

**2006**

# **ARKANSAS PLUMBING CODE**

**SUPPLEMENT – SEPTEMBER 2008**

**Based on the 2006  
International Plumbing Code®**



## CHAPTER 3

# GENERAL REGULATIONS

### SECTION 301 GENERAL

**301.1 Scope.** The provisions of this chapter shall govern the general regulations regarding the installation of plumbing not specific to other chapters.

**301.2 System installation.** Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls and other surfaces through fixture usage.

**301.3 Connections to the sanitary drainage system.** All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code or a Health-Department-approved disposal system. This section shall not be construed to prevent the indirect waste systems required by Chapter 8.

**301.4 Connections to water supply.** All premises intended for human habitation, occupancy, or use shall be provided with a supply of potable water, neither connected with unsafe water supplies not subject to the hazards of backflow or backsiphonage. Every plumbing fixture, device or appliance requiring or using water for its proper operation shall be directly or indirectly connected to the water supply system in accordance with the provisions of this code.

**301.5 Pipe, tube and fitting sizes.** Unless otherwise specified, the pipe, tube and fitting sizes specified in this code are expressed in nominal or standard sizes as designated in the referenced material standards.

**301.6 Prohibited locations.** Plumbing systems shall not be located in an elevator shaft or in an elevator equipment room.

**Exception:** Floor drains, sumps and sump pumps shall be permitted at the base of the shaft provided they are indirectly connected to the plumbing system.

**301.7 Conflicts.** Where conflicts between this code and the conditions of the listing or the manufacturer's installation instructions occur, the provisions of this code apply.

**Exception:** Where a code provision is less restrictive than the conditions of the listing of the equipment or appliance or the manufacturer's installation instructions, the conditions of the listing and manufacturer's installation instructions shall apply.

### SECTION 302 EXCLUSION OF MATERIALS DETRIMENTAL TO THE SEWER SYSTEM

**302.1 Detrimental or dangerous materials.** Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing,

damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment processes, shall not be deposited, by any means, into such systems.

**302.2 Industrial wastes.** Waste products from manufacturing or industrial operations shall not be introduced into the public sewer until it has been determined by the code official or other authority having jurisdiction that the introduction thereof will not damage the public sewer system or interfere with the functioning of the sewage treatment plant.

### SECTION 303 MATERIALS

**303.1 Identification.** Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer.

**303.2 Installation of materials.** All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

**303.3 Plastic pipe, fittings and components.** All plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

**303.4 Third-party testing and certification.** All plumbing products and materials shall comply with the referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 303.1. When required by Table 303.4, plumbing products and materials shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.

### SECTION 304 RODENTPROOFING

**304.1 General.** Plumbing systems shall be designed and installed in accordance with Sections 304.2 through 304.4 to prevent rodents from entering structures.

**304.2 Strainer plates.** All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than 0.5 inch (12.7 mm) in least dimension.

**304.3 Meter boxes.** Meter boxes shall be constructed in such a manner that rodents are prevented from entering a structure by way of the water service pipes connecting the meter box and the structure.

**TABLE 303.4  
PRODUCTS AND MATERIALS REQUIRING THIRD-PARTY TESTING AND THIRD-PARTY CERTIFICATION**

PRODUCT OR MATERIAL	THIRD-PARTY CERTIFIED	THIRD-PARTY TESTED
Portable water supply system components and potable water fixture fittings	Required	—
Sanitary drainage and vent system components	Plastic pipe, fittings and pipe-related components	All others
Waste fixture fittings	Plastic pipe, fittings and pipe-related components	All others
Storm drainage system components	Plastic pipe, fittings and pipe-related components	All others
Plumbing fixtures	—	Required
Plumbing appliances	Required	—
Backflow prevention devices	Required	—
Water distribution system safety devices	Required	—
Special waste system components	—	Required
Subsoil drainage system components	—	Required

**304.4 Openings for pipes.** In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars that are securely fastened to the adjoining structure.

**SECTION 305  
PROTECTION OF PIPES AND  
PLUMBING SYSTEM COMPONENTS**

**305.1 Corrosion.** Pipes passing under and/or through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for expansion and contraction of piping to prevent any rubbing action. Minimum wall thickness of material shall be 0.025 inch (0.64 mm).

**305.2 Breakage.** Pipes passing through or under walls shall be protected from breakage.

**305.3 Stress and strain.** Piping in a plumbing system shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement.

**305.4 Sleeves.** Annular spaces between sleeves and pipes shall be filled or tightly caulked in an approved manner. Annular spaces between sleeves and pipes in fire-resistance-rated assemblies shall be filled or tightly caulked in accordance with this code and the *Arkansas Fire Prevention Code*.

**305.5 Pipes through or under footings or foundation walls.** Any pipe that passes under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall.

**305.5.1 PEX and or CPVC.** PEX or CPVC installed for the purpose of water distribution piping shall not be required to

be sleeved under slab unless otherwise required by the manufacturer’s instructions.

**305.6 Freezing.** Water, soil and waste pipes shall not be installed outside of a building, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperature unless adequate provision is made to protect such pipes from freezing by insulation or heat or both. Tub valves, tub and shower valves or shower valves shall not be installed in outside walls. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade. Frost resistant automatic draining type wall hydrants with high or low hazard vacuum breakers is required for all outside walls or in other places subject to freezing.

**305.7 Waterproofing of openings.** Joints at the roof and around vent pipes, shall be made water tight by the use of lead, copper, galvanized steel, aluminum, plastic or other approved flashings or flashing material. Exterior wall openings shall be made water tight.

**305.8 Protection against physical damage.** In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1.5 inches (38 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective shield plates shall be a minimum of 0.062-inch-thick (1.6 mm) steel, shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

**305.9 Protection of components of plumbing system.** Components of a plumbing system installed along alleyways, driveways, parking garages or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.

less than 6 inches (152 mm) above the roof or roof drain; floor or floor drain; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by 0.25-inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed so as not to freeze on roof walks.

**TABLE 606.5.4  
SIZES FOR OVERFLOW PIPES FOR WATER SUPPLY TANKS**

MAXIMUM CAPACITY OF WATER SUPPLY LINE TO TANK (gpm)	DIAMETER OF OVERFLOW PIPE (inches)
0 - 50	2
50 - 150	2½
150 - 200	3
200 - 400	4
400 - 700	5
700 - 1,000	6
Over 1,000	8

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m.

**606.5.5 Low-pressure cutoff required on booster pumps.**

A low-pressure cutoff shall be installed on all booster pumps in a water pressure booster system to prevent creation of a vacuum or negative pressure on the suction side of the pump when a positive pressure of 10 psi (68.94 kPa) or less occurs on the suction side of the pump.

**606.5.6 Potable water inlet control and location.** Potable water inlets to gravity tanks shall be controlled by a fill valve or other automatic supply valve installed so as to prevent the tank from overflowing. The inlet shall be terminated so as to provide an air gap not less than 4 inches (102 mm) above the overflow.

**606.5.7 Tank drain pipes.** A valved pipe shall be provided at the lowest point of each tank to permit emptying of the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table 606.5.7.

**TABLE 606.5.7  
SIZE OF DRAIN PIPES FOR WATER TANKS**

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1½
1,501 to 3,000	2
3,001 to 5,000	2½
5,000 to 7,500	3
Over 7,500	4

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L.

**606.5.8 Prohibited location of potable supply tanks.** Potable water gravity tanks or manholes of potable water

pressure tanks shall not be located directly under any soil or waste piping or any source of contamination.

**606.5.9 Pressure tanks, vacuum relief.** All water pressure tanks shall be provided with a vacuum relief valve at the top of the tank that will operate up to a maximum water pressure of 200 psi (1380 kPa) and up to a maximum temperature of 200°F (93°C). The minimum size of such vacuum relief valve shall be 0.50 inch (12.7 mm).

**Exception:** This section shall not apply to pressurized captive air diaphragm/bladder tanks.

**606.5.10 Pressure relief for tanks.** Every pressure tank in a hydropneumatic pressure booster system shall be protected with a pressure relief valve. The pressure relief valve shall be set at a maximum pressure equal to the rating of the tank. The relief valve shall be installed on the supply pipe to the tank or on the tank. The relief valve shall discharge by gravity to a safe place of disposal.

**606.6 Water supply system test.** Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested in accordance with Section 312.

