosure, shall be first lined with sheet plastic, lead, copper, or shall be lined with other durable and watertight materials that extend not less than 3 inches (76 mm) above horizontal surfaces of the seat or the seating area.

Lining materials shall be pitched 1/4 inch per foot (20.8 mm/m) to weep holes in the subdrain of a smooth and solidly formed subbase. Such lining materials shall extend upward on the rough jambs of the shower opening to a point not less than 3 inches (76 mm) above the horizontal surfaces of the seat or the seating area, the top of the finished dam or threshold and shall extend outward over the top of the permanent seat, permanent seating area, or rough threshold and be turned over and fastened on the outside face of both the permanent seat, permanent seating area, or rough threshold and the jambs.

Nonmetallic shower subpans or linings shall be permitted to be built up on the job site of not less than three layers of standard grade 15 pound (6.8 kg) asphalt impregnated roofing felt. The bottom layer shall be fitted to the formed subbase and each succeeding layer thoroughly hot-mopped to that below. Corners shall be carefully fitted and shall be made strong and watertight by folding or lapping, and each corner shall be reinforced with suitable webbing hot-mopped in place.

Folds, laps, and reinforcing webbing shall extend not less than 4 inches (102 mm) in all directions from the corner, and webbing shall be of approved type and mesh, producing a tensile strength of not less than 50 pounds per square foot (lb/ft²) (244 kg/m²) in either direction.

Nonmetallic shower subpans or linings shall be permitted to consist of multilayers of other approved equivalent materials suitably reinforced and carefully fitted in place on the job site as elsewhere required in this section.

Linings shall be properly recessed and fastened to the approved backing so as not to occupy the space required for the wall covering, and shall not be nailed or perforated at a point that is less than 1 inch (25.4 mm) above the finished dam or threshold.

An approved type subdrain shall be installed with a shower subpan or lining and each such subdrain shall be of the type that sets flush with the subbase and shall be equipped with a clamping ring or other device to make a tight connection between the lining and the drain.

The subdrain shall have weep holes into the waste line. The weep holes located in the subdrain clamping ring shall be protected from clogging.

10.8.2 PVC sheets

Plasticized polyvinyl chloride (PVC) sheets shall conform to ASTM D4551. Sheets shall be joined by solvent cementing in accordance with the manufacturer's installation instructions.

10.8.3 Chlorinated Polyethylene (CPE) sheets

Nonplasticized chlorinated polyethylene sheets shall conform to ASTM D4068. The liner shall be joined in accordance with the manufacturer's installation instructions.

10.8.4 Sheet lead

Sheet lead shall weigh not less than 4 lb/ft² (19.5 kg/m²) and shall be coated with an asphalt paint or other approved coating. The lead sheet shall be insulated from conducting substances, other than the connecting drain, by 15 pound (6.8 kg) asphalt felt or an equivalent. Sheet lead shall be joined by burning.

10.8.5 Sheet copper

Sheet copper shall comply with ASTM B152 and shall weigh not less than 12 ounces per square foot (oz/ft²) (3.7 kg/m²) or thickness/Gauge not less than 0.02 inches (0.51 mm).

The copper sheet shall be insulated from conducting substances, other than the connecting drain, by 15 pound (6.8 kg) asphalt felt or an equivalent. Sheet copper shall be joined by brazing or soldering.

10.8.6 Tests for shower receptors.

Shower receptors shall be tested for watertightness by filling with water to a depth of not less than 2 inches (51 mm) for at least 15 minutes. Where no threshold is present, a 2-inch (51 mm) barrier shall be temporarily constructed for testing. The test plug shall be so placed that both upper and under sides of the subpan shall be subjected to the test at the point where it is clamped to the drain.

10.9 Public shower floors

Floors of public shower rooms shall have a nonskid surface and shall be drained in such a manner that wastewater from one bather shall not pass over areas occupied by other bathers.

Gutters in public or gang shower rooms shall have rounded corners for easy cleaning and shall be sloped not less than 2 percent toward drains. Drains in gutters shall be spaced at a maximum of 8 feet (2438 mm) from sidewalls nor more than 16 feet (4877 mm) apart.

10.10 Location of valves and heads

Control valves and showerheads shall be located on the sidewall of shower compartments or otherwise arranged so that the showerhead does not discharge directly at the entrance to the compartment so that the bather can adjust the valves before stepping into the shower spray.

10.11 Water supply riser

A water supply riser from the shower valve to the showerhead outlet, whether exposed or not, shall be securely attached to the structure.

11 Bathtubs and whirlpool bathtubs

11.1 General

Bathtubs shall conform to CSA B45.5/IAPMO Z124, or CSA B45.12/IAPMO Z402 or other relevant applicable standards.

Whirlpool bathtubs shall conform to ASME A112.19.7/CSA B45.10.

Pressure sealed doors within a bathtub or whirlpool bathtub enclosure shall conform to ASME A112.19.15.

11.2 Waste outlet

Bathtubs and whirlpool bathtubs shall have a waste outlet and fixture tailpiece not less than 1 1/2 inches (40 mm) in diameter.

Fixture tailpieces shall be constructed from the materials specified in DRS 644-4 for drainage piping. Waste outlets shall be provided with an approved stopper or strainer.

