

CHAPTER 4

PLUMBING FIXTURES AND FIXTURE FITTINGS

401.0 Materials – General Requirements.

401.1 Quality of Fixtures. Plumbing fixtures shall be constructed of dense, durable, non-absorbent materials and shall have smooth, impervious surfaces, free from unnecessary concealed fouling surfaces. Except as permitted elsewhere in this code, all fixtures shall conform in quality and design to nationally recognized applicable standards included in Table 14-1.

401.2 Lead. See Table 14-1. Sheet lead shall be not less than the following:

For safe pans not less than four (4) pounds per square foot (19.5 kg/m²) or 1/16 inch (1.6 mm) thick.

401.3 Plumbing fixture fittings covered under the scope of NSF 61 shall comply with the requirements of NSF 61.

402.0 Water-Conserving Fixtures and Fittings.

402.1 Flush volumes for low-consumption and water-saver water closets and urinals shall be in accordance with applicable standards referenced in Table 14-1.

402.2 Water Closets. Water closets, either flush tank, flushometer tank, or flushometer valve operated, shall have an average consumption of not more than 1.6 gallons (6.1 liters) of water per flush.

402.3 Urinals. Urinals shall have an average water consumption of not more than 1.0 gallon (3.8 liters) of water per flush.

402.3.1 Nonwater Urinals. Where nonwater urinals are installed they shall be listed and comply with applicable standards. Nonwater urinals shall have a barrier liquid sealant to maintain a trap seal. Nonwater urinals shall permit the uninhibited flow of waste through the urinal to the sanitary drainage system. Where nonwater urinals are installed they shall have a water distribution line roughed in to the urinal location to allow a subsequent replacement of the nonwater supplied urinal with a water supplied urinal.

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Nonwater urinals must be cleaned and maintained in accordance with the manufacturer's instructions after installation. Used cartridges must be recycled and should not be disposed of in a landfill.

402.4 Metered Faucets. Self-closing or self-closing

metering faucets shall be installed on lavatories intended to serve the transient public in service stations, train stations, airports, and convention halls. Metered faucets shall deliver not more than 0.25 gallons (1.0 liter) of water per use. Employee restrooms not generally used by the public shall be exempt from the requirement of self-closing lavatory faucets.

402.5 Emergency Safety Showers. Emergency safety showers shall not be limited in their water supply flow rates.

402.6 Installation. Water-conserving fixtures shall be installed in strict accordance with the manufacturers' instructions to maintain their rated performance.

403.0 Overflows.

When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the overflow when the stopper is closed or remain in the overflow when the fixture is empty. The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, except that overflow on flush tanks may discharge into the water closets or urinals served by them, but it shall be unlawful to connect such overflows with any other part of the drainage system.

404.0 Strainers and Connections.

404.1 Strainers. All plumbing fixtures, other than water closets and urinals, shall be equipped with approved strainers having an approved waterway area. Strainers serving shower drains shall have a waterway equivalent to the area of the tailpiece.

404.2 Connections. Fixtures having concealed slip joint connections shall be provided with an access panel or utility space at least twelve (12) inches (305 mm) in its least dimension and so arranged without obstructions as to make such connections accessible for inspection and repair.

404.3 Continuous wastes and fixture tailpieces shall be constructed from the materials specified in Section 701.0 for drainage piping, provided, however, that such connections where exposed or accessible may be of seamless drawn brass not less than No. 20 B&S Gauge (0.032 inches) (0.8 mm). Each such tailpiece, continuous waste, or waste and overflow shall not be less than one and one-half (1-1/2) inches (40 mm) O.D. for sinks, dishwashers, laundry tubs, bathtubs, urinals,

and similar fixtures, and not less than one and one quarter (1-1/4) inches (32 mm) for lavatories, drinking fountains, and similar small fixtures.

404.4 Approved wye or other directional-type branch fittings shall be installed in all continuous wastes connecting or receiving the discharge from food waste disposal units, dishwashers, clothes washers, or other force discharge fixtures or appliances. No dishwasher drain shall be connected to a sink tailpiece, continuous waste, or trap on the discharge side of a food waste disposal unit.

405.0 Prohibited Fixtures.

405.1 Water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge shall be prohibited. Any water closet that might permit siphonage of the contents of the bowl back into the tank shall be prohibited. Drinking fountains shall not be installed in public toilet rooms.

405.2 Prohibited Urinals. Floor-type and wall-hung type trough urinals shall be prohibited. Urinals that have an invisible seal or that have an unventilated space or wall that is not thoroughly washed at each discharge shall be prohibited.

→ **405.3** Fixed wooden, or tile wash trays or sinks for domestic use shall not be installed in any 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 any building used for human habitation, unless first approved by the Health Officer.

