

while permitting normal sewage or wastes to discharge into the drainage system by gravity.

## JOINT

**Expansion.** A loop, return bend or return offset that provides for the expansion and contraction in a piping system and is utilized in tall buildings or where there is a rapid change of temperature, as in power plants, steam rooms and similar occupancies.

**Flexible.** Any joint between two pipes that permits one pipe to be deflected or moved without movement or deflection of the other pipe.

**Mechanical.** See “Mechanical joint.”

**Slip.** A type of joint made by means of a washer or a special type of packing compound in which one pipe is slipped into the end of an adjacent pipe.

**LEAD-FREE PIPE AND FITTINGS.** Containing not more than 0.25-percent lead.

**LEAD-FREE SOLDER AND FLUX.** Containing not more than 0.2-percent lead.

**LEADER.** An exterior drainage pipe for conveying storm water from roof or gutter drains to an approved means of disposal.

**LOCAL VENT STACK.** A vertical pipe to which connections are made from the fixture side of traps and through which vapor or foul air is removed from the fixture or device utilized on bedpan washers.

**MACERATING TOILET SYSTEMS.** An assembly consisting of a water closet and sump with a macerating pump that is designed to collect, grind and pump wastes from the water closet and up to two other fixtures connected to the sump.

**MAIN.** The principal pipe artery to which branches are connected.

**MANIFOLD.** See “Plumbing appurtenance.”

**MECHANICAL JOINT.** A connection between pipes, fittings, or pipes and fittings that is not screwed, caulked, threaded, soldered, solvent cemented, brazed or welded. A joint in which compression is applied along the centerline of the pieces being joined. In some applications, the joint is part of a coupling, fitting or adapter.

**MEDICAL GAS SYSTEM.** The complete system to convey medical gases for direct patient application from central supply systems (bulk tanks, manifolds and medical air compressors), with pressure and operating controls, alarm warning systems, related components and piping networks extending to station outlet valves at patient use points.

**MEDICAL VACUUM SYSTEMS.** A system consisting of central-vacuum-producing equipment with pressure and operating controls, shutoff valves, alarm-warning systems, gauges and a network of piping extending to and terminating with suitable station inlets at locations where patient suction may be required.

**MINOR REPAIRS.** Minor repairs are defined to consist of fixing leaks and the clearing of stoppages in soil, waste, and supply lines; and restore defective valves, faucets and similar

appliances to an efficient operating condition by any method other than connecting or disconnecting from the water source of existing water/sewer/or natural gas system provided such repairs do not involve or require the replacement of new valves, pipes and fixtures. Such work shall be considered new work and shall require plumbing licenses and inspections other than the reinstallation of existing water closets.

**NONPOTABLE WATER.** Water not safe for drinking, personal or culinary utilization.

**NUISANCE.** Public nuisance as known in common law or in equity jurisprudence; whatever is dangerous to human life or detrimental to health; whatever structure or premises is not sufficiently ventilated, sewerred, drained, cleaned or lighted, with respect to its intended occupancy; and whatever renders the air, or human food, drink or water supply unwholesome.

**OCCUPANCY.** The purpose for which a building or portion thereof is utilized or occupied.

**OFFSET.** A combination of approved bends that makes two changes in direction bringing one section of the pipe out of line but into a line parallel with the other section.

**OPEN AIR.** Outside the structure.

**PLUMBING.** The practice, materials and fixtures utilized in the installation, maintenance, extension and alteration of all piping, fixtures, plumbing appliances and plumbing appurtenances, within or adjacent to any structure, in connection with sanitary drainage or storm drainage facilities; venting systems; and public or private water supply systems.

**PLUMBING APPLIANCE.** Any one of a special class of plumbing fixtures intended to perform a special function. Included are fixtures having the operation or control dependent on one or more energized components, such as motors, controls, heating elements, or pressure- or temperature-sensing elements.

Such fixtures are manually adjusted or controlled by the owner or operator, or are operated automatically through one or more of the following actions: a time cycle, a temperature range, a pressure range, a measured volume or weight.

**PLUMBING APPURTENANCE.** A manufactured device, prefabricated assembly or an on-the-job assembly of component parts that is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply and does not add any discharge load to a fixture or to the drainage system.

**PLUMBING FIXTURE.** A receptacle or device that is either permanently or temporarily connected to the water distribution system of the premises and demands a supply of water therefrom; discharges wastewater, liquid-borne waste materials or sewage either directly or indirectly to the drainage system of the premises; or requires both a water supply connection and a discharge to the drainage system of the premises.

**PLUMBING INSPECTOR.** Refer to Appendix H of this code.

**PLUMBING SYSTEM.** Includes the water supply and distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and sanitary

dance with the manufacturer's instructions. In-line thermostatic valves shall not be utilized for compliance with this section.