**SECTION 607  
HOT WATER SUPPLY SYSTEM**

**607.1 Where required.** In residential occupancies, hot water shall be supplied to all plumbing fixtures and equipment utilized for bathing, washing, culinary purposes, cleansing, laundry or building maintenance. In nonresidential occupancies, hot water shall be supplied for culinary purposes, cleansing, laundry or building maintenance purposes. In nonresidential occupancies, hot water or tempered water shall be supplied for bathing and washing purposes. Tempered water shall be supplied through a water temperature limiting device that conforms to ASSE 1070 and shall limit the tempered water to a maximum of 110°F (43°C). This provision shall not supersede the requirement for protective shower valves in accordance with Section 424.3.

**607.2 Hot water supply temperature maintenance.** Where the developed length of hot water piping from the source of hot water supply to the farthest fixture exceeds 100 feet (30 480 mm), the hot water supply system shall be provided with a method of maintaining the temperature in accordance with the *Arkansas Energy Conservation Code*.

**607.2.1 Piping insulation.** Circulating hot water system piping shall be insulated in accordance with the *Arkansas Energy Conservation Code*.

**[E] 607.2.2 Hot water system controls.** Automatic circulating hot water system pumps or heat trace shall be arranged to be conveniently turned off, automatically or manually, when the hot water system is not in operation.

**607.2.3 Recirculating pump.** Where a thermostatic mixing valve is used in a system with a hot water recirculating pump, the hot water or tempered water return line shall be routed to the cold water inlet pipe of the water heater and the cold water inlet pipe or the hot water return connection of the thermostatic mixing valve.

**607.3 Thermal expansion control.** A means of controlling increased pressure caused by thermal expansion shall be provided where required in accordance with Sections 607.3.1 and 607.3.2.

**607.3.1 Pressure-reducing valve.** For water service system sizes up to and including 2 inches (51 mm), a device for controlling pressure shall be installed where, because of thermal expansion, the pressure on the downstream side of a pressure-reducing valve exceeds the pressure-reducing valve setting.

**607.3.2 Backflow prevention device or check valve.** Where a backflow prevention device, check valve or other device is installed on a water supply system utilizing storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.

**607.4 Flow of hot water to fixtures.** Fixture fittings, faucets and diverters shall be installed and adjusted so that the flow of hot water from the fittings corresponds to the left-hand side of the fixture fitting.

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

**607.5 Hot to dishwashing machines.** Dishwashing machines, or similar dishwashing equipment not in private living quarters or dwelling units, shall be provided with water at 180° F (82° C) and not more than 194° F (90° C).

**SECTION 608**

**PROTECTION OF POTABLE WATER SUPPLY**

**608.1 General.** A potable water supply system shall be designed, installed and maintained in such a manner so as to prevent contamination from nonpotable liquids, solids or gases being introduced into the potable water supply through cross-connections or any other piping connections to the system. Backflow preventer applications shall conform to Table 608.1, except as specifically stated in Sections 608.2 through 608.16.10.

**608.2 Plumbing fixtures.** The supply lines and fittings for every plumbing fixture shall be installed so as to prevent backflow. Plumbing fixture fittings shall provide backflow protection in accordance with ASME A112.18.1.

**608.3 Devices, appurtenances, appliances and apparatus.** All devices, appurtenances, appliances and apparatus intended to serve some special function, such as sterilization, distillation, processing, cooling, or storage of ice or foods, and that connect to the water supply system, shall be provided with protection against backflow and contamination of the water supply system. Water pumps, filters, softeners, tanks and all other appliances and devices that handle or treat potable water shall be protected against contamination.

**608.3.1 Special equipment, water supply protection.** The water supply for hospital fixtures shall be protected against

backflow with a reduced pressure principle backflow preventer, an atmospheric or spill-proof vacuum breaker, or an air gap. Vacuum breakers for bedpan washer hoses shall not be located less than 5 feet (1524 mm) above the floor. Vacuum breakers for hose connections in health care or laboratory areas shall not be less than 6 feet (1829 mm) above the floor.

**608.4 Water service piping.** Water service piping shall be protected in accordance with Sections 603.2 and 603.2.1.

**608.5 Chemicals and other substances.** Chemicals and other substances that produce either toxic conditions, taste, odor or discoloration in a potable water system shall not be introduced into, or utilized in, such systems.

**608.6 Cross-connection control.** Cross connections shall be prohibited, except where approved protective devices are installed.

**608.6.1 Private water supplies.** Cross connections between a private water supply and a potable public supply shall be prohibited.

**608.7 Stop-and-waste valves prohibited.** Combination stop-and-waste valves or cocks shall not be installed underground.

**608.8 Identification of potable and nonpotable water.** In all buildings where two or more water distribution systems, one potable water and the other nonpotable water, are installed, each system shall be identified either by color marking or metal tags in accordance with Sections 608.8.1 through 608.8.3.

**608.8.1 Information.** Pipe identification shall include the contents of the piping system and an arrow indicating the direction of flow. Hazardous piping systems shall also contain information addressing the nature of the hazard. Pipe identification shall be repeated at maximum intervals of 25 feet (7620 mm) and at each point where the piping passes through a wall, floor or roof. Lettering shall be readily observable within the room or space where the piping is located.

**608.8.2 Color.** The color of the pipe identification shall be discernable and consistent throughout the building.

**608.8.3 Size.** The size of the background color field and lettering shall comply with Table 608.8.3.

**TABLE 608.8.3  
SIZE OF PIPE IDENTIFICATION**

PIPE DIAMETER (inches)	LENGTH BACKGROUND COLOR FIELD (inches)	SIZE OF LETTERS (inches)
3/4 to 1 1/4	8	0.5
1 1/2 to 2	8	0.75
2 1/2 to 6	12	1.25
8 to 10	24	2.5
over 10	32	3.5

For SI: 1 inch = 25.4 mm.

**TABLE 608.1  
APPLICATION OF BACKFLOW PREVENTERS**

DEVICE	DEGREE OF HAZARD <sup>a</sup>	APPLICATION <sup>b</sup>	APPLICABLE STANDARDS
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002, CSA B125
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/8"	ASSE 1022, CSA B64.3.1
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 3/4"	ASSE 1012, CSA B64.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.13.4)
Double check backflow prevention assembly and double check fire protection backflow prevention assembly	Low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1015, AWWA C510, CSA B64.5, CSA B64.5.1
Double check detector fire protection backflow prevention assemblies	Low hazard	Backpressure or backsiphonage (Fire sprinkler systems) Sizes 2" - 16"	ASSE 1048
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes 1/4" - 1"	ASSE 1024, CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes 1/2" - 1"	ASSE 1052, CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes 1/2", 3/4", 1"	ASSE 1011, CSA B64.2, CSA B64.2.1
Laboratory faucet backflow preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035, CSA B64.7
Pipe-applied atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/4" - 4"	ASSE 1001, CSA B64.1.1
Pressure vacuum breaker assembly	High or low hazard	Backsiphonage only Sizes 1/2" - 2"	ASSE 1020, CSA B64.1.2
Reduced pressure principle backflow preventer and reduced pressure principle fire protection backflow preventer	High or low hazard	Backpressure or backsiphonage Sizes 3/8" - 16"	ASSE 1013, AWWA C511, CSA B64.4, CSA B64.4.1
Reduced pressure detector fire protection backflow prevention assemblies	High or low hazard	Backsiphonage or backpressure (Fire sprinkler systems)	ASSE 1047
Spillproof vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/4" - 2"	ASSE 1056
Vacuum breaker wall hydrants, frost-resistant, automatic draining type	High or low hazard	Low head backpressure or backsiphonage Sizes 3/4", 1"	ASSE 1019, CSA B64.2.2

For SI: 1 inch = 25.4 mm.

- a. Low hazard—See Pollution (Section 202).  
High hazard—See Contamination (Section 202).
- b. See Backpressure (Section 202).  
See Backpressure, low head (Section 202).  
See Backsiphonage (Section 202).

**608.9 Reutilization prohibited.** Water utilized for the cooling of equipment or other processes shall not be returned to the potable water system. Such water shall be discharged into a drainage system through an air gap or shall be utilized for non-potable purposes.

**608.10 Reuse of piping.** Piping that has been utilized for any purpose other than conveying potable water shall not be utilized for conveying potable water.

**608.11 Painting of water tanks.** The interior surface of a potable water tank shall not be lined, painted or repaired with any material that changes the taste, odor, color or potability of the water supply when the tank is placed in, or returned to, service.

**608.12 Pumps and other appliances.** Water pumps, filters, softeners, tanks and all other devices that handle or treat potable water shall be protected against contamination.

**608.13 Backflow protection.** Means of protection against backflow shall be provided in accordance with Sections 608.13.1 through 608.13.9.