406.0 Special Fixtures and Specialties.

→ **406.1 Water and Waste Connections.** Baptisteries, ornamental and lily ponds, aquaria, ornamental fountain basins, and similar fixtures and specialties requiring water and/or waste connections shall be submitted for approval to the Authority Having Jurisdiction prior to installation.

→ **406.2** Restaurant kitchen and other special use sinks may be made of approved-type bonderized and galvanized sheet steel of not less than No. 16 U.S. gauge (0.0625 inches) (1.6 mm). All sheet-metal plumbing fixtures shall be adequately designed, constructed, and braced in an approved manner to satisfactorily accomplish their intended purpose.

→ **406.3 Special Use Fixtures.** Special use fixtures shall be made of one of the following:

- (A) Soapstone
- (B) Chemical stoneware
- (C) Copper-based alloy
- (D) Nickel-based alloy

(E) Corrosion-resistant steel

(F) Other materials suited for the intended use of the fixture.

406.4 Zinc Alloy Components. Zinc alloy components shall meet the applicable nationally recognized standards and shall be used in accordance with their listing.

407.0 Installation.

407.1 Cleaning. Plumbing fixtures shall be installed in a manner to afford easy access for repairs and cleaning. Where practical, all pipes from fixtures shall be run to the nearest wall.

407.2 Joints. 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.

407.3 Securing Fixtures. Floor-outlet or floor-mounted fixtures shall be rigidly secured to the drainage connection and to the floor, when so designed, by screws or bolts of copper, brass, or other equally corrosion-resistant material.

407.4 Wall-Hung Fixtures. Wall-hung fixtures shall be rigidly supported by metal supporting members so that no strain is transmitted to the connections. Flush tanks and similar appurtenances shall be secured by approved non-corrosive screws or bolts.

407.5 Securing Floor-Mounted, Back-Outlet Water Closet Bowls. Floor-mounted, back-outlet water closet bowls shall be set level with an angle of ninety (90) degrees (1.58 rad) between the floor and wall at the centerline of the fixture outlet. The floor and wall shall have a flat mounting surface for at least five (5) inches (127 mm) to the right and left of the fixture outlet centerline. The fixture shall be secured to the wall outlet flange or drainage connection and to the floor by corrosion-resistant screws or bolts. The closet flange shall be secured to a firm base.

Where floor-mounted, back-outlet water closets are used, the soil pipe shall not be less than three (3) inches (80 mm) in diameter. Offset, eccentric, or reducing floor flanges shall not be used.

407.6 Setting. Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet or bidet shall be set closer than fifteen (15) inches (381 mm) from its center to any side wall or obstruction nor closer than thirty (30) inches (762 mm) center to center to any similar fixture. The clear space in front of any water closet or bidet shall not be less than twenty-four (24) inches (610 mm). No urinal shall be set closer than twelve (12) inches (305 mm) from its center to any side wall or partition nor closer than twenty-four (24) inches (610 mm) center to center.

Exception: The clear space in front of water

closets and bidets in residential structures shall not be less than twenty-one (21) inches (533.4 mm).

407.7 Installations for Persons with Disabilities.

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

407.8 Supply Fittings. The supply lines and fittings for every plumbing fixture shall be so installed as to prevent backflow as required in Chapter 6.

408.0 Water Closets.

408.1 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 under six (6) years of age, water closets shall be of a size and height suitable for children's use. All water closets shall be equipped with seats as required below.

408.2 Water Closet Seats.

408.2.1 Water closet seats shall be of smooth, non-absorbent material.

408.2.2 All water closet seats, except those within dwelling units, shall be either of the open front type or have an automatic seat cover dispenser.

408.2.3 Water closet seats shall be properly sized for the water closet bowl type.

408.2.4 Seats for use in public buildings shall conform to the standard listed in Table 14-1.

409.0 Urinals.

Every water supply to a urinal shall be protected by an approved-type vacuum breaker or other approved backflow prevention device as described in Section 603.3.

410.0 Flushing Devices for Water Closets and Urinals.

410.1 Flushing Devices Required. Each water closet, urinal, clinic 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 meet anti-siphon requirements required in Chapter 6.

Exception: Nonwater urinals as required in section 402.3.1.

410.2 Automatic Flushing Tanks. Tanks flushing more than one (1) urinal shall be automatic in operation and of sufficient capacity to provide the necessary volume to flush and properly cleanse all urinals simultaneously. Automatically controlled flushometer valves may be substituted for flush tanks.

410.3 Flushometer Valves. No manually controlled flushometer valve shall be used to flush more than one (1) 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 properly operate them. When 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.

410.4 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 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 seal after each flushing. The water supply to flush tanks equipped for automatic flushing shall be controlled by a suitable timing device.