11.3 Overflow

Where overflows are provided, they shall be installed in accordance with Clause 7.

11.4 Limitation of hot water temperature in bathtubs and whirlpool bathtubs

The maximum hot water temperature discharging from the bathtub and whirlpool bathtub filler shall be limited to 120°F (49°C). The maximum temperature shall be regulated by one of the following means:

- 3) A limiting device conforming to either ASSE 1070/ASME A112.1070/CSA B125.70 or CSA B125.3 or relevant applicable standard;
- 4) A water heater conforming to DRS 644-5.

11.5 Backflow protection

The water supply to a bathtub and whirlpool bathtub filler valve shall be protected by an air gap or in accordance with Clause 19.

11.6 Installation and access

Bathtubs and whirlpool bathtubs shall be installed in accordance with the manufacturer's installation instructions. Access openings shall be of a size and opening to permit the removal and replacement of the circulation pump.

Whirlpool pump access located in the crawl space shall be located not more than 20 feet (6096 mm) from an access door, trap door, or crawl hole.

The circulation pump shall be located above the crown weir of the trap.

The pump and the circulation piping shall be self-draining to minimize water retention.

11.6.1 Suction fittings

Suction fittings on whirlpool bathtubs shall conform to ASME A112.19.7/CSA B45.10.

11.6.2 Flexible PVC hoses and tubing

Flexible PVC hoses and tubing intended to be used on whirlpool bathtub water circulation systems or pneumatic systems shall conform to IAPMO/ANSI Z1033 or other relevant applicable standards.

12 Bidets

12.1 General

Bidets shall conform to ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4.

12.2 Backflow protection

The water supply to the bidet shall be protected by an air gap or in accordance with Clause 19.

12.3 Limitation of water temperature in bidets

The maximum hot water temperature discharging from a bidet shall be limited to 110 °F (43 °C). The maximum temperature shall be regulated by one of the following means:

- 5) A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70 or other relevant applicable standards.
- 6) A water heater conforming to DRS 644-5.

13 Water closets

13.1 General

Water closets shall conform to CSA B45.5/IAPMO Z124 or other relevant applicable standards.

Water closet bowls for public use shall be of the elongated type. In nurseries, schools, and other similar places where plumbing fixtures are provided for the use of children less than 6 years of age, water closets shall be of a size and height suitable for children's use.

NOTE Water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge and water closet that might permit siphonage of the contents of the bowl back into the tank is prohibited.

13.2 Water consumption

Water closets shall have a maximum consumption not to exceed 1.6 gallons (6.0 Lpf) of water per flush.

13.2.1 Dual Flush Water Closets

Dual flush water closets shall conform to ASME A112.19.14. The effective flush volume for dual flush water closets shall be defined as the composite, average flush volume of two reduced flushes and one full flush.

13.2.2 Flushometer valve activated water closets

Flushometer valve activated water closets shall have a maximum flush volume of 1.6 gallons (6.0 Lpf) of water per flush.

13.3 Water Closet seats

Water closet seats shall be properly sized for the water closet bowl type, and shall be of smooth, non-absorbent material.

Seats, for public use, shall be of the elongated type and either of the open front type or have an automatic seat cover dispenser.

Water closet seats can be provided with or without covers. Plastic seats shall conform to IAPMO/ANSI Z124.5 or other relevant applicable standards.

13.4 Personal hygiene devices

Water closets with integral personal hygiene devices shall conform to ASME A112.4.2/CSA B45.16.

14 Urinals

14.1 General

Urinals shall conform to the requirements of relevant applicable standards and shall have an average water consumption not to exceed 1 gallon (3.8 Lpf) of water per flush.

NOTE Trough urinals and urinals with an invisible seal are prohibited.

14.1.1 Nonwater urinals

Nonwater urinals shall have a liquid barrier sealant to maintain a trap seal. Nonwater urinals shall permit the uninhibited flow of waste through the urinal to the sanitary drainage system.

Nonwater urinals shall be cleaned and maintained in accordance with the manufacturer's instructions after installation.

Where nonwater urinals are installed, not less than one water supplied fixture rated at not less than 1 water supply fixture unit (WSFU) shall be installed upstream on the same drain line to facilitate drain line flow and rinsing.

Where nonwater urinals are installed, they shall have a water distribution line rough-in to each individual urinal location to allow for the installation of an approved backflow prevention device in the event of a retrofit.

14.1.2 Nonwater Urinals with Drain Cleansing Action.

Nonwater urinals with drain cleansing action shall conform to ASME A112.19.19 and shall be cleaned, maintained and installed in accordance with the manufacturer's installation instructions.

14.2 Backflow protection

A water supply to a urinal shall be protected by an approved-type vacuum breaker or other approved backflow prevention device in accordance with DRS 644-4.

15 Flushing Devices

15.1 Where required.

Each water closet, urinal, clinical sink, or other plumbing fixture that depends on trap siphonage to discharge its waste contents shall be provided with a flushometer valve, flushometer tank, or flush tank designed and installed so as to supply water in sufficient quantity and rate of flow to flush the contents of the fixture to which it is connected, to cleanse the fixture, and to refill the fixture trap, without excessive water use.

Flushing devices shall comply with the antisiphon requirements in accordance with DRS 644-3.