**608.13.1 Air gap.** The minimum required air gap shall be measured vertically from the lowest end of a potable water outlet to the flood level rim of the fixture or receptacle into which such potable water outlet discharges. Air gaps shall comply with ASME A112.1.2 and air gap fittings shall comply with ASME A112.1.3.

**608.13.2 Reduced pressure principle backflow preventers.** Reduced pressure principle backflow preventers shall conform to ASSE 1013, AWWA C511 or CAN/CSA-B64.3. Reduced pressure detector assembly backflow preventers shall conform to ASSE 1047. These devices shall be permitted to be installed where subject to continuous pressure conditions. The relief opening shall discharge by air gap and shall be prevented from being submerged.

**608.13.3 Backflow preventer with intermediate atmospheric vent.** Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012 or CAN/CSA-B64.3. These devices shall be permitted to be installed where subject to continuous pressure conditions. The relief opening shall discharge by air gap and shall be prevented from being submerged.

**608.13.4 Barometric loop.** Barometric loops shall precede the point of connection and shall extend vertically to a height of 35 feet (10 668 mm). A barometric loop shall only be utilized as an atmospheric-type or pressure-type vacuum breaker.

**608.13.5 Pressure-type vacuum breakers.** Pressure-type vacuum breakers shall conform to ASSE 1020 and spillproof vacuum breakers shall comply with ASSE 1056. These devices are designed for installation under continuous pressure conditions when the critical level is installed at the required height. Pressure-type vacuum breakers shall not be installed in locations where spillage could cause damage to the structure.

**608.13.6 Atmospheric-type vacuum breakers.** Pipe-applied atmospheric-type vacuum breakers shall conform to ASSE 1001 or CAN/CSA-B64.1.1. Hose-connec-

tion vacuum breakers shall conform to ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CAN/CSA-B64.2, CAN/CSA-B64.2.2 or CSA B64.7. These devices shall operate under normal atmospheric pressure when the critical level is installed at the required height.

**608.13.7 Double check-valve assemblies.** Double check-valve assemblies shall conform to ASSE 1015 or AWWA C510. Double-detector check-valve assemblies shall conform to ASSE 1048. These devices shall be capable of operating under continuous pressure conditions.

**608.13.8 Spillproof vacuum breakers.** Spillproof vacuum breakers (SVB) shall conform to ASSE 1056. These devices are designed for installation under continuous-pressure conditions when the critical level is installed at the required height.

**608.13.9 Chemical dispenser backflow devices.** Backflow devices for chemical dispensers shall comply with ASSE 1055 or shall be equipped with an air gap fitting.

**608.14 Location of backflow preventers.** Access shall be provided to backflow preventers as specified by the installation instructions of the approved manufacturer.

**608.14.1 Outdoor enclosures for backflow prevention devices.** Outdoor enclosures for backflow prevention devices shall comply with ASSE 1060.

**608.15 Protection of potable water outlets.** All potable water openings and outlets shall be protected against backflow in accordance with Section 608.15.1, 608.15.2, 608.15.3, 608.15.4, 608.15.4.1, 608.15.4.2 or 608.15.4.3.

**608.15.1 Protection by air gap.** Openings and outlets shall be protected by an air gap between the opening and the fixture flood level rim as specified in Table 608.15.1. Openings and outlets equipped for hose connection shall be protected by means other than an air gap.

**608.15.2 Protection by a reduced pressure principle backflow preventer.** Openings and outlets shall be protected by a reduced pressure principle backflow preventer.

**608.15.3 Protection by a backflow preventer with intermediate atmospheric vent.** Openings and outlets shall be protected by a backflow preventer with an intermediate atmospheric vent.

**608.15.4 Protection by a vacuum breaker.** Openings and outlets shall be protected by atmospheric-type or pressure-type vacuum breakers. The critical level of the vacuum breaker shall be set a minimum of 6 inches (152 mm) above the flood level rim of the fixture or device. Fill valves shall be set in accordance with Section 425.3.1. Vacuum breakers shall not be installed under exhaust hoods or similar locations that will contain toxic fumes or vapors. Pipe-applied vacuum breakers shall be installed not less than 6 inches (152 mm) above the flood level rim of the fixture, receptor or device served.

**608.15.4.1 Deck-mounted and integral vacuum breakers.** Approved deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric or spillproof vacuum breakers shall be installed in accordance with the manufacturer's instructions and the

**TABLE 608.15.1  
MINIMUM REQUIRED AIR GAPS**

FIXTURE	MINIMUM AIR GAP	
	Away from a wall <sup>a</sup> (inches)	Close to a wall (inches)
Lavatories and other fixtures with effective opening not greater than 1/2 inch in diameter	1	1 1/2
Sink, laundry trays, gooseneck back faucets and other fixtures with effective openings not greater than 3/4 inch in diameter	1.5	2.5
Over-rim bath fillers and other fixtures with effective openings not greater than 1 inch in diameter	2	3
Drinking water fountains, single orifice not greater than 7/16 inch in diameter or multiple orifices with a total area of 0.150 square inch (area of circle 7/16 inch in diameter)	1	1 1/2
Effective openings greater than 1 inch	Two times the diameter of the effective opening	Three times the diameter of the effective opening

For SI: 1 inch = 25.4 mm.

a. Applicable where walls or obstructions are spaced from the nearest inside-edge of the spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.

requirements for labeling with the critical level not less than 1 inch (25 mm) above the flood level rim.

**608.15.4.2 Hose connections.** Sillcocks, hose bibbs, wall hydrants and other openings with a hose connection shall be protected by an atmospheric-type or pressure-type vacuum breaker or a permanently attached hose connection vacuum breaker.

**Exceptions:**

1. This section shall not apply to water heater and boiler drain valves that are provided with hose connection threads and that are intended only for tank or vessel draining.
2. This section shall not apply to water supply valves intended for connection of clothes washing machines where backflow prevention is otherwise provided or is integral with the machine.

**608.16 Connections to the potable water system.** Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.9.

**608.16.1 Beverage dispensers.** The water supply connection to carbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap. The backflow preventer device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

**608.16.2 Connections to boilers.** The potable supply to the boiler shall be equipped with a backflow preventer with an intermediate atmospheric vent complying with ASSE 1012 or CAN/CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer, complying with ASSE 1013, CAN/CSA B64.4 or AWWA C511.

**608.16.3 Heat exchangers.** Heat exchangers utilizing an essentially toxic transfer fluid shall be separated from the

potable water by double-wall construction. An air gap open to the atmosphere shall be provided between the two walls. Heat exchangers utilizing an essentially nontoxic transfer fluid shall be permitted to be of single-wall construction.

**608.16.4 Additives or nonpotable source.** Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer. Where chemical additives or antifreeze are added to only a portion of an automatic fire sprinkler or standpipe system, the reduced pressure principle backflow preventer shall be permitted to be located so as to isolate that portion of the system. Where systems are not under continuous pressure, the potable water supply shall be protected against backflow by an air gap or a pipe applied atmospheric vacuum breaker conforming to ASSE 1001 or CAN/CSA B64.1.1.

**608.16.5 Connections to lawn irrigation systems.** The potable water supply to lawn irrigation systems shall be protected against backflow by an atmospheric-type vacuum breaker, a pressure-type vacuum breaker or a reduced pressure principle backflow preventer. A valve shall not be installed downstream from an atmospheric vacuum breaker. Where chemicals are introduced into the system, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer.

**608.16.6 Connections subject to backpressure.** Where a potable water connection is made to a nonpotable line, fixture, tank, vat, pump or other equipment subject to back-pressure, the potable water connection shall be protected by a reduced pressure principle backflow preventer.

**608.16.7 Chemical dispensers.** Where chemical dispensers connect to the potable water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.5, 608.13.6, 608.13.8 or 608.13.9.



**608.16.8 Portable cleaning equipment.** Where the portable cleaning equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.3, 608.13.7 or 608.13.8.

**608.16.9 Dental pump equipment.** Where dental pumping equipment connects to the water distribution system, the water supply system shall be protected against backflow in accordance with Section 608.13.1, 608.13.2, 608.13.5, 608.13.6 or 608.13.8.

**608.16.10 Coffee machines and noncarbonated beverage dispensers.** The water supply connection to coffee machines and noncarbonated beverage dispensers shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap.