410.5 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 when installed per manufacturer's instructions.

411.0 Floor Drains and Shower Stalls.

411.1 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, floor receptors, and shower drains shall be of an approved type, suitably flanged to provide a watertight joint in the floor.

411.2 Location of Floor Drains. Floor drains shall be installed in the following areas:

411.2.1 Toilet rooms containing two (2) or more water closets or a combination of one (1) water closet and one (1) urinal, except in a dwelling unit.

dam or threshold and shall extend outward over the top of the rough threshold and be turned over and fastened on the outside face of both the rough threshold and the jambs.

Nonmetallic shower subpans or linings may be built up on the job site of not less than three (3) layers of standard, grade fifteen (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. All 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. All folds, laps, and reinforcing webbing shall extend at least four (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 fifty (50) psi (344.5 kPa) in either direction. Nonmetallic shower subpans or linings may also 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 approved backing so as not to occupy the space required for the wall covering and shall not be nailed or perforated at any point that may be less than one (1) inch (25.4 mm) above the finished dam or threshold. An approved-type subdrain shall be installed with every shower subpan or lining. 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.

All shower lining materials shall conform to approved standards acceptable to the Authority Having Jurisdiction.

*Lead and copper subpans or linings shall be insulated from all conducting substances other than their connecting drain by fifteen (15) pound (6.8 kg) asphalt felt or its equivalent, and no lead pan or liner shall be constructed of material weighing less than four (4) pounds per square foot (19.5 kg/m²). Copper pans or liners shall be at least No. 24 B & S Gauge (0.02 inches) (0.5 mm). Joints in lead pans or liners shall be burned. Joints in copper pans or liners shall be soldered or brazed. Plastic pans shall not be coated with asphalt-based materials.

411.8.1 Tests for Shower Receptors. Shower receptors shall be tested for watertightness by filling with water to the level of the rough threshold. 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.

411.9 Floors of public shower rooms shall have a nonskid surface and shall be drained in such a manner that wastewater from one bather will 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 two (2) percent toward drains. Drains in gutters shall be spaced not more than eight (8) feet (2438 mm) from sidewalls nor more than sixteen (16) feet (4879 mm) apart.

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

411.11 Water Supply Riser. Every water supply riser from the shower valve to the showerhead outlet, whether exposed or not, shall be securely attached to the structure.

413.0 Fixtures and Fixture Fittings for Persons with Disabilities.

Plumbing fixtures and fixture fittings for persons with disabilities shall conform to the appropriate standards referenced in Table 14-1 of this code.

413.1 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. The water heater thermostat shall not be considered a control for meeting this provision.

414.0 Bathtubs and Whirlpool Bathtubs.

Unless otherwise listed, all bathtubs and whirlpool bathtubs shall comply with the following requirements:

414.1 A removable panel shall be provided to access and remove the pump. Whirlpool pump access located in the crawl space shall be located no more than twenty (20) feet (6096 mm) from an access door, trap door, or crawl hole.

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

414.3 The pump and the circulation piping shall be



self-draining to minimize water retention in accordance with standards referenced in Table 14-1.

414.4 Suction fittings on whirlpool bathtubs shall comply with the listed standards.

414.5 Limitation of Hot Water in Bathtubs and Whirlpool Bathtubs. The maximum hot water temperature discharging from the bathtub and whirlpool bathtub filler shall be limited to 120°F. The water heater thermostat shall not be considered a control for meeting this provision.

mixed water setting of 120°F (49°C). The water heater thermostat shall not be considered a suitable control for meeting this provision.

415.0 Installation of Fixture Fittings.

Where two separate handles control the hot and cold water, the left-hand control of the faucet when facing the fixture fitting outlet shall provide the means to alter the hot water temperature from the fixture fitting.

Single-handle mixing valves shall have the flow of hot water correspond to the markings on the fitting.

416.0 Bidets.

416.1 Materials. Bidets shall conform to the standards listed in Table 14-1.

416.2 Backflow Protection. The water supply to the bidet shall be protected according to Chapter 6, which allows for an airgap or vacuum breaker.

417.0 Future Fixtures.

When provision is made for the future installation of fixtures, those provided for shall be considered in determining the required sizes of drain pipes. 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 may be installed, the plumbing system for such fixture shall be complete and conform with all plumbing requirements of this code.

418.0 Shower and Tub-Shower Combination Control Valves.

Showers and tub-shower combinations in all buildings 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. These valves shall conform to ASSE 1016. Gang showers, when supplied with a single temperature-controlled water supply pipe, may be controlled by a master thermostatic mixing valve in lieu of individually controlled pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valves. Handle position stops shall be provided on such valves and shall be adjusted per the manufacturer's instructions to deliver a maximum