

## CHAPTER 27

# PLUMBING FIXTURES

### SECTION P2701 FIXTURES, FAUCETS AND FIXTURE FITTINGS

**P2701.1 Quality of fixtures.** Plumbing fixtures, faucets and fixture fittings shall be constructed of *approved* materials, shall have smooth impervious surfaces, shall be free from defects and concealed fouling surfaces, and shall conform to the standards cited in this code. Plumbing fixtures shall be provided with an adequate supply of potable water to flush and keep the fixtures in a clean and sanitary condition without danger of backflow or cross connection.

### SECTION P2702 FIXTURE ACCESSORIES

**P2702.1 Plumbing fixtures.** Plumbing fixtures, other than water closets, shall be provided with *approved* strainers.

**P2702.2 Waste fittings.** Waste fittings shall conform to ASME A112.18.2/CSA B125.2, ASTM F 409 or to one of the standards listed in Table P3002.1(1) for above-ground drainage and vent pipe and fittings.

**P2702.3 Plastic tubular fittings.** Plastic tubular fittings shall conform to ASTM F 409 listed in Table P2701.1.

**P2702.4 Carriers for wall-hung water closets.** Carriers for wall-hung water closets shall conform to ASME A112.6.1 or ASME A112.6.2.

### SECTION P2703 TAIL PIECES

**P2703.1 Minimum size.** Fixture tail pieces shall be not less than 1½ inches (38 mm) in diameter for sinks, dishwashers, laundry tubs, bathtubs and similar fixtures, and not less than 1¼ inches (32 mm) in diameter for bidets, lavatories and similar fixtures.

### SECTION P2704 ACCESS TO CONNECTIONS

**P2704.1 General.** Slip joints shall be made with an *approved* elastomeric gasket and shall be installed only on the trap outlet, trap inlet and within the trap seal. Fixtures with concealed slip-joint connections shall be provided with an access panel or utility space at least 12 inches (305 mm) in its smallest dimension or other *approved* arrangement so as to provide access to the slip connections for inspection and repair.

### SECTION P2705 INSTALLATION

**P2705.1 General.** The installation of fixtures shall conform to the following:

1. Floor-outlet or floor-mounted fixtures shall be secured to the drainage connection and to the floor, where so designed, by screws, bolts, washers, nuts and similar fasteners of copper, brass or other corrosion-resistant material.

2. Wall-hung fixtures shall be rigidly supported so that strain is not transmitted to the plumbing system.
3. Where fixtures come in contact with walls and floors, the contact area shall be water tight.
4. Plumbing fixtures shall be usable.
5. Water closets, lavatories and bidets. A water closet, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition or vanity or closer than 30 inches (762 mm) center-to-center between adjacent fixtures. There shall be at least a 21-inch (533 mm) clearance in front of the water closet, lavatory or bidet to any wall, fixture or door.
6. The location of piping, fixtures or *equipment* shall not interfere with the operation of windows or doors.
7. In areas prone to flooding as established by Table R301.2(1), plumbing fixtures shall be located or installed in accordance with Section R322.1.7.
8. Integral fixture-fitting mounting surfaces on manufactured plumbing fixtures or plumbing fixtures constructed on site, shall meet the design requirements of ASME A112.19.2 or ASME A 112.19.3.

### SECTION P2706 WASTE RECEPTORS

**P2706.1 General.** Every waste receptor shall be of an *approved* type. Plumbing fixtures or other receptors receiving the discharge of indirect waste pipes shall be shaped and have a capacity to prevent splashing or flooding and shall be *readily accessible* for inspection and cleaning. Waste receptors and standpipes shall be trapped and vented and shall connect to the building drainage system. A removable strainer or basket shall cover the waste outlet of waste receptors. Waste receptors shall be installed in ventilated spaces. Waste receptors shall not be installed in bathrooms or in any inaccessible or unventilated space such as a closet. Ready access shall be provided to waste receptors.

**Exception:** Open hub waste receptors shall be permitted in the form of a hub or pipe extending not less than 1 inch (25 mm) above a water-impervious floor, and are not required to have a strainer.