**424.4 Multiple (gang) showers.** Multiple (gang) showers supplied with a single-tempered water supply pipe shall have the water supply for such showers controlled by an approved automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016 or CSA B125 and is installed at the point of use. Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions.

**424.5 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 424.3.

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

**424.7 Temperature-actuated, flow reduction valves for individual fixture fittings.** 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 in Section 424.3.

**424.8 Transfer valves.** Deck-mounted bath/shower transfer valves containing an integral atmospheric vacuum breaker shall conform to the requirements of ASME A112.18.7.

## SECTION 425

### FLUSHING DEVICES FOR WATER CLOSETS AND URINALS

**425.1 Flushing devices required.** Each water closet, urinal, clinical sink and any plumbing fixture that depends on trap siphonage to discharge the fixture contents to the drainage system shall be provided with a flushometer valve, flushometer tank or a flush tank designed and installed to supply water in quantity and rate of flow to flush the contents of the fixture, cleanse the fixture and refill the fixture trap.

**425.1.1 Separate for each fixture.** A flushing device shall not serve more than one fixture.

**425.2 Flushometer valves and tanks.** Flushometer valves and tanks shall comply with ASSE 1037. Vacuum breakers on flushometer valves shall conform to the performance requirements of ASSE 1001 or CSA B64.1.1. Access shall be provided to vacuum breakers. Flushometer valves shall be of the

water-conservation type and shall not be utilized where the water pressure is lower than the minimum required for normal operation. When operated, the valve shall automatically complete the cycle of operation, opening fully and closing positively under the water supply pressure. Each flushometer valve shall be provided with a means for regulating the flow through the valve. The trap seal to the fixture shall be automatically refilled after each valve flushing cycle.

**425.3 Flush tanks.** Flush tanks equipped for manual flushing shall be controlled by a device designed to refill the tank after each discharge and to shut off completely the water flow to the tank when the tank is filled to operational capacity. The trap seal to the fixture shall be automatically refilled after each flushing. The water supply to flush tanks equipped for automatic flushing shall be controlled with a timing device or sensor control devices.

**425.3.1 Fill valves.** All flush tanks shall be equipped with an antisiphon fill valve conforming to ASSE 1002 or CSA B125. The fill valve backflow preventer shall be located at least 1 inch (25 mm) above the full opening of the overflow pipe.

**425.3.2 Overflows in flush tanks.** Flush tanks shall be provided with overflows discharging to the water closet or urinal connected thereto and shall be sized to prevent flooding the tank at the maximum rate at which the tanks are supplied with water according to the manufacturer's design conditions. The opening of the overflow pipe shall be located above the flood level rim of the water closet or urinal or above a secondary overflow in the flush tank.

**425.3.3 Sheet copper.** Sheet copper utilized for flush tank linings shall conform to ASTM B 152 and shall not weigh less than 10 ounces per square foot (0.03 kg/m<sup>2</sup>).

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

**425.4 Flush pipes and fittings.** Flush pipes and fittings shall be of nonferrous material and shall conform to ASME A112.19.5 or CSA B125.

## SECTION 426

### MANUAL FOOD AND BEVERAGE DISPENSING EQUIPMENT

**426.1 Approval.** Manual food and beverage dispensing equipment shall conform to the requirements of NSF 18.

## SECTION 427

### FLOOR SINKS

**427.1 Approval.** Sanitary floor sinks shall conform to the requirements of ASME A112.6.7.

**605.2 Lead content of water supply pipe and fittings.** Pipe and pipe fittings, including valves and faucets, utilized in the water supply system shall have a maximum of 0.25-percent lead content.

**605.3 Water service pipe.** Water service pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.3. All water service pipe or tubing, installed underground and outside of the structure, shall have a minimum working pressure rating of 160 psi (1100 kPa) at 73.4°F (23°C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a minimum rated working pressure equal to the highest available pressure. Plastic water service pipe shall terminate no closer than 30 inches (762 mm) outside of an exterior wall or slab on grade. All ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104.

**605.3.1 Dual check-valve-type backflow preventer.** Where a dual check-valve backflow preventer is installed on the water supply system, it shall comply with ASSE 1024 or CSA B64.6.

**605.4 Water distribution pipe.** Water distribution pipe shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.4. All hot water distribution pipe and tubing shall have a minimum pressure rating of 100 psi (690 kPa) at 180°F (82°C).

**605.5 Fittings.** Pipe fittings shall be approved for installation with the piping material installed and shall conform to the

respective pipe standards or one of the standards listed in Table 605.5. All pipe fittings utilized in water supply systems shall also conform to NSF 61. The fittings shall not have ledges, shoulders or reductions capable of retarding or obstructing flow in the piping. Ductile and gray iron pipe fittings shall be cement mortar lined in accordance with AWWA C104.