15.2 Flushometer valves

Flushometer valves and flushometer tanks shall conform to ASSE 1037/ASME A112.1037/CSA B125.37 or other relevant applicable standards and shall be installed in accordance with DRS 644-3.

No manually controlled flushometer valve shall be used to flush more than one urinal, and each such urinal flushometer valve shall be an approved, self-closing type discharging a predetermined quantity of water.

Flushometers shall be installed so that they will be accessible for repair. Flushometer valves shall not be used where the water pressure is insufficient to operate them properly.

Where the valve is operated, it shall complete the cycle of operation automatically, opening fully, and closing positively under the line water pressure. Each flushometer shall be provided with a means for regulating the flow through it.

15.3 Flush tanks

Flush tanks for manual flushing shall be equipped with a flush valve that conforms to ASME A112.19.5/CSA B45.15 and an antisiphon fill valve (ballcock) that conforms to ASSE 1002/ASME A112.1002/CSA B125.12 or other relevant applicable standards and installed in accordance with DRS 644-3.

15.4 Water supply for flush tanks

An adequate quantity of water shall be provided to flush and clean the fixture served. The water supply for flushing tanks and flushometer tanks equipped for manual flushing shall be controlled by a float valve or other automatic device designed to refill the tank after each discharge and to shut completely off the water flow to the tank where the tank is filled to operational capacity. Provision shall be made to automatically supply water to the fixture to refill the trap seal after each flushing.

15.5 Overflows in flush tanks

Flush tanks shall be provided with overflows discharging into the water closet or urinal connected thereto. Overflows supplied as original parts with the fixture shall be of sufficient size to prevent tank flooding at the maximum rate at which the tank is supplied with water under normal operating conditions and where installed in accordance with the manufacturer's installation instructions.

16 Dishwashing machines

16.1 General

Domestic dishwashing machines shall conform to UL 749. Domestic dishwashing machines containing sanitation features shall conform to NSF/ANSI 184 and UL 749.

Commercial dishwashing machines shall conform NSF/ANSI 3 and to UL 921 and other relevant applicable standards.

16.2 Backflow protection

The water supply connection to a commercial dishwashing machine shall be protected by an air gap or a backflow prevention device in accordance with DRS 644-3 or that conforms to ASSE 1004 or other relevant applicable standards.

16.3 Drainage connection

Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with Section 807.3 into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwasher connection of a food waste disposer.

Commercial dishwashing machines shall discharge indirectly through an air break or by a direct connection in accordance with DRS 644-4.

16.4 Lead content

Dishwashing machines shall meet the lead content requirements of DRS 644-4.

17 Drinking fountains

17.1 General

Drinking fountains shall be self-closing and conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, or ASME A112.19.3/CSA B45.4.

Drinking fountains and bottle filling stations shall NSF/ANSI/CAN 61. Permanently installed electric water coolers and bottle filling stations shall also conform to UL 399.

17.2 Drinking fountain alternatives

Where food is consumed indoors, water stations shall be permitted to be substituted for drinking fountains. Bottle filling stations shall be permitted to be substituted for drinking fountains up to 50 percent of the requirements for drinking fountains.

NOTE Drinking fountains shall not be a requirement for an occupant load of 30 people or less.

17.3 Drainage connection

Drinking fountains shall be permitted to discharge directly into the drainage system or indirectly through an air break in accordance with WDRS xxx-5(relevant clause).

17.4 Location

Drinking fountains shall not be installed in toilet rooms.

18 Emergency eyewash and shower equipment

18.1 General

Emergency eyewash and shower equipment shall conform to ISEA Z358.1.

18.2 Water supply

Emergency eyewash and shower equipment shall not be limited in the water supply flow rates. Where hot and cold water is supplied to an emergency shower or eyewash station, the temperature of the water supply shall be controlled by a temperature actuated mixing valve conforming to ASSE 1071 or other relevant applicable standards.

Where water is supplied directly to an emergency shower or eyewash station from a water heater, the water heater shall conform to ASSE 1085 or other relevant applicable standards.

The flow rate, discharge pattern, and temperature of flushing fluids shall be provided in accordance with ISEA Z358.1.

18.3 Installation

Emergency eyewash and shower equipment shall be installed in accordance with the manufacturer's installation instructions.

18.4 Location

Emergency eyewash and shower equipment shall be located on the same level as the hazard and accessible for immediate use. The path of travel shall be free of obstructions and shall be clearly identified with signage.

18.5 Drain

A drain shall not be required for emergency eyewash or shower equipment. Where a drain is provided, the discharge shall be in accordance with DRS 644-4.

19 Faucets and fixture fittings

19.1 General

Faucets and fixture fittings shall conform to ASME A112.18.1/CSA B125.1. Fixture fittings covered under the scope of NSF/ANSI/CAN 61 shall comply with the requirements of NSF/ANSI/CAN 61.

19.2 Deck mounted bath/shower valves

Deck mounted bath/shower transfer valves with integral backflow protection shall conform to ASME A112.18.1/CSA B125.1. This shall include handheld showers, and other bathing appliances mounted on the deck of bathtubs or other bathing appliances that incorporate a hose or pull-out feature.