**P2706.2 Standpipes.** Standpipes shall extend a minimum of 18 inches (457 mm) and a maximum of 42 inches (1067 mm) above the trap weir. Access shall be provided to all standpipe traps and drains for rodding.

**P2706.2.1 Laundry tray connection.** A laundry tray waste line is permitted to connect into a standpipe for the automatic clothes washer drain. The standpipe shall extend not less than 30 inches (762 mm) above the trap weir and shall extend above the flood level rim of the laundry tray. The outlet of the laundry tray shall be a maximum horizontal distance of 30 inches (762 mm) from the standpipe trap.

**PLUMBING FIXTURES**

**TABLE P2701.1  
PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS**

MATERIAL	STANDARD
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3
Bathtub/whirlpool pressure-sealed doors	ASME A112.19.15
Diverter for faucets with hose spray anti-syphon type, residential application	ASSE 1025
Enameled cast-iron plumbing fixtures	ASME A112.19.1M, CSA B45.2
Floor drains	ASME A112.6.3
Floor-affixed supports for off-the-floor plumbing fixtures for public use	ASME A112.6.1M
Framing-affixed supports for off-the-floor water closets with concealed tanks	ASME A112.6.2
Home laundry equipment	ASSE 1007
Hose connection vacuum breaker	ASSE 1052
Hot water dispensers, household storage type, electrical	ASSE 1023
Household dishwashing machines	ASSE 1006
Household disposers	ASSE 1008
Hydraulic performance for water closets and urinals	ASME A112.19.2
Individual pressure balancing valves for individual fixture fittings	ASSE 1066
Individual shower control valves anti-scald	ASSE 1016, CSA B125
Macerating toilet systems and related components	ASME A112.3.4
Nonvitreous ceramic plumbing fixtures	ASME A112.19.9M, CSA B45.1
Plastic bathtub units	ANSI Z124.1, CSA B45.1
Plastic lavatories	ANSI Z124.3, CSA B45.5
Plastic shower receptors and shower stall	ANSI Z124.2, CSA B45.5
Plastic sinks	ANSI Z124.6, CSA B45.5
Plastic water closet bowls and tanks	ANSI Z124.4, CSA B45.5
Plumbing fixture fittings	ASME A112.18.1/CSA B125.1
Plumbing fixture waste fittings	ASME A112.18.2/CSA B125.2, ASTM F 409
Porcelain-enameled formed steel plumbing fixtures	ASME A112.19.4M, CSA B45.3
Pressurized flushing devices for plumbing fixtures	ASSE 1037
Specification for copper sheet and strip for building construction	ASTM B 370
Stainless steel plumbing fixtures (residential)	ASME A112.19.3M, CSA B45.4
Suction fittings for use in swimming pools, wading pools, spas, hot tubs and whirlpool bathtub appliances	ASME A112.19.8M
Temperature-actuated, flow reduction valves to individual fixture fittings	ASSE 1062
Thermoplastic accessible and replaceable plastic tube and tubular fittings	ASTM F 409
Trench drains	ASME A112.6.3
Trim for water closet bowls, tanks and urinals	ASME A112.19.5
Vacuum breaker wall hydrant—frost-resistant, automatic-draining type	ASSE 1019
Vitreous china plumbing fixtures	ASME A112.19.2M
Wall-mounted and pedestal-mounted, adjustable and pivoting lavatory and sink carrier systems	ASME A112.19.12
Water closet flush tank fill valves	ASSE 1002, CSA B125.3
Whirlpool bathtub appliances	ASME A112.19.7M

**P2706.3 Prohibited waste receptors.** Plumbing fixtures that are used for washing or bathing shall not be used to receive the discharge of indirect waste piping.

**Exceptions:**

1. A kitchen sink trap is acceptable for use as a receptor for a dishwasher.
2. A laundry tray is acceptable for use as a receptor for a clothes washing machine.

### SECTION P2707 DIRECTIONAL FITTINGS

**P2707.1 Directional fitting required.** *Approved* directional-type branch fittings shall be installed in fixture tailpieces receiving the discharge from food waste disposal units or dishwashers.