**608.17 Protection of individual water supplies.** An individual water supply shall be located and constructed so as to be safeguarded against contamination in accordance with the *Arkansas Water Well Construction Commission, the Arkansas Department of Health Division of Engineering and the Arkansas Department of Health Environmental Health Protection program.*

### SECTION 609 HEALTH CARE PLUMBING

**609.1 Scope.** This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to this code the *Arkansas Mechanical Code* and the Rules and Regulations to health care facilities licensed under Act-414, 1961, as amended, and administered by the *Arkansas Department of Health, Division of Health Care Facilities.*

### SECTION 610 DISINFECTION OF POTABLE WATER SYSTEM

**610.1 General.** New or repaired potable water systems shall be purged of deleterious matter and disinfected prior to utilization. The method to be followed shall be that prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section. This requirement shall apply to “on-site” or “in-plant” fabrication of a system or to a modular portion of a system.

1. The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.
2. The system or part thereof shall be filled with a water/chlorine solution containing at least 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing at least 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.

3. Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
4. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

### SECTION 611 DRINKING WATER TREATMENT UNITS

**611.1 Design.** Drinking water treatment units shall meet the requirements of NSF 42, NSF 44, NSF 53 or NSF 62.

**611.2 Reverse osmosis systems.** The discharge from a reverse osmosis drinking water treatment unit shall enter the drainage system through an air gap or an air gap device that meets the requirements of NSF 58.

**611.3 Connection tubing.** The tubing to and from drinking water treatment units shall be of a size and material as recommended by the manufacturer. The tubing shall comply with NSF 14, NSF 42, NSF 44, NSF 53, NSF 58 or NSF 61.

### SECTION 612 SOLAR SYSTEMS

**612.1 Solar systems.** The construction, installation, alterations and repair of systems, equipment and appliances intended to utilize solar energy for space heating or cooling, domestic hot water heating, swimming pool heating or process heating shall be in accordance with this code, the *Arkansas Gas Code* and the *Arkansas Mechanical Code.*

### SECTION 613 TEMPERATURE CONTROL DEVICES AND VALVES

**613.1 Temperature-actuated mixing valves.** Temperature-actuated mixing valves, which are installed to reduce water temperatures to defined limits, shall comply with ASSE 1017.

### SECTION 614 TESTING AND REPAIR

**614.1 Backflow Assembly Testing and Repair Programs.** It is required that all backflow programs that certify backflow tester technicians and repair technicians have their teaching instructors re-certify every 5 years for testing and repair. It is the responsibility of the testing program to provide documentation of proof of re-certification for their program instructors to the Arkansas Department of Health and Human Services plumbing and natural gas program.

- a) A Testing Technician or Repair Technician is any person meeting all applicable licensing and/or certification requirements of the State Administrative Authority.
- b) Testing of backflow and backpressure devices shall be done by a Testing Technician who will be responsible for the competence and accuracy of all test reports.

- c) A Testing Technician shall perform all tests of the mechanical devices/assemblies and be responsible for the competence and accuracy of all test and reports.
- 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.

the connection to the double sanitary tee pattern is 18 inches (457 mm) or greater.

**TABLE 706.3  
FITTINGS FOR CHANGE IN DIRECTION**

TYPE OF FITTING PATTERN	CHANGE IN DIRECTION		
	Horizontal to vertical	Vertical to horizontal	Horizontal to horizontal
Sixteenth bend	X	X	X
Eighth bend	X	X	X
Sixth bend	X	X	X
Quarter bend	X	X <sup>a</sup>	X <sup>a</sup>
Short sweep	X	X <sup>a,b</sup>	X <sup>a</sup>
Long sweep	X	X	X
Sanitary tee <sup>d</sup>	X <sup>c</sup>	—	—
Wye	X	X	X
Combination wye and eighth bend	X	X	X

For SI: 1 inch = 25.4 mm.

- a. The fittings shall only be permitted for a 2-inch or smaller fixture drain.
- b. Three inches or larger.
- c. For a limitation on double sanitary tees, see Section 706.3.
- d. Sanitary tees may be used in a horizontal position for lavatories and sinks.

**706.4 Heel- or side-inlet quarter bends.** Heel-inlet quarter bends shall be an acceptable means of connection, except where the quarter bend serves a water closet. A low-heel inlet shall not be used as a wet-vented connection. Side-inlet quarter bends shall be an acceptable means of connection for drainage, wet venting and stack venting arrangements.

**SECTION 707  
PROHIBITED JOINTS AND CONNECTIONS**

**707.1 Prohibited joints.** The following types of joints and connections shall be prohibited:

1. Cement or concrete joints.
2. Mastic or hot-pour bituminous joints.
3. Joints made with fittings not approved for the specific installation.
4. Joints between different diameter pipes made with elastomeric rolling O-rings.
5. Solvent-cement joints between different types of plastic pipe.
6. Saddle-type fittings.

**SECTION 708  
CLEANOUTS**

**708.1 Scope.** This section shall govern the size, location, installation and maintenance of drainage pipe cleanouts.

**708.2 Cleanout plugs.** Cleanout plugs shall be brass or plastic, or other approved materials. Brass cleanout plugs shall be utilized with metallic drain, waste and vent piping only, and shall conform to ASTM A 74, ASME A112.3.1 or ASME A112.36.2M. Cleanouts with plate-style access covers shall be fitted with corrosion-resisting fasteners. Plastic cleanout plugs shall conform to the requirements of Section 702.4. Plugs shall have raised square or countersunk square heads. Countersunk heads shall be installed where raised heads are a trip hazard. Cleanout plugs with borosilicate glass systems shall be of borosilicate glass.

**708.3 Where required.** Cleanouts shall be located in accordance with Sections 708.3.1 through 708.3.6.

**708.3.1 Horizontal drains within buildings.** All horizontal drains shall be provided with cleanouts located not more than 100 feet (30 480 mm) apart.

**708.3.2 Building sewers.** Building sewers shall be provided with cleanouts located not more than 100 feet (30 480 mm) apart measured from the upstream entrance of the cleanout. For building sewers 8 inches (203 mm) and larger, manholes shall be provided and located not more than 200 feet (60 960 mm) from the junction of the building drain and building sewer, at each change in direction and at intervals of not more than 400 feet (122 m) apart. Manholes and manhole covers shall be of an approved type.

**708.3.3 Changes of direction.** Cleanouts shall be installed at each change of direction greater than 45 degrees (0.79 rad) in the building sewer, building drain and horizontal waste or soil lines. Where more than one change of direction occurs in a run of piping, only one cleanout shall be required for each 40 feet (12 192 mm) of developed length of the drainage piping.

**708.3.4 Base of stack.** A cleanout shall be provided at the base of each waste or soil stack.

**708.3.5 Building drain and building sewer.** There shall be a two-way cleanout at the junction of the building drains and the building sewer. The cleanout shall be brought up to finished ground level. A cleanout shall be installed within 2 feet (610 mm) downstream of any backwater valve.

**708.3.6 Manholes.** Manholes serving a building drain shall have secured gas-tight covers and shall be located in accordance with Section 708.3.2.

**708.4 Concealed piping.** Cleanouts on concealed piping or piping under a floor slab or in a crawl space of less than 24 inches (610 mm) in height or a plenum shall be extended through and terminate flush with the finished wall, floor or ground surface or shall be extended to the outside of the building. Cleanout plugs shall not be covered with cement, plaster or any other permanent finish material. Where it is necessary to conceal a cleanout or to terminate a cleanout in an area subject to vehicular traffic, the covering plate, access door or cleanout shall be of an approved type designed and installed for this purpose.

**708.5 Opening direction.** Every cleanout shall be installed to open to allow cleaning in the direction of the flow of the drainage pipe or at right angles thereto.

**708.6 Prohibited installation.** Cleanout openings shall not be utilized for the installation of new fixtures, except where approved and where another cleanout of equal access and capacity is provided.

**708.7 Minimum size.** Cleanouts shall be the same nominal size as the pipe they serve up to 4 inches (102 mm). For pipes larger than 4 inches (102 mm) nominal size, the minimum size of the cleanout shall be 4 inches (102 mm).

**Exceptions:**

1. "P" trap connections with slip joints or ground joint connections, or stack cleanouts that are not more than one pipe diameter smaller than the drain served, shall be permitted.
2. Cast-iron cleanout sizing shall be in accordance with referenced standards in Table 702.4, ASTM A 74 for hub and spigot fittings or ASTM A 888 or CISPI 301 for hubless fittings.

**708.8 Clearances.** Cleanouts on 6-inch (153 mm) and smaller pipes shall be provided with a clearance of not less than 18 inches (457 mm) for rodding. Cleanouts on 8-inch (203 mm) and larger pipes shall be provided with a clearance of not less than 36 inches (914 mm) for rodding.

**708.9 Access.** Access shall be provided to all cleanouts.

**SECTION 709  
FIXTURE UNITS**

**709.1 Values for fixtures.** Drainage fixture unit values as given in Table 709.1 designate the relative load weight of different kinds of fixtures that shall be employed in estimating the total load carried by a soil or waste pipe, and shall be used in connection with Tables 710.1(1) and 710.1(2) of sizes for soil, waste and vent pipes for which the permissible load is given in terms of fixture units.