**605.5.1 Mechanically formed tee fittings.** Mechanically extracted outlets shall have a height not less than three times the thickness of the branch tube wall.

**605.5.1.1 Full flow assurance.** Branch tubes shall not restrict the flow in the run tube. A dimple/depth stop shall be formed in the branch tube to ensure that penetration into the collar is of the correct depth. For inspection purposes, a second dimple shall be placed 0.25 inch (6.4 mm) above the first dimple. Dimples shall be aligned with the tube run.

**605.5.1.2 Brazed joints.** Mechanically formed tee fittings shall be brazed in accordance with Section 605.14.1.

**605.6 Flexible water connectors.** Flexible water connectors exposed to continuous pressure shall conform to ASME A112.18.6. Access shall be provided to all flexible water connectors.

**605.7 Valves.** All valves shall be of an approved type and compatible with the type of piping material installed in the system. Ball valves, gate valves, globe valves and plug valves intended

**TABLE 605.3  
WATER SERVICE PIPE**

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 1527; ASTM D 2282
Asbestos-cement pipe	ASTM C 296
Brass pipe	ASTM B 43
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D 2846; ASTM F 441; ASTM F 442; CSA B137.6
Copper or copper-alloy pipe	ASTM B 42; ASTM B 302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM) <sup>a</sup>	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F 876; ASTM F 877; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F 1281; CSA B137.10M
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F 1986
Ductile iron water pipe	AWWA C151; AWWA C115
Galvanized steel pipe	ASTM A 53
Polybutylene (PB) plastic pipe and tubing	ASTM D 2662; ASTM D 2666; ASTM D 3309; CSA B137.8M
Polyethylene (PE) plastic pipe	ASTM D 2239; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D 2737; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F 1282; CSA B137.9
Polypropylene (PP) plastic pipe or tubing	ASTM F 2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D 1785; ASTM D 2241; ASTM D 2672; CSA B137.3
Stainless steel pipe (Type 304/304L)	ASTM A 312; ASTM A 778
Stainless steel pipe (Type 316/316L)	ASTM A 312; ASTM A 778

a. M or WM shall not be installed below concrete.

- d) The Testing Technician shall be equipped with and be competent to use all necessary tools, and other equipment necessary to test properly backflow prevention assemblies to determine that the assemblies are functioning properly.
- e) Testing and/or Repair Technician certification shall be current in accordance with the educational and/or training requirements of the State Administrative Authority. The testing equipment being used is acceptable to the State Administrative Authority, and is in proper operating condition and calibration. The Certified Testing Technician shall be equipped with, and be competent to use, all necessary tools, gauges, and other equipment necessary to test properly backflow prevention assemblies to determine if the assemblies are functioning properly.
- f) A Repair Technician shall be responsible for all repairs performed on an assembly. An Arkansas Plumbers license shall be required in addition to the Assembly Repair Training when repairing backflow prevention assemblies within the scope of the plumbing system.

**Exception:** An additional Arkansas Plumbers License is not required if the Repair Technician holds a repair certificate of competency from the Department of Health Plumbing and Natural Gas Program for Repair Technician.

Other professionally licensed technicians may be authorized to repair backflow assemblies within their special jurisdiction if properly certified and it is determined to be necessary to meet the intent of this code by the administrative authority. Example: A professional fire sprinkler installer who meets all requirements except a plumbing license may be certified to repair assemblies on fire sprinkler systems only.

- g) Cross-connection control survey standards shall be administered in accordance with the minimum requirements set forth by the Cross Connection Survey Program.

ted components shall be used to determine compliance with 605.2 and 615.1. For lead content of materials that are provided as a range, the maximum content of the range shall be used.

**615.3. Exemptions.** The prohibitions in 605.2 and this section shall not apply to pipes, pipe fittings, plumbing fittings, or fixtures, including backflow preventers, that are used exclusively for nonpotable services such as manufacturing, industrial processing, irrigation, outdoor watering, toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves or any other uses where the water is not anticipated to be used for human consumption.

## SECTION 615 LEAD FREE REQUIREMENTS

**615.1. Lead content of water supply pipe and fittings.** Pipe and pipe fittings, including valves and faucets, utilized in the plumbing water supply system shall have a maximum of 0.25 percent lead content when used with respect to the wetted surfaces of pipe, pipe fittings, plumbing fittings, and fixtures.

**615.2. Calculations.** The weighted average lead content of a pipe, pipe fitting, plumbing fitting, or fixture shall be calculated by using the following formula: For each wetted component, the percentage of lead in the component shall be multiplied by the ratio of the wetted surface area of that component to the total wetted surface area of the entire product to arrive at the weighted percentage of lead of the component. The weighted percentage of lead of each wetted component shall be added together, and the sum of these weighted percentages shall constitute the weighted average lead content of the product. The lead content of the material used to produce wet-