### SECTION P2708 SHOWERS

**P2708.1 General.** Shower compartments shall have at least 900 square inches (0.6 m<sup>2</sup>) of interior cross-sectional area. Shower compartments shall be not less than 30 inches (762 mm) in minimum dimension measured from the finished interior dimension of the shower compartment, exclusive of fixture valves, shower heads, soap dishes, and safety grab bars or rails. The minimum required area and dimension shall be measured from the finished interior dimension at a height equal to the top of the threshold and at a point tangent to its centerline and shall be continued to a height of not less than 70 inches (1778 mm) above the shower drain outlet. Hinged shower doors shall open outward. The wall area above built-in tubs having installed shower heads and in shower compartments shall be constructed in accordance with Section R702.4. Such walls shall form a water-tight joint with each other and with either the tub, receptor or shower floor.

**Exceptions:**

1. Fold-down seats shall be permitted in the shower, provided the required 900-square-inch (0.6 m<sup>2</sup>) dimension is maintained when the seat is in the folded-up position.
2. Shower compartments having not less than 25 inches (635 mm) in minimum dimension measured from the finished interior dimension of the compartment provided that the shower compartment has a minimum of 1,300 square inches (0.838 m<sup>2</sup>) of cross-sectional area.

**P2708.1.1 Access.** The shower compartment access and egress opening shall have a minimum clear and unobstructed finished width of 22 inches (559 mm).

**P2708.2 Water supply riser.** Water supply risers from the shower valve to the shower head outlet, whether exposed or concealed, shall be attached to the structure using support devices designed for use with the specific piping material or fittings anchored with screws.

**P2708.3 Shower control valves.** Individual shower and tub/shower combination valves shall be equipped with control valves of the pressure-balance, thermostatic-mixing or combination pressure-balance/thermostatic-mixing valve types with a high limit stop in accordance with ASSE 1016 or CSA B125. The high limit stop shall be set to limit water temperature to a maximum of 120°F (49°C). In-line thermostatic valves shall not be used for compliance with this section.

**P2708.4 Hand showers.** Hand-held showers shall conform to ASME A112.18.1 or CSA B125.1. Hand-held showers shall be provide backflow protection in accordance with ASME A112.18.1 or CSA B125.1 or shall be protected against backflow by a device complying with ASME A112.18.3.

### SECTION P2709 SHOWER RECEPTORS

**P2709.1 Construction.** Shower receptors shall have a finished curb threshold not less than 1 inch (25 mm) below the sides and back of the receptor. The curb shall be not less than 2 inches (51 mm) and not more than 9 inches (229 mm) deep when measured from the top of the curb to the top of the drain. The finished floor shall slope uniformly toward the drain not less than 1/4 unit vertical in 12 units horizontal (2-percent slope) nor more than 1/2 inch (13 mm), and floor drains shall be flanged to provide a water-tight joint in the floor.

**P2709.2 Lining required.** The adjoining walls and floor framing enclosing on-site built-up shower receptors shall be lined with one of the following materials:

1. Sheet lead,
2. Sheet copper,
3. Plastic liner material that complies with ASTM D 4068 or ASTM D 4551,
4. Hot mopping in accordance with Section P2709.2.3 or
5. Sheet-applied load-bearing, bonded waterproof membranes that comply with ANSI A118.10.

The lining material shall extend not less than 3 inches (76 mm) beyond or around the rough jambs and not less than 3 inches (76 mm) above finished thresholds. Sheet-applied load bearing, bonded waterproof membranes shall be applied in accordance with the manufacturer's installation instructions.

**P2709.2.1 PVC sheets.** Plasticized polyvinyl chloride (PVC) sheets shall be a minimum of 0.040 inch (1 mm) thick, and shall meet the requirements of ASTM D 4551. Sheets shall be joined by solvent welding in accordance with the manufacturer's installation instructions.

**P2709.2.2 Chlorinated polyethylene (CPE) sheets.** Non-plasticized chlorinated polyethylene sheet shall be a minimum of 0.040 inch (1 mm) thick, and shall meet the requirements of ASTM D 4068. The liner shall be joined in accordance with the manufacturer's installation instructions.