**709.2 Fixtures not listed in Table 709.1.** Fixtures not listed in Table 709.1 shall have a drainage fixture unit load based on the outlet size of the fixture in accordance with Table 709.2. The minimum trap size for unlisted fixtures shall be the size of the drainage outlet but not less than 1.25 inches (32 mm).

**709.3 Values for continuous and semicontinuous flow.** Drainage fixture unit values for continuous and semicontinuous flow into a drainage system shall be computed on the basis that 1 gpm (0.06 L/s) of flow is equivalent to two fixture units.

**709.4 Values for indirect waste receptor.** The drainage fixture unit load of an indirect waste receptor receiving the discharge of indirectly connected fixtures shall be the sum of the drainage fixture unit values of the fixtures that discharge to the receptor, but not less than the drainage fixture unit value given for the indirect waste receptor in Table 709.1 or 709.2.

**TABLE 709.2  
DRAINAGE FIXTURE UNITS FOR FIXTURE DRAINS OR TRAPS**

FIXTURE DRAIN OR TRAP SIZE (Inches)	DRAINAGE FIXTURE UNIT VALUE
1 <sup>1</sup> / <sub>4</sub>	1
1 <sup>1</sup> / <sub>2</sub>	2
2	3
2 <sup>1</sup> / <sub>2</sub>	4
3	5
4	6

For SI: 1 inch = 25.4 mm.

**SECTION 710  
DRAINAGE SYSTEM SIZING**

**710.1 Maximum fixture unit load.** The maximum number of drainage fixture units connected to a given size of building sewer, building drain or horizontal branch of the building drain shall be determined using Table 710.1(1). The maximum number of drainage fixture units connected to a given size of horizontal branch or vertical soil or waste stack shall be determined using Table 710.1(2). A building sewer serving a building that contains a water closet shall be a minimum of 4 inches (102 mm). No portion of the drainage system installed underground or below a basement, cellar or slab, shall be less than two (2) inches in diameter.

**710.1.1 Horizontal stack offsets.** Horizontal stack offsets shall be sized as required for building drains in accordance with Table 710.1(1), except as required by Section 711.4.

**710.1.2 Vertical stack offsets.** Vertical stack offsets shall be sized as required for straight stacks in accordance with Table 710.1(2), except where required to be sized as a building drain in accordance with Section 711.1.1.

**710.2 Future fixtures.** Where provision is made for the future installation of fixtures, those provided for shall be considered in determining the required sizes of drain pipes.

**SECTION 711  
OFFSETS IN DRAINAGE PIPING IN  
BUILDINGS OF FIVE STORIES OR MORE**

**711.1 Horizontal branch connections above or below vertical stack offsets.** If a horizontal branch connects to the stack within 2 feet (610 mm) above or below a vertical stack offset, and the offset is located more than four branch intervals below the top of the stack, the offset shall be vented in accordance with Section 915.

**711.1.1 Omission of vents for vertical stack offsets.** Vents for vertical offsets required by Section 711.1 shall not be required where the stack and its offset are sized as a building drain [see Table 710.1(1)].

**TABLE 709.1  
DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS**

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Automatic clothes washers, commercial <sup>a,g</sup>	3	2
Automatic clothes washers, residential <sup>g</sup>	2	2
Bathroom group as defined in Section 202 (1.6 gpf water closet) <sup>f</sup>	5	—
Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf) <sup>f</sup>	6	—
Bathtub <sup>b</sup> (with or without overhead shower or whirlpool attachments)	2	1½
Bidet	1	1¼
Combination sink and tray	2	1½
Dental lavatory	1	1¼
Dental unit or cuspidor	1	1¼
Dishwashing machine, <sup>c</sup> domestic	2	1½
Drinking fountain	½	1¼
Emergency floor drain	0	2
Floor drains	2	2
Kitchen sink, domestic	2	1½
Kitchen sink, domestic with food waste grinder and/or dishwasher	2	1½
Laundry tray (1 or 2 compartments)	2	1½
Lavatory	1	1¼
Shower	2	1½
Service sink	2	1½
Sink	2	1½
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2 <sup>e</sup>	Note d
Urinal, nonwater supplied	0.5	Note d
Wash sink (circular or multiple) each set of faucets	2	1½
Water closet, flushometer tank, public or private	4 <sup>e</sup>	Note d
Water closet, private (1.6 gpf)	3 <sup>e</sup>	Note d
Water closet, private (flushing greater than 1.6 gpf)	4 <sup>e</sup>	Note d
Water closet, public (1.6 gpf)	4 <sup>e</sup>	Note d
Water closet, public (flushing greater than 1.6 gpf)	6 <sup>e</sup>	Note d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L (gpf = gallon per flushing cycle).

- a. For traps larger than 3 inches, use Table 709.2.
- b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.
- c. See Sections 709.2 through 709.4 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.
- d. Trap size shall be consistent with the fixture outlet size.
- e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.
- f. For fixtures added to a dwelling unit bathroom group, add the dfu value of those additional fixtures to the bathroom group fixture count.
- g. See Section 406.3 for sizing requirements for fixture drain, branch drain, and drainage stack for an automatic clothes washer standpipe.

**SANITARY DRAINAGE**

**TABLE 710.1(1)  
BUILDING DRAINS AND SEWERS**

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS CONNECTED TO ANY PORTION OF THE BUILDING DRAIN OR THE BUILDING SEWER, INCLUDING BRANCHES OF THE BUILDING DRAIN <sup>a</sup>			
	Slope per foot			
	1/16 inch	1/8 inch	1/4 inch	1/2 inch
1 1/4	—	—	1	1
1 1/2	—	—	3	3
2	—	—	21	26
2 1/2	—	—	24	31
3	—	36	42	50
4	—	180	216	250
5	—	390	480	575
6	—	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

For SI: 1 inch = 25.4 mm, 1 inch per foot = 83.3 mm/m.

a. The minimum size of any building drain serving a water closet shall be 3 inches.

**TABLE 710.1(2)  
HORIZONTAL FIXTURE BRANCHES AND STACKS<sup>a</sup>**

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)			
	Total for horizontal branch	Stacks <sup>b</sup>		
		Total discharge into one branch interval	Total for stack of three branch intervals or less	Total for stack greater than three branch intervals
1 1/2	3	2	4	8
2	6	6	10	24
2 1/2	12	9	20	42
3	20	20	48	72
4	160	90	240	500
5	360	200	540	1,100
6	620	350	960	1,900
8	1,400	600	2,200	3,600
10	2,500	1,000	3,800	5,600
12	2,900	1,500	6,000	8,400
15	7,000	Note c	Note c	Note c

For SI: 1 inch = 25.4 mm.

a. Does not include branches of the building drain. Refer to Table 710.1(1).

b. Stacks shall be sized based on the total accumulated connected load at each story or branch interval. As the total accumulated connected load decreases, stacks are permitted to be reduced in size. Stack diameters shall not be reduced to less than one-half of the diameter of the largest stack size required.

c. Sizing load based on design criteria.

**711.2 Horizontal branch connections to horizontal stack offsets.** Where a horizontal stack offset is located more than four branch intervals below the top of the stack, a horizontal branch shall not connect within the horizontal stack offset or within 2 feet (610 mm) above or below such offset.

**711.3 Horizontal stack offsets.** A stack with a horizontal offset located more than four branch intervals below the top of the stack shall be vented in accordance with Section 915 and sized as follows:

1. The portion of the stack above the offset shall be sized as for a vertical stack based on the total number of drainage fixture units above the offset.
2. The offset shall be sized in accordance with Section 710.1.1.
3. The portion of the stack below the offset shall be sized as for the offset or based on the total number of drainage fixture units on the entire stack, whichever is larger [see Table 710.1(2), Column 5].

**711.3.1 Omission of vents for horizontal stack offsets.** Vents for horizontal stack offsets required by Section 711.3 shall not be required where the stack and its offset are one pipe size larger than required for a building drain [see Table 710.1(1)] and the entire stack and offset are not less in cross-sectional area than that required for a straight stack plus the area of an offset vent as provided for in Section 915. Omission of offset vents in accordance with this section shall not constitute approval of horizontal branch connections within the offset or within 2 feet (610 mm) above or below the offset.

**711.4 Offsets below lowest branch.** Where a vertical offset occurs in a soil or waste stack below the lowest horizontal branch, a change in diameter of the stack because of the offset shall not be required. If a horizontal offset occurs in a soil or waste stack below the lowest horizontal branch, the required diameter of the offset and the stack below it shall be determined as for a building drain in accordance with Table 710.1(1).