19.3 Handheld showers

Handheld showers shall conform to ASME A112.18.1/CSA B125.1. Handheld showers with integral backflow protection shall conform to ASME A112.18.1/CSA B125.1 or shall have a backflow prevention device that complies with ASME A112.18.3 or ASSE 1014.

19.4 Faucets and fixture fittings with hose connected outlets

Faucets and fixture fittings with pull-out spout shall conform to ASME A112.18.1/CSA B125.1.

Faucets and fixture fittings with pull-out spouts with integral backflow protection shall comply with ASME A112.18.1/CSA B125.1 or shall have a backflow preventer device shall conform to ASME A112.18.3.

19.5 Separate controls for hot and cold water

Where two separate handles control the hot and cold water, the left-hand control of the faucet where facing the fixture fitting outlet shall control the hot water. Faucets and diverters shall be connected to the water distribution system so that hot water corresponds to the left side of the fixture fitting.

Single-handle mixing valves installed in showers and tub shower combinations shall have the flow of hot water corresponding to the markings on the fixture fitting.

19.6 Low-pressure water dispenser

Beverage faucets shall conform to ASME A112.18.1/CSA B125.1. Electrically heated or cooled water dispensers shall comply with ASSE 1023 or the relevant applicable standard.

19.7 Head shampoo sink faucets

Head shampoo sink faucets shall be supplied with hot water that is limited to not more than 120 °F (49 °C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be in accordance with one of the following:

- 7) A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70 or other relevant applicable standards.
- 8) A water heater conforming to DRS 644-5.
- 9) A temperature-actuated, flow-reduction device conforming to ASSE 1062 or other relevant applicable standards.

19.8 Footbaths and pedicure baths

The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub and footbaths, shall be limited to not more than 120 °F (49 °C) by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or other relevant applicable standards or by a water heater conforming to relevant applicable standards.

20 Floor drains

20.1 General

Floor drains shall conform to ASME A112.3.1, ASME A112.6.3, or CSA B79.

20.2 Strainer

Floor drains shall be considered plumbing fixtures and each such drain shall be provided with an approved-type strainer having a waterway equivalent to the area of the tailpiece. Floor drains shall be of an approved type and shall provide a watertight joint on the floor.

20.3 Location of floor drains

Floor drains shall be installed in the following areas:

- 1) Toilet rooms containing two or more water closets or a combination of one water closet and one urinal, except in a dwelling unit.
- 2) Commercial kitchens and in accordance with DRS 644-4.
- 3) Laundry rooms in commercial buildings and common laundry facilities in multi-family dwelling buildings.
- 4) Boiler rooms.

20.4 Food storage areas

Where drains are provided in storerooms, walk-in freezers, walk-in coolers, refrigerated equipment, or other locations where food is stored, such drains shall have indirect waste piping.

Separate waste pipes shall be run from each food storage area, each with an indirect connection to the building sanitary drainage system. Traps shall be provided in accordance with DRS 644-4 and shall be vented.

Indirect drains shall be permitted to be located in freezers or other spaces where freezing temperatures are maintained, provided that traps, where supplied, shall be located where the seal will not freeze. Otherwise, the floor of the freezer shall be sloped to a floor drain located outside of the storage compartment.

20.5 Floor slope

Floors shall be sloped to floor drains.

21 Food waste disposers

21.1 General

Food waste disposal units shall conform to UL 430. Residential food waste disposers shall also conform to ASSE 1008 or other relevant applicable standards.

21.2 Drainage connection

Approved wye or other directional-type branch fittings shall be installed in continuous wastes connecting or receiving the discharge from a food waste disposer. No dishwasher drain shall be connected to a sink tailpiece, continuous waste, or trap on the discharge side of a food waste disposer.

21.3 Water supply

A cold-water supply shall be provided for food waste disposers. Such connection to the water supply shall be protected by an air gap or backflow prevention device in accordance with DRS 644-4.

22 Sinks

22.1 General

Sinks shall conform to CSA B45.8/IAPMO Z403, or CSA B45.12/IAPMO Z402 or other relevant applicable standards.

Moveable sink systems shall comply with ASME A112.19.12. Sink assemblies with automatic soap dispensers, faucets, or hand dryers shall conform to IAPMO IGC 127 or other relevant applicable standards.

22.2 Water consumption

Sink faucets shall have a maximum flow rate of not more than 2.2 gpm at 60 psi (8.3 L/m at 414 kPa).

NOTE For Clinical sinks, Laundry sinks and Service sinks maximum flow rate not more than 2.2 gpm at 60 psi (8.3 L/m at 414 kPa)

22.3 Pre-rinse spray valve

Commercial food service pre-rinse spray valves shall have a maximum flow rate in accordance with Table 1 and shall be equipped with an integral automatic shutoff.

Table 1 — Commercial pre-rinse spray valve maximum flow rate

Product class by spray force	Maximum flow rate gpm
Product Class 1 ($\leq$ 5.0 ounces-force)	1.00
Product Class 2 ($>$ 5.0 ounces-force and	1.20

≤ 8.0 ounces-force)	
Product Class 3 (> 8.0 ounces-force)	1.28
For SI units: 1 gallon per minute = 3.785 L/min, 1 ounce-force = 0.278 N	

22.4 Waste outlet

Kitchen and laundry sinks shall have a waste outlet and fixture tailpiece not less than 1 1/2 inches (40 mm) in diameter. Service sinks shall have a waste outlet and fixture tailpiece not less than 2 inches (50 mm) in diameter.