**P2709.2.3 Hot-mopping.** Shower receptors lined by hot mopping shall be built-up with not less than three layers of standard grade Type 15 asphalt-impregnated roofing felt. The bottom layer shall be fitted to the formed subbase and each succeeding layer thoroughly hot-mopped to that

below. All corners shall be carefully fitted and shall be made strong and water tight by folding or lapping, and each corner shall be reinforced with suitable webbing hot-mopped in place. All folds, laps and reinforcing webbing shall extend at least 4 inches (102 mm) in all directions from the corner and all webbing shall be of *approved* type and mesh, producing a tensile strength of not less than 50 pounds per inch (893 kg/m) in either direction.

**P2709.3 Installation.** Lining materials shall be pitched one-fourth unit vertical in 12 units horizontal (2-percent slope) to weep holes in the subdrain by means of a smooth, solidly formed subbase, shall be properly recessed and fastened to *approved* backing so as not to occupy the space required for the wall covering, and shall not be nailed or perforated at any point less than 1 inch (25.4 mm) above the finished threshold.

**P2709.3.1 Materials.** Lead and copper linings shall be insulated from conducting substances other than the connecting drain by 15-pound (6.80 kg) asphalt felt or its equivalent. Sheet lead liners shall weigh not less than 4 pounds per square foot (19.5 kg/m<sup>2</sup>). Sheet copper liners shall weigh not less than 12 ounces per square foot (3.7 kg/m<sup>2</sup>). Joints in lead and copper pans or liners shall be burned or silver brazed, respectively. Joints in plastic liner materials shall be jointed per the manufacturer's recommendations.

**P2709.4 Receptor drains.** An *approved* flanged drain shall be installed with shower subpans or linings. The flange shall be placed flush with the subbase and be equipped with a clamping ring or other device to make a water-tight connection between the lining and the drain. The flange shall have weep holes into the drain.

## SECTION P2710 SHOWER WALLS

**P2710.1 Bathtub and shower spaces.** Shower walls shall be finished in accordance with Section R307.2.

## SECTION P2711 LAVATORIES

**P2711.1 Approval.** Lavatories shall conform to ANSI Z124.3, ASME A112.19.1, ASME A112.19.2, ASME A112.19.3, ASME A112.19.4, ASME A112.19.9, CSA B45.1, CSA B45.2, CSA B45.3 or CSA B45.4.

**P2711.2 Cultured marble lavatories.** Cultured marble vanity tops with an integral lavatory shall conform to ANSI Z124.3 or CSA B45.5.

**P2711.3 Lavatory waste outlets.** Lavatories shall have waste outlets not less than 1<sup>1</sup>/<sub>4</sub> inch (32 mm) in diameter. A strainer, pop-up stopper, crossbar or other device shall be provided to restrict the clear opening of the waste outlet.

**P2711.4 Movable lavatory systems.** Movable lavatory systems shall comply with ASME A112.19.12.

## SECTION P2712 WATER CLOSETS

**P2712.1 Approval.** Water closets shall conform to the water consumption requirements of Section P2903.2 and shall conform to ANSI Z124.4, ASME A112.19.2, CSA B45.1, CSA B45.4 or CSA B45.5. Water closets shall conform to the hydraulic performance requirements of ASME A112.19.6. Water closets tanks shall conform to ANSI Z124.4, ASME A112.19.2, ASME A112.19.9, CSA B45.1, CSA B45.4 or CSA B45.5. Water closets that have an invisible seal and unventilated space or walls that are not thoroughly washed at each discharge shall be prohibited. Water closets that permit backflow of the contents of the bowl into the flush tank shall be prohibited.

**P2712.2 Flushing devices required.** Water closets shall be provided with a flush tank, flushometer tank or flushometer valve designed and installed to supply water in sufficient quantity and flow to flush the contents of the fixture, to cleanse the fixture and refill the fixture trap in accordance with ASME A112.19.2 and ASME A112.19.6.