## SECTION 712 SUMPS AND EJECTORS

**712.1 Building subdrains.** Building subdrains that cannot be discharged to the sewer by gravity flow shall be discharged into a tightly covered and vented sump from which the liquid shall be lifted and discharged into the building gravity drainage system by automatic pumping equipment or other approved method. In other than existing structures, the sump shall not receive drainage from any piping within the building capable of being discharged by gravity to the building sewer.

**712.2 Valves required.** A check valve and a full open valve located on the discharge side of the check valve shall be

installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system. Access shall be provided to such valves. Such valves shall be located above the sump cover required by Section 712.1 or, where the discharge pipe from the ejector is below grade, the valves shall be accessibly located outside the sump below grade in an access pit with a removable access cover.

**712.3 Sump design.** The sump pump, pit and discharge piping shall conform to the requirements of Sections 712.3.1 through 712.3.5.

**712.3.1 Sump pump.** The sump pump capacity and head shall be appropriate to anticipated use requirements.

**712.3.2 Sump pit.** The sump pit shall be not less than 18 inches (457 mm) in diameter and 24 inches (610 mm) deep, unless otherwise approved. The pit shall be accessible and located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, concrete, steel, plastic or other approved materials. The pit bottom shall be solid and provide permanent support for the pump. The sump pit shall be fitted with a gas-tight removable cover adequate to support anticipated loads in the area of use. The sump pit shall be vented in accordance with Chapter 9.

**712.3.3 Discharge piping.** Discharge piping shall meet the requirements of Section 712.2.

**712.3.4 Maximum effluent level.** The effluent level control shall be adjusted and maintained to at all times prevent the effluent in the sump from rising to within 2 inches (51 mm) of the invert of the gravity drain inlet into the sump.

**712.3.5 Ejector connection to the drainage system.** Pumps connected to the drainage system shall connect to the building sewer or shall connect to a wye fitting in the building drain a minimum of 10 feet (3048 mm) from the base of any soil stack, waste stack or fixture drain. Where the discharge line connects into horizontal drainage piping, the connector shall be made through a wye fitting into the top of the drainage piping.

**712.4 Sewage pumps and sewage ejectors.** A sewage pump or sewage ejector shall automatically discharge the contents of the sump to the building drainage system.

**712.4.1 Macerating toilet systems.** Macerating toilet systems shall comply with CSA B45.9 or ASME A112.3.4 and shall be installed in accordance with the manufacturer's installation instructions.

**712.4.2 Capacity.** A sewage pump or sewage ejector shall have the capacity and head for the application requirements. Pumps or ejectors that receive the discharge of water closets shall be capable of handling spherical solids with a diameter of up to and including 2 inches (51 mm). Other pumps or ejectors shall be capable of handling spherical solids with a diameter of up to and including 1 inch (25.4 mm). The mini-

imum capacity of a pump or ejector based on the diameter of the discharge pipe shall be in accordance with Table 712.4.2.

**Exceptions:**

1. Grinder pumps or grinder ejectors that receive the discharge of water closets shall have a minimum discharge opening of 1.25 inches (32 mm).
2. Macerating toilet assemblies that serve single water closets shall have a minimum discharge opening of 0.75 inch (19 mm).

**TABLE 712.4.2  
MINIMUM CAPACITY OF SEWAGE PUMP OR SEWAGE EJECTOR**

DIAMETER OF THE DISCHARGE PIPE (inches)	CAPACITY OF PUMP OR EJECTOR (gpm)
2	21
2½	30
3	46

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m.

**SECTION 713  
HEALTH CARE PLUMBING**

**713.1 Scope.** This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following occupancies: nursing homes; homes for the aged; orphanages; infirmaries; first aid stations; psychiatric facilities; clinics; professional offices of dentists and doctors; mortuaries; educational facilities; surgery, dentistry, research and testing laboratories; establishments manufacturing pharmaceutical drugs and medicines; and other structures with similar apparatus and equipment classified as plumbing.

**713.2 Bedpan washers and clinical sinks.** Bedpan washers and clinical sinks shall connect to the drainage and vent system in accordance with the requirements for a water closet. Bedpan washers shall also connect to a local vent.

**713.3 Indirect waste.** Sterilizers, steamers and condensers shall discharge to the drainage through an indirect waste pipe by means of an air gap. Where a battery of not more than three sterilizers discharges to an individual receptor, the distance between the receptor and a sterilizer shall not exceed 8 feet (2438 mm). The indirect waste pipe on a bedpan steamer shall be trapped.

**713.4 Vacuum system station.** Ready access shall be provided to vacuum system station receptacles. Such receptacles shall be built into cabinets or recesses and shall be visible.

**713.5 Bottle system.** Vacuum (fluid suction) systems intended for collecting, removing and disposing of blood, pus or other fluids by the bottle system shall be provided with receptacles

equipped with an overflow prevention device at each vacuum outlet station.

**713.6 Central disposal system equipment.** All central vacuum (fluid suction) systems shall provide continuous service. Systems equipped with collecting or control tanks shall provide for draining and cleaning of the tanks while the system is in operation. In hospitals, the system shall be connected to the emergency power system. The exhausts from a vacuum pump serving a vacuum (fluid suction) system shall discharge separately to open air above the roof.

**713.7 Central vacuum or disposal systems.** Where the waste from a central vacuum (fluid suction) system of the barometric-lag, collection-tank or bottle-disposal type is connected to the drainage system, the waste shall be directly connected to the sanitary drainage system through a trapped waste.

**713.7.1 Piping.** The piping of a central vacuum (fluid suction) system shall be of corrosion-resistant material with a smooth interior surface. A branch shall not be less than 0.5-inch (12.7 mm) nominal pipe size for one outlet and shall be sized in accordance with the number of vacuum outlets. A main shall not be less than 1-inch (25 mm) nominal pipe size. The pipe sizing shall be increased in accordance with the manufacturer’s instructions as stations are increased.

**713.7.2 Velocity.** The velocity of airflow in a central vacuum (fluid suction) system shall be less than 5,000 feet per minute (25 m/s).

**713.8 Vent connections prohibited.** Connections between local vents serving bedpan washers or sterilizer vents serving sterilizing apparatus and normal sanitary plumbing systems are prohibited. Only one type of apparatus shall be served by a local vent.

**713.9 Local vents and stacks for bedpan washers.** Bedpan washers shall be vented to open air above the roof by means of one or more local vents. The local vent for a bedpan washer shall not be less than a 2-inch-diameter (51 mm) pipe. A local vent serving a single bedpan washer is permitted to drain to the fixture served.

**713.9.1 Multiple installations.** Where bedpan washers are located above each other on more than one floor, a local vent stack is permitted to be installed to receive the local vent on the various floors. Not more than three bedpan washers shall be connected to a 2-inch (51 mm) local vent stack, not more than six to a 3-inch (76 mm) local vent stack and not more than 12 to a 4-inch (102 mm) local vent stack. In multiple installations, the connections between a bedpan washer local vent and a local vent stack shall be made with tee or tee-wye sanitary pattern drainage fittings installed in an upright position.

**713.9.2 Trap required.** The bottom of the local vent stack, except where serving only one bedpan washer, shall be drained by means of a trapped and vented waste connection to the sanitary drainage system. The trap and waste shall be the same size as the local vent stack.



**713.9.3 Trap seal maintenance.** A water supply pipe not less than 1/4 inch (6.4 mm) in diameter shall be taken from the flush supply of each bedpan washer on the discharge or fixture side of the vacuum breaker, shall be trapped to form not less than a 3-inch (76 mm) water seal, and shall be connected to the local vent stack on each floor. The water supply shall be installed to provide a supply of water to the local vent stack for cleansing and drain trap seal maintenance each time a bedpan washer is flushed.

**713.10 Sterilizer vents and stacks.** Multiple installations of pressure and nonpressure sterilizers shall have the vent connections to the sterilizer vent stack made by means of inverted wye fittings. Access shall be provided to vent connections for inspection and maintenance.

**713.10.1 Drainage.** The connection between sterilizer vent or exhaust openings and the sterilizer vent stack shall be designed and installed to drain to the funnel or basket-type waste fitting. In multiple installations, the sterilizer vent stack shall be drained separately to the lowest sterilizer funnel or basket-type waste fitting or receptor.

**713.11 Sterilizer vent stack sizes.** Sterilizer vent stack sizes shall comply with Sections 713.11.1 through 713.11.4.

**713.11.1 Bedpan steamers.** The minimum size of a sterilizer vent serving a bedpan steamer shall be 1.50 inches (38 mm) in diameter. Multiple installations shall be sized in accordance with Table 713.11.1.

**TABLE 713.11.1  
STACK SIZES FOR BEDPAN STEAMERS AND  
BOILING-TYPE STERILIZERS  
(Number of Connections of Various Sizes  
Permitted to Various-sized Sterilizer Vent Stacks)**

STACK SIZE (inches)	CONNECTION SIZE	
	1 1/2"	2"
1 1/2 <sup>a</sup>	1	or 0
2 <sup>a</sup>	2	or 1
2 <sup>b</sup>	1	and 1
3 <sup>a</sup>	4	or 2
3 <sup>b</sup>	2	and 2
4 <sup>a</sup>	8	or 4
4 <sup>b</sup>	4	and 4

For SI: 1 inch = 25.4 mm.  
a. Total of each size.  
b. Combination of sizes.

**713.11.2 Boiling-type sterilizers.** The minimum size of a sterilizer vent stack shall be 2 inches (51 mm) in diameter where serving a utensil sterilizer and 1.5 inches (38 mm) in diameter where serving an instrument sterilizer. Combinations of boiling-type sterilizer vent connections shall be sized in accordance with Table 713.11.1.

**713.11.3 Pressure sterilizers.** Pressure sterilizer vent stacks shall be 2.5 inches (64 mm) minimum. Those serving combinations of pressure sterilizer exhaust connections shall be sized in accordance with Table 713.11.3.

**TABLE 713.11.3  
STACK SIZES FOR PRESSURE STERILIZERS  
(Number of Connections of Various Sizes Permitted  
To Various-sized Vent Stacks)**

STACK SIZE (inches)	CONNECTION SIZE			
	3/4"	1"	1 1/4"	1 1/2"
1 1/2 <sup>a</sup>	3 or	2 or	1	—
1 1/2 <sup>b</sup>	2 and	1	—	—
2 <sup>a</sup>	6 or	3 or	2 or	1
2 <sup>b</sup>	3 and	2	—	—
2 <sup>b</sup>	2 and	1 and	1	—
2 <sup>b</sup>	1 and	1 and	—	1
3 <sup>a</sup>	15 or	7 or	5 or	3
3 <sup>b</sup>	1 and	1 and 5 and	2 and —	2 1

For SI: 1 inch = 25.4 mm.  
a. Total of each size.  
b. Combination of sizes.

**713.11.4 Pressure instrument washer sterilizer sizes.** The minimum diameter of a sterilizer vent stack serving an instrument washer sterilizer shall be 2 inches (51 mm). Not more than two sterilizers shall be installed on a 2-inch (51 mm) stack, and not more than four sterilizers shall be installed on a 3-inch (76 mm) stack.

**SECTION 714  
Deleted**

**SECTION 715  
BACKWATER VALVES**

**715.1 Sewage backflow.** Where the flood level rims of plumbing fixtures are below the elevation of the manhole cover of the next upstream manhole in the public sewer, such fixtures shall be protected by a backwater valve installed in the building drain, branch of the building drain or horizontal branch serving such fixtures. Plumbing fixtures having flood level rims above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not discharge through a backwater valve.

**715.2 Material.** All bearing parts of backwater valves shall be of corrosion-resistant material. Backwater valves shall comply with ASME A112.14.1, CSA B181.1 or CSA B181.2.

**715.3 Seal.** Backwater valves shall be so constructed as to provide a mechanical seal against backflow.

**715.4 Diameter.** Backwater valves, when fully opened, shall have a capacity not less than that of the pipes in which they are installed.

**715.5 Location.** Backwater valves shall be installed so that access is provided to the working parts for service and repair.



permitted to be vented by a wet vent. The wet vent shall be considered the vent for the fixtures and shall extend from the connection of the dry vent along the direction of the flow in the drain pipe to the most downstream fixture drain connection to the horizontal branch drain. Only the fixtures within the bathroom groups shall connect to the wet-vented horizontal branch drain. Any additional fixtures shall discharge downstream of the wet vent.

**909.1.1 Vertical wet vent.** Any combination of fixtures within two bathroom groups located on the same floor level is permitted to be vented by a vertical wet vent. The vertical wet vent shall extend from the connection to the dry vent down to the lowest fixture drain connection. Each fixture shall connect independently to the vertical wet vent. Water closet drains shall connect at the same elevation. Other fixture drains shall connect above or at the same elevation as the water closet fixture drains. The dry vent connection to the vertical wet vent shall be an individual or common vent serving one or two fixtures.

**909.2 Vent connection.** The dry-vent connection to the wet vent shall be an individual vent or common vent to the lavatory, bidet, shower or bathtub. In vertical wet-vent systems, the most upstream fixture drain connection shall be a dry-vented fixture drain connection. In horizontal wet-vent systems, not more than one wet-vented fixture drain shall discharge upstream of the dry-vented fixture drain connection.

**909.3 Size.** The dry-vent serving the wet vent shall be sized based on the largest required diameter of pipe within the wet-vent system served by the dry vent. The wet vent shall be of a minimum size as specified in Table 909.3, based on the fixture unit discharge to the wet vent.

**TABLE 909.3  
WET VENT SIZE**

WET VENT PIPE SIZE (inches)	DRAINAGE FIXTURE UNIT LOAD (dfu)
1 1/2	1
2	4
2 1/2	6
3	12

For SI: 1 inch = 25.4 mm.

**SECTION 910  
WASTE STACK VENT**

**910.1 Waste stack vent permitted.** A waste stack shall be considered a vent for all of the fixtures discharging to the stack where installed in accordance with the requirements of this section.

**910.2 Stack installation.** The waste stack shall be vertical, and both horizontal and vertical offsets shall be prohibited between the lowest fixture drain connection and the highest fixture drain connection. Every fixture drain shall connect separately to the waste stack. The stack shall not receive the discharge of water closets or urinals.

**910.3 Stack vent.** A stack vent shall be provided for the waste stack. The size of the stack vent shall be not less than the size of

the waste stack. Offsets shall be permitted in the stack vent, shall be located at least 6 inches (152 mm) above the flood level of the highest fixture and shall be in accordance with Section 905.2. The stack vent shall be permitted to connect with other stack vents and vent stacks in accordance with Section 903.5.

**910.4 Waste stack size.** The waste stack shall be sized based on the total discharge to the stack and the discharge within a branch interval in accordance with Table 910.4. The waste stack shall be the same size throughout its length.

**TABLE 910.4  
WASTE STACK VENT SIZE**

STACK SIZE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)	
	Total discharge into one branch interval	Total discharge for stack
1 1/2	1	2
2	2	4
2 1/2	No limit	8
3	No limit	24
4	No limit	50
5	No limit	75
6	No limit	100

For SI: 1 inch = 25.4 mm.

**SECTION 911  
CIRCUIT VENTING**

**911.1 Circuit vent permitted.** A maximum of eight fixtures connected to a horizontal branch drain shall be permitted to be circuit vented. Each fixture drain shall connect horizontally to the horizontal branch being circuit vented. The horizontal branch drain shall be classified as a vent from the most downstream fixture drain connection to the most upstream fixture drain connection to the horizontal branch.

**911.1.1 Multiple circuit-vented branches.** Circuit-vented horizontal branch drains are permitted to be connected together. Each group of a maximum of eight fixtures shall be considered a separate circuit vent and shall conform to the requirements of this section.

**911.2 Vent connection.** The circuit vent connection shall be located between the two most upstream fixture drains. The vent shall connect to the horizontal branch and shall be installed in accordance with Section 905. The circuit vent pipe shall not receive the discharge of any soil or waste.

**911.3 Slope and size of horizontal branch.** The maximum slope of the vent section of the horizontal branch drain shall be one unit vertical in 12 units horizontal (8-percent slope). The entire length of the vent section of the horizontal branch drain shall be sized for the total drainage discharge to the branch.

**911.3.1 Size of multiple circuit vent.** Each separate circuit-vented horizontal branch that is interconnected shall be sized independently in accordance with Section 911.3. The downstream circuit-vented horizontal branch shall be sized

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for the total discharge into the branch, including the upstream branches and the fixtures within the branch.

**911.4 Relief vent.** A relief vent shall be provided for circuit-vented horizontal branches receiving the discharge of four or more water closets and connecting to a drainage stack that receives the discharge of soil or waste from upper horizontal branches.

**911.4.1 Connection and installation.** The relief vent shall connect to the horizontal branch drain between the stack and the most downstream fixture drain of the circuit vent. The relief vent shall be installed in accordance with Section 905.

**911.4.2 Fixture drain or branch.** The relief vent is permitted to be a fixture drain or fixture branch for fixtures located within the same branch interval as the circuit-vented horizontal branch. The maximum discharge to a relief vent shall be four fixture units.

**911.5 Additional fixtures.** Fixtures, other than the circuit-vented fixtures, are permitted to discharge to the horizontal branch drain. Such fixtures shall be located on the same floor as the circuit-vented fixtures and shall be either individually or common vented.

### SECTION 912

#### COMBINATION DRAIN AND VENT SYSTEM

**912.1 Type of fixtures.** A combination drain and vent system shall not serve fixtures other than floor drains, sinks, lavatories and drinking fountains. Combination drain and vent systems shall not receive the discharge from a commercial food waste grinder or clinical sink.

**912.2 Installation.** The only vertical pipe of a combination drain and vent system shall be the connection between the fixture drain of a sink, floor drain, lavatory or drinking fountain, and the horizontal combination drain vent pipe. The maximum vertical distance shall be 8 feet (2438 mm) and the minimum pipe diameter shall be 3 inches. The 3-inch pipe shall rise vertically as high as possible above the fixture drain connection and terminate with a cap or an approved air admittance valve. Island sinks may be installed using a combination drain and vent system.

**912.2.1 Slope.** The horizontal combination drain and vent pipe shall have a maximum slope of one-half unit vertical in 12 units horizontal (4-percent slope). The minimum slope shall be in accordance with Table 704.1 or unless approved by the state administrative authority.

**912.2.1.2 Restricted waste.** No drainage piping conveying soil or waste from water closets or urinals shall be connected to any combination waste and vent system; nor shall such waste pass through any part of the combination drain and vent system.

**912.2.2 Connection.** The combination drain and vent system shall be provided with a dry vent connected at any point within the combination drain system and shall be sized in accordance with Table 916.1.

**912.2.3 Size of the combination drain and vent piping.** Piping shall be increased two (2) pipe sizes greater than the

fixture trap served, beginning at the trap and including all branches and the main drain.

### SECTION 913

#### ISLAND FIXTURE VENTING

**913.1 Limitation.** Island fixture venting shall not be permitted for fixtures other than sinks and lavatories. Residential kitchen sinks with a dishwasher waste connection, a food waste grinder, or both, in combination with the kitchen sink waste, shall be permitted to be vented in accordance with this section.

**913.2 Vent connection.** The island fixture vent shall connect to the fixture drain as required for an individual or common vent. The vent shall rise vertically to above the drainage outlet of the fixture being vented before offsetting horizontally or vertically downward. The vent or branch vent for multiple island fixture vents shall extend to a minimum of 6 inches (152 mm) above the highest island fixture being vented before connecting to the outside vent terminal.

**913.3 Vent installation below the fixture flood level rim.** The vent located below the flood level rim of the fixture being vented shall be installed as required for drainage piping in accordance with Chapter 7, except for sizing. The vent shall be sized in accordance with Section 916.2. The lowest point of the island fixture vent shall connect full size to the drainage system. The connection shall be to a vertical drainpipe or to the top half of a horizontal drain pipe. Cleanouts shall be provided in the island fixture vent to permit rodding of vent piping located below the flood level rim of the fixtures. Rodding in both directions shall be permitted through a cleanout.

### SECTION 914

#### RELIEF VENTS—STACKS OF MORE THAN 10 BRANCH INTERVALS

**914.1 Where required.** Soil and waste stacks in buildings having more than 10 branch intervals shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.

**914.2 Size and connection.** The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of each relief vent shall connect to the soil or waste stack through a wye below the horizontal branch serving the floor, and the upper end shall connect to the vent stack through a wye not less than 3 feet (914 mm) above the floor.

### SECTION 915

#### VENTS FOR STACK OFFSETS

**915.1 Vent for horizontal offset of drainage stack.** Horizontal offsets of drainage stacks shall be vented where five or more branch intervals are located above the offset. The offset shall be vented by venting the upper section of the drainage stack and the lower section of the drainage stack.

**915.2 Upper section.** The upper section of the drainage stack shall be vented as a separate stack with a vent stack connection installed in accordance with Section 903.4. The offset shall be considered the base of the stack.

**915.3 Lower section.** The lower section of the drainage stack shall be vented by a yoke vent connecting between the offset and the next lower horizontal branch. The yoke vent connection shall be permitted to be a vertical extension of the drainage stack. The size of the yoke vent and connection shall be a minimum of the size required for the vent stack of the drainage stack.

**SECTION 916  
VENT PIPE SIZING**

**916.1 Size of stack vents and vent stacks.** The minimum required diameter of stack vents and vent stacks shall be determined from the developed length and the total of drainage fixture units connected thereto in accordance with Table 916.1, but in no case shall the diameter be less than one-half the diameter of the drain served or less than 1 1/4 inches (32 mm). The minimum size vent installed underground, or below a basement, cellar or slab, shall not be less than 2 inches (51 mm) in diameter.

**916.2 Vents other than stack vents or vent stacks.** The diameter of individual vents, branch vents, circuit vents and relief

vents shall be at least one-half the required diameter of the drain served. The required size of the drain shall be determined in accordance with Table 710.1(2). Vent pipes shall not be less than 1 1/4 inches (32 mm) in diameter. Vents exceeding 40 feet (12 192 mm) in developed length shall be increased by one nominal pipe size for the entire developed length of the vent pipe. Relief vents for soil and waste stacks in buildings having more than 10 branch intervals shall be sized in accordance with Section 914.2.

**916.3 Developed length.** The developed length of individual, branch, circuit and relief vents shall be measured from the farthest point of vent connection to the drainage system to the point of connection to the vent stack, stack vent or termination outside of the building.

**916.4 Multiple branch vents.** Where multiple branch vents are connected to a common branch vent, the common branch vent shall be sized in accordance with this section based on the size of the common horizontal drainage branch that is or would be required to serve the total drainage fixture unit (dfu) load being vented.

**TABLE 916.1  
SIZE AND DEVELOPED LENGTH OF STACK VENTS AND VENT STACKS**

DIAMETER OF SOIL OR WASTE STACK (inches)	TOTAL FIXTURE UNITS BEING VENTED (dfu)	MAXIMUM DEVELOPED LENGTH OF VENT (feet) <sup>a</sup> DIAMETER OF VENT (inches)										
		1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
1 1/4	2	30										
1 1/2	8	50	150	—	—	—	—	—	—	—	—	—
1 1/2	10	30	100									
2	12	30	75	200								
2	20	26	50	150								
2 1/2	42		30	100	300							
3	10		42	150	360	1,040						
3	21	—	32	110	270	810	—	—	—	—	—	—
3	53		27	94	230	680						
3	102		25	86	210	620						
4	43	—		35	85	250	980	—	—	—	—	—
4	140			27	65	200	750					
4	320			23	55	170	640					
4	540	—	—	21	50	150	580	—	—	—	—	—
5	190				28	82	320	990				
5	490				21	63	250	760				
5	940	—	—	—	18	53	210	670	—	—	—	—
5	1,400				16	49	190	590				
6	500					33	130	400	1,000			
6	1,100	—	—	—	—	26	100	310	780	—	—	—
6	2,000					22	84	260	660			
6	2,900					20	77	240	600			
8	1,800	—	—	—	—		31	95	240	940	—	—
8	3,400						24	73	190	720		

(continued)

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**TABLE 916.1—continued  
SIZE AND DEVELOPED LENGTH OF STACK VENTS AND VENT STACKS**

DIAMETER OF SOIL OR WASTE STACK (inches)	TOTAL FIXTURE UNITS BEING VENTED (dfu)	MAXIMUM DEVELOPED LENGTH OF VENT (feet) <sup>a</sup> DIAMETER OF VENT (inches)										
		1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>	3	4	5	6	8	10	12
8	5,600						20	62	160	610		
8	7,600	—	—	—	—	—	18	56	140	560		—
10	4,000							31	78	310	960	
10	7,200							24	60	240	740	
10	11,000	—	—	—	—	—		20	51	200	630	—
10	15,000							18	46	180	570	
12	7,300								31	120	380	940
12	13,000	—	—	—	—	—	—	—	24	94	300	720
12	20,000								20	79	250	610
12	26,000								18	72	230	500
15	15,000	—	—	—	—	—	—	—		40	130	310
15	25,000									31	96	240
15	38,000	—	—	—	—	—	—	—	—	26	81	200
15	50,000									24	74	180

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The developed length shall be measured from the vent connection to the open air.

**916.4.1 Branch vents exceeding 40 feet in developed length.** Branch vents