Fixture tailpieces shall be constructed from the materials specified in DRS 644-4 for drainage piping. Waste outlets shall be provided with an approved strainer.

23 Floor sinks

23.1 General

Floor sinks shall conform to ASME A112.6.7.

23.2 Strainers

The waste outlet of a floor sink shall be provided with an approved strainer or grate that is removable and accessible.

24 Minimum number of required fixtures

24.1 Fixture count

Plumbing fixtures shall be provided for the type of building occupancy and in the minimum number shown in Table A.1. The total occupant load and occupancy classification shall be determined in accordance with the building code. Occupancy classification not shown in Table A.1 shall be considered separately by the Competent Authority.

24.1.1 Fixture calculations

The minimum number of fixtures shall be calculated at 50 % male and 50 % female based on the total occupant load. Where information submitted indicates a difference in the distribution of the sexes such information shall be used to determine the number of fixtures for each sex.

Once the occupancy load and occupancy are determined, Table A.1 shall be applied to determine the minimum number of plumbing fixtures required. Where applying the fixture ratios in Table A.1 results in fractional numbers, such numbers shall be rounded to the next whole number.

For multiple occupancies, fractional numbers shall be first summed and then rounded to the next whole number. For toilet facilities designed for use by all genders, the minimum number of fixtures shall be the aggregate calculated at 50 percent female and 50 percent male in accordance with Table A.1.

Where all-gender fixtures are provided in addition to separate men's and women's facilities, those fixtures shall be included in determining the number of fixtures provided in an occupancy.

24.1.2 Single use, family or assisted-use toilet, and bathing facilities

Where single use, family or assisted-use toilet, and bathing rooms are required in applicable building regulations, the facilities shall be installed in accordance with those regulations.

Fixtures located in single use, family or assisted-use, and bathing room facilities shall contribute to the total number of required fixtures in accordance with Table A.1.

24.2 Separate facilities

Separate toilet facilities shall be provided for each sex.

NOTE 1 The requirements of this clause is not applicable to residential installations.

NOTE 2 In occupancies with a total occupant load of 10 or less, including customers and employees, one toilet facility, designed for use by no more than one person at a time, shall be permitted for use by both sexes.

NOTE 3 in business and mercantile occupancies with a total occupant load of 50 or less including customers and employees, one toilet facility, designed for use by no more than one person at a time, shall be permitted for use by both sexes.

NOTE 4 Separate facilities shall not be required where rooms have fixtures designed for use by both sexes and the water closets are installed in privacy compartments. Urinals shall be located in a privacy compartment.

24.2.1 Single use facilities

Single use toilet facilities, bathing facilities, and family or assisted use toilet facilities shall be identified with signage indicating use by either sex.

24.2.2 Family or assisted-use toilet facilities

Where a separate toilet facility is required for each sex, and each toilet facility is required to have only one water closet, two family or assisted-use toilet facilities shall be permitted in place of the required separate toilet facilities.

24.3 Fixture requirements for special occupancies

Additional fixtures shall be permitted to be required where unusual environmental conditions or referenced activities are encountered. In food preparation areas, fixture requirements shall be permitted to be dictated by health codes.

24.4 Toilet facilities serving employees and customers

Each building or structure shall be provided with toilet facilities for employees and customers. Requirements for customers and employees shall be permitted to be met with a single set of restrooms accessible to both groups.

Required toilet facilities for employees and customers located in shopping malls or centers shall be permitted to be met by providing a centrally located toilet facility accessible to several stores. The maximum travel distance from entry to any store to the toilet facility shall not exceed 300 feet (91 440 mm).

Required toilet facilities for employees and customers in other than shopping malls or centers shall have a maximum travel distance not to exceed 500 feet (152 m).

24.4.1 Access to toilet facilities

In multi-story buildings, accessibility to the required toilet facilities shall not exceed one vertical story. Access to the required toilet facilities for customers shall not pass-through areas designated as for employee use only such as kitchens, food preparation areas, storage rooms, closets, or similar spaces.

Toilet facilities accessible only to private offices shall not be counted to determine compliance with this section.

24.5 Toilet facilities for workers

Toilet facilities shall be provided and maintained in a sanitary condition for the use of workers during construction.

24.6 Water closet compartment

Public water closets shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

Partitions for water closets located in separate gender toilet or bathrooms shall conform to the Type B requirements of IAPMO Z124.10 or other relevant applicable standards.

Partitions for water closets located in all gender toilet or bathrooms shall conform to the Type A security requirements of IAPMO Z124.10 or other relevant applicable standards.

NOTE 1 Water closet compartments shall not be required in a single-occupant toilet room having a lockable door.

NOTE 2 Toilet rooms in day care facilities having more than one water closets shall be permitted to have one water closet without an enclosing compartment.

24.7 Urinal partitions

Each urinal shall be separated with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall conform to the requirement of the Clause 5.2.6.

Partitions for urinals shall conform to the Type C security requirements of IAPMO Z124.10 or other relevant applicable standards. Walls or partitions shall extend from not less than 12 inches (305 mm) above the finished floor to not less than 60 inches (1524 mm) above the finished floor.

Walls shall extend outward from the wall surface not less than 18 inches (457 mm). Urinals located in all gender toilet rooms shall be visually separated from the remainder of the room or each urinal shall be installed in a

privacy compartment conforming to Type A security requirements of IAPMO Z124.10 or other relevant applicable standards.

NOTE Urinal partitions can be excluded in a single occupant or family/assisted-use toilet room with a lockable door.

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Annex A (informative)

Minimum plumbing facilities

A.1 Each building shall be provided with sanitary facilities, including provisions for persons with disabilities as prescribed by the competent authority. Table A.1 applies to new buildings, additions to a building, and changes of occupancy or type in an existing building resulting in increased occupant load

Table A.1 — Minimum plumbing facilities

Type of occupancy ²	Water closets (fixtures per person) ³		Urinals (fixtures per Person) ⁴	Lavatories (fixtures per person) ⁵		Bathtubs or showers (fixtures per person)	Drinking fountains/facilities (fixtures per person)	Other ^{6, 7}
A-1 Assembly occupancy (fixed or permanent seating)- theaters, concert halls, and auditoriums	Male 1: 1-100 2: 101-200 3: 201-400	Female 1: 1-25 2: 26-50 3: 51-100 4: 101-200 6: 201-300 8: 301-400	Male 1: 1-200 2: 201-300 3: 301-400 4: 401-600	Male 1: 1-200 2: 201-400 3: 401-600 4: 601-750	Female 1: 1-100 2: 101-200 4: 201-300 5: 301-500 6: 501-750	—	1: 1-250 2: 251-500 3: 501-750	1 service sink or laundry sink
	Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 125 females.		Over 600, add 1 fixture for each additional 300 males.	Over 750, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.		—	Over 750, add 1 fixture for each additional 500 persons.	
A-2 Assembly occupancy- restaurants, pubs, lounges, nightclubs and banquet halls	Male 1: 1-50 2: 51-150 3: 151-300 4: 301-400	Female 1: 1-25 2: 26-50 3: 51-100 4: 101-200 6: 201-300 8: 301-400	Male 1: 1-200 2: 201-300 3: 301-400 4: 401-600	Male 1: 1-150 2: 151-200 3: 201-400	Female 1: 1-150 2: 151-200 4: 201-400	—	1: 1-250 2: 251-500 3: 501-750	1 service sink or laundry sink
	Over 400, add 1 fixture for each additional 250 males and 1 fixture for each 125 females.		Over 600, add 1 fixture for each additional 300 males.	Over 400, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females		—	Over 750, add 1 fixture for each additional 500 persons.	
A-3 Assembly occupancy (typical without fixed or permanent seating)- arcades, places of worship, museums, libraries, lecture halls, gymnasiums (without	Male 1: 1-100 2: 101-200 3: 201-400	Female 1: 1-25 2: 26-50 3: 51-100 4: 101-200 6: 201-300 8: 301-400	Male 1: 1-100 2: 101-200 3: 201-400 4: 401-600	Male 1: 1-200 2: 201-400 3: 401-600 4: 601-750	Female 1: 1-100 2: 101-200 4: 201-300 5: 301-500 6: 501-750	—	1: 1-250 2: 251-500 3: 501-750	1 service sink or laundry sink
						—		

spectator seating), indoor pools (with-out spectator seating)	Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 125 females.	Over 600, add 1 fixture for each additional 300 males.	Over 750, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.	–	Over 750, add 1 fixture for each additional 500 persons.	
A-4 Assembly occupancy (indoor activities or sporting events with spectator seating)- swimming pools, skating rinks, arenas, and gymnasiums	Male 1: 1-100 2: 101-200 3: 201-400 Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 125 females.	Female 1: 1-25 2: 26-50 3: 51-100 4: 101-200 6: 201-300 8: 301-400 Over 600, add 1 fixture for each additional 300 males.	Male 1: 1-100 2: 101-200 3: 201-400 4: 401-600 Over 750, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.	Female 1: 1-100 2: 101-200 4: 201-300 5: 301-500 6: 501-750 Over 750, add 1 fixture for each additional 500 persons.	1: 1-250 2: 251-500 3: 501-750 Over 750, add 1 fixture for each additional 500 persons.	1 service sink or laundry sink

Type of occupancy ²	Water closets (fixtures per person) ³	Urinals (fixtures per Person) ⁴	Lavatories (fixtures per person) ⁵	Bathtubs or showers (fixtures per person)	Drinking fountains/ facilities (fixtures per person)	Other ^{6, 7}
A-5 Assembly occupancy (outdoor activities or sporting events)- amusement parks, grandstands and stadiums	Male 1: 1-100 2: 101-200 3: 201-400 Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 125 females.	Female 1: 1-25 2: 26-50 3: 51-100 4: 101-200 6: 201-300 8: 301-400 Over 600, add 1 fixture for each additional 300 males.	Male 1: 1-100 2: 101-200 3: 201-400 4: 401-600 Over 750, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.	Female 1: 1-100 2: 101-200 4: 201-300 5: 301-500 6: 501-750 Over 750, add 1 fixture for each additional 500 persons.	1: 1-250 2: 251-500 3: 501-750 Over 750, add 1 fixture for each additional 500 persons.	1 service sink or laundry sink
B Business occupancy (office, professional or service type transactions)- banks, vet clinics, hospitals, car wash, banks, beauty salons, ambulatory health care facilities, laundries and dry cleaning, educational institutions (above high school), or training facilities not located within school, post offices and printing shops	Male 1: 1-50 2: 51-100 3: 101-200 4: 201-400 Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 150 females.	Female 1: 1-15 2: 16-30 3: 31-50 4: 51-100 8: 101-200 11: 201-400 Over 600, add 1 fixture for each additional 300 males.	Male 1: 1-75 2: 76-150 3: 151-200 4: 201-300 5: 301-400 Over 400, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.	Female 1: 1-50 2: 51-100 3: 101-150 4: 151-200 5: 201-300 6: 301-400 Over 400, add 1 fixture for each additional 250 males and 1 fixture for each additional 200 females.	1 per 150	1 service sink or laundry sink

E Educational occupancy- private or public schools	Male 1 per 50	Female 1 per 30	Male 1 per 100	Male 1 per 40	Female 1 per 40	—	1 per 150	1 service sink or laundry sink
F1, F2 Factory or Industrial occupancy- fabricating or assembly work	Male 1: 1-50 2: 51-75 3: 76-100	Female 1: 1-50 2: 51-75 3: 76-100	—	Male 1: 1-50 2: 51-75 3: 76-100	Female 1: 1-50 2: 51-75 3: 76-100	1 shower for each 15 persons exposed to excessive heat or to skin contamination with poisonous, infectious or irritating material	1: 1-250 2: 251-500 3: 501-750 Over 750, add 1 fixture for each additional 500 persons.	1 service sink or laundry sink
I-1 Institutional occupancy (houses more than 16 persons on a 24-hour basis)- substance abuse centers, assisted living, group homes, or residential facilities	Male 1 per 15	Female 1 per 15	—	Male 1 per 15	Female 1 per 15	1 per 8	1 per 150	1 service sink or laundry sink

Type of occupancy ²	Water closets (fixtures per person) ³	Urinals (fixtures per Person) ⁴	Lavatories (fixtures per person) ⁵	Bathtubs or showers (fixtures per person)	Drinking fountains/facilities (fixtures per person)	Other ^{6,7}
I-2 Institutional occupancy- medical, psychiatric, surgical or nursing homes	Hospitals and nursing homes- individual rooms and ward room	1 per room	—	1 per room	1 per room	1 service sink or laundry sink
	Hospital Waiting or Visitor Rooms	1 per 8 patients	—	1 per 10 patients	1 per 20 patients	1 per 150
	Employee Use	1 per room	—	1 per room	—	—
	Male 1: 1-15 2: 16-35 3: 36-55 Over 55, add 1 fixture for each additional 40 persons.	Female 1: 1-15 3: 16-35 4: 36-55	—	Male 1 per 40 Female 1 per 40	—	—
I-3 Institutional	Prisons	1 per cell	—	1 per cell	1 per 20	1 per cell block/floor

occupancy (houses more than 5 people)	Correctional facilities or juvenile center	1 per 8	–	1 per 10	1 per 8	1 per floor	1 service sink or laundry sink
	Employee Use	Male 1: 1-15 2: 16-35 3: 36-55 Over 55, add 1 fixture for each additional 40 persons.	Female 1: 1-15 3: 16-35 4: 36-55 –	Male 1 per 40	Female 1 per 40	– 1 per 150	–
I-4 occupancy (any age that receives care for less than 24 hours)	Institutional	Male 1: 1-15 2: 16-35 3: 36-55 Over 55, add 1 fixture for each additional 40 persons.	Female 1: 1-15 3: 16-35 4: 36-55 –	Male 1 per 40	Female 1 per 40	– 1 per 150	1 service sink or laundry sink
M Mercantile occupancy (the sale of merchandise and accessible to the public)		Male 1: 1-100 2: 101-200 3: 201-400 Over 400, add 1 fixture for each additional 500 males and 1 fixture for each 200 females.	Female 1: 1-100 2: 101-200 4: 201-300 6: 301-400 –	Male 0: 1-200 Male 1: 1-200 2: 201-400 Over 400, add 1 fixture for each additional 500 males.	Female 1: 1-200 2: 201-300 3: 301-400 –	1: 1-250 2: 251-500 3: 501-750 –	1 service sink or laundry sink
R-1 Residential occupancy (minimal stay)- hotels, motels, bed and breakfast homes		1 per sleeping room	–	1 per sleeping room	1 per sleeping room	–	1 service sink or laundry sink

Type of occupancy ²		Water closets (fixtures per person) ³		Urinals (fixtures per Person) ⁴	Lavatories (fixtures per person) ⁵		Bathtubs or showers (fixtures per person)	Drinking fountains/facilities (fixtures per person)	Other ^{6,7}
R-2 Residential occupancy (long-term or permanent)	Dormitories	Male 1 per 10 Add 1 fixture for each additional 25 males and 1 fixture for each additional 20 females.	Female 1 per 8 –	Male 1 per 25 Over 150, add 1 fixture for each additional 50 males.	Male 1 per 12 Add 1 fixture for each additional 20 males and 1 fixture for each additional 15 females.	Female 1 per 12 –	1 per 8	1 per 150	1 service sink or laundry sink
	Employee Use	Male 1: 1-15 2: 16-35 3: 36-55	Female 1: 1-15 3: 16-35 4: 36-55	–	Male 1 per 40	Female 1 per 40	–	–	–

		Over 55, add 1 fixture for each additional 40 persons						
	Apartment house/unit	1 per apartment	–	1 per apartment	1 per apartment	–		1 kitchen sink per apartment. 1 laundry sink or 1 automatic clothes washer connection per unit or 1 laundry sink or 1 automatic clothes washer connection for each 12 units
R-3 Residential occupancy (long-term or permanent in nature) for more than 5 but does not exceed 16 occupants)	Male 1 per 10 Female 1 per 8	–	Male 1 per 12 Female 1 per 12	–	1 per 8	1 per 150	1 service sink or laundry sink	
	Add 1 fixture for each additional 25 males and 1 fixture for each additional 20 females.	–	Add 1 fixture for each additional 20 males and 1 fixture for each additional 15 females.	–				
R-3 Residential occupancy (one and two-family dwellings)	1 per one and two-family dwelling	–	1 per one and two-family dwelling	–	1 per one and two-family dwelling	–	1 kitchen sink and 1 automatic clothes washer connection per one and two-family dwelling	
R-4 Residential occupancy (residential care or assisted living)	Male 1 per 10 Female 1 per 8	–	Male 1 per 12 Female 1 per 12	–	1 per 8	1 per 150	1 service sink or laundry sink	
	Add 1 fixture for each additional 25 males and 1 fixture for each additional 20 females.	–	Add 1 fixture for each additional 20 males and 1 fixture for each additional 15 females.	–				

Type of occupancy ²	Water closets (fixtures per person) ³	Urinals (fixtures per Person) ⁴	Lavatories (fixtures per person) ⁵	Bathtubs or showers (fixtures per person)	Drinking fountains/facilities (fixtures per person)	Other ^{6,7}
S-1, S-2 Storage occupancy-storage of goods, warehouse	Male 1: 1-100 2: 101-200 Female 1: 1-100 2: 101-200		Male 1: 1-200 2: 201-400 Female 1: 1-200 2: 201-400		1: 1-250 2: 251-500 3: 501-750	

aircraft hanger, food products, appliances	3: 201-400	3: 201-400	—	3: 401-750	3: 401-750	—		1 service sink or laundry sink
	Over 400, add 1 fixture for each additional 500 males and 1 fixture for each additional 150 females.			Over 750, add 1 fixture for each additional 500 persons.			Over 750, add 1 fixture for each additional 500 persons.	

Notes:

- 1 The figures shown are based upon one fixture being the minimum required for the number of persons indicated or any fraction thereof.
- 2 A restaurant is defined as a business that sells food to be consumed on the premises.
 - a. The number of occupants for a drive-in restaurant shall be considered as equal to the number of parking stalls.
 - b. Hand-washing facilities shall be available in the kitchen for employees.
- 3 The total number of required water closets for females shall be not less than the total number of required water closets and urinals for males.
- 4 For each urinal added in excess of the minimum required, one water closet shall be permitted to be deducted. The number of water closets shall not be reduced to less than two-thirds of the minimum requirement.
- 5 Metering or self-closing faucets shall be installed on lavatories intended to serve the transient public.
- 6 Service sinks shall not be required for non-residential occupancies with an occupant load of 15 or less.
- 7 For business and mercantile occupancies, one common service sink shall be permitted when accessible to all businesses and mercantile within 300 feet (91 440 mm) and within the same story.

Bibliography

- [1] CSA B45.5-2017/IAPMO Z124 Plastic Plumbing Fixtures
- [2] IAPMO IGC 127 Combined Hand-Washing Systems
- [3] IAPMO IGC 154 Shower and Tub/Shower Enclosures, Bathtubs with Glass Pressure-Sealed Doors, and Shower/Steam Panels
- [4] IAPMO PS 106 Tileable Shower Receptors and Shower Kits
- [5] ASSE 1016-2017/ASME A112.1016-2017/CSA B125.16-2017 Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations
- [6] ASSE 1069 Automatic Temperature Control Mixing Valves
- [7] CSA B45.12/IAPMO Z402 Aluminum and Copper Plumbing Fixtures
- [8] ASSE 1084 Water Heaters with Temperature Limiting Capacity
- [9] IAPMO/ANSI Z1033 Flexible PVC Hoses and Tubing for Pools, Hot Tubs, Spas, and Jetted Bathtubs
- [10] IAPMO/ANSI Z124.5 Plastic Toilet Seats
- [11] ASSE 1023 Electrically Heated or Cooled Water Dispensers
- [12] ASSE 1084 Water Heaters with Temperature Limiting Capacity
- [13] ASSE 1008 Plumbing Aspects of Residential Food Waste Disposer Units
- [14] CSA B45.8/IAPMO Z403, Terrazzo, Concrete, Composite Stone, and Natural Stone Plumbing Fixtures
- [15] IAPMO IGC 127 Combined Hand-Washing Systems
- [16] IAPMO/ANSI/CAN Z124.10-2022 Water Closets and Urinal Partitions

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