**P2712.3 Water supply for flushing devices.** An adequate quantity of water shall be provided to flush and clean the fixture served. The water supply to flushing devices 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 completely shut off the water flow to the tank when the tank is filled to operational capacity. Provision shall be made to automatically supply water to the fixture so as to refill the trap after each flushing.

**P2712.4 Flush valves in flush tanks.** Flush valve seats in tanks for flushing water closets shall be at least 1 inch (25 mm) above the flood-level rim of the bowl connected thereto, except an *approved* water closet and flush tank combination designed so that when the tank is flushed and the fixture is clogged or partially clogged, the flush valve will close tightly so that water will not spill continuously over the rim of the bowl or backflow from the bowl to the tank.

**P2712.5 Overflows in flush tanks.** Flush tanks shall be provided with overflows discharging to the water closet connected thereto and such overflow shall be of sufficient size to prevent flooding the tank at the maximum rate at which the tanks are supplied with water according to the manufacturer's design conditions.

**P2712.6 Access.** All parts in a flush tank shall be accessible for repair and replacement.

**P2712.7 Water closet seats.** Water closets shall be equipped with seats of smooth, nonabsorbent material and shall be properly sized for the water closet bowl type.

**P2712.8 Flush tank lining.** Sheet copper used for flush tank linings shall have a minimum weight of 10 ounces per square foot (3 kg/m<sup>2</sup>).

**P2712.9 Electro-hydraulic water closets.** Electro-hydraulic water closets shall conform to ASME A112.19.13.

### SECTION P2713 BATHTUBS

**P2713.1 Bathtub waste outlets and overflows.** Bathtubs shall have outlets and overflows at least 1½ inches (38 mm) in diameter, and the waste outlet shall be equipped with an *approved* stopper.

**P2713.2 Bathtub enclosures.** Doors within a bathtub enclosure shall conform to ASME A112.19.15.

**P2713.3 Bathtub and whirlpool bathtub valves.** The hot water supplied to bathtubs and whirlpool bathtubs shall be limited to a maximum temperature of 120°F (49°C) by a water-temperature-limiting device that conforms to ASSE 1070, except where such protection is otherwise provided by a combination tub/shower valve in accordance with Section P2708.3.

### SECTION P2714 SINKS

**P2714.1 Sink waste outlets.** Sinks shall be provided with waste outlets not less than 1½ inches (38 mm) in diameter. A strainer, crossbar or other device shall be provided to restrict the clear opening of the waste outlet.

**P2714.2 Movable sink systems.** Movable sink systems shall comply with ASME A112.19.12.

### SECTION P2715 LAUNDRY TUBS

**P2715.1 Laundry tub waste outlet.** Each compartment of a laundry tub shall be provided with a waste outlet not less than 1½ inches (38 mm) in diameter and a strainer or crossbar to restrict the clear opening of the waste outlet.

### SECTION P2716 FOOD WASTE GRINDER

**P2716.1 Food waste grinder waste outlets.** Food waste grinders shall be connected to a drain of not less than 1½ inches (38 mm) in diameter.

**P2716.2 Water supply required.** Food waste grinders shall be provided with an adequate supply of water at a sufficient flow rate to ensure proper functioning of the unit.

### SECTION P2717 DISHWASHING MACHINES

**P2717.1 Protection of water supply.** The water supply for dishwashers shall be protected by an air gap or integral backflow preventer.

**P2717.2 Sink and dishwasher.** A sink and dishwasher are permitted to discharge through a single 1½-inch (38 mm) trap. The discharge pipe from the dishwasher shall be increased to a minimum of ¾ inch (19 mm) in diameter and shall be connected with a wye fitting to the sink tailpiece. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the sink tailpiece.

**P2717.3 Sink, dishwasher and food grinder.** The combined discharge from a sink, dishwasher, and waste grinder is permitted to discharge through a single 1½ inch (38 mm) trap. The discharge pipe from the dishwasher shall be increased to a minimum of ¾ inch (19 mm) in diameter and shall connect with a wye fitting between the discharge of the food-waste grinder and the trap inlet or to the head of the food grinder. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the sink tail piece or the food grinder.

### SECTION P2718 CLOTHES WASHING MACHINE

**P2718.1 Waste connection.** The discharge from a clothes washing machine shall be through an *air break*.

### SECTION P2719 FLOOR DRAINS

**P2719.1 Floor drains.** Floor drains shall have waste outlets not less than 2 inches (51 mm) in diameter and a removable strainer. The floor drain shall be constructed so that the drain can be cleaned. Access shall be provided to the drain inlet. Floor drains shall not be located under or have their access restricted by permanently installed appliances.

### SECTION P2720 WHIRLPOOL BATHTUBS

**P2720.1 Access to pump.** Access shall be provided to circulation pumps in accordance with the fixture or pump manufacturer's installation instructions. Where the manufacturer's instructions do not specify the location and minimum size of field-fabricated access openings, a 12-inch by 12-inch (305 mm by 305 mm) minimum size opening shall be installed for access to the circulation pump. Where pumps are located more than 2 feet (610 mm) from the access opening, an 18-inch by 18-inch (457 mm by 457 mm) minimum size opening shall be installed. A door or panel shall be permitted to close the opening. In all cases, the access opening shall be unobstructed and be of the size necessary to permit the removal and replacement of the circulation pump.

**P2720.2 Piping drainage.** The circulation pump shall be accessibly located above the crown weir of the trap. The pump drain line shall be properly graded to ensure minimum water retention in the volute after fixture use. The circulation piping shall be installed to be self-draining.

**P2720.3 Leak testing.** Leak testing and pump operation shall be performed in accordance with the manufacturer's installation instructions.

**P2720.4 Manufacturer's instructions.** The product shall be installed in accordance with the manufacturer's installation instructions.



### SECTION P2721 BIDET INSTALLATIONS

**P2721.1 Water supply.** The bidet shall be equipped with either an air-gap-type or vacuum-breaker-type fixture supply fitting.

**P2721.2 Bidet water temperature.** The discharge water temperature from a bidet fitting shall be limited to a maximum temperature of 110°F (43°C) by a water-temperature-limiting device conforming to ASSE 1070.

### SECTION P2722 FIXTURE FITTING

**P2722.1 General.** Fixture supply valves and faucets shall comply with ASME A112.18.1/ CSA B125.1 as listed in Table P2701.1. Faucets and fixture fittings that supply drinking water for human ingestion shall conform to the requirements of NSF 61, Section 9. Flexible water connectors shall conform to the requirements of Section P2905.7.

**P2722.2 Hot water.** Fixture fittings and faucets that are supplied with both hot and cold water shall be installed and adjusted so that the left-hand side of the water temperature control represents the flow of hot water when facing the outlet.

**Exception:** Shower and tub/shower mixing valves conforming to ASSE 1016 or CSA B125, where the water temperature control corresponds to the markings on the device.

**P2722.3 Hose-connected outlets.** Faucets and fixture fittings with hose-connected outlets shall conform to ASME A112.18.3 or CSA B125.

**P2722.4 Individual pressure-balancing in-line valves for individual fixture fittings.** Where individual pressure-balancing in-line valves for individual fixture fittings are installed, the valves shall comply with ASSE 1066. Such valves shall be installed in an accessible location and shall not be used alone as a substitute for the balanced pressure, thermostatic or combination shower valves required in Section P2708.3.

### SECTION P2723 MACERATING TOILET SYSTEMS

**P2723.1 General.** Macerating toilet systems shall be installed in accordance with manufacturer's installation instructions.

**P2723.2 Drain.** The minimum size of the drain from the macerating toilet system shall be  $\frac{3}{4}$  inch (19 mm) in diameter.

### SECTION P2724 SPECIALTY TEMPERATURE CONTROL DEVICES AND VALVES

**P2724.1 Temperature-actuated, flow-reduction devices for individual fixtures.** Temperature-actuated, flow-reduction devices, where installed for individual fixture fittings, shall conform to ASSE 1062. Such valves shall not be used alone as a substitute for the balanced pressure, thermostatic or combination shower valves required for showers in Section P2708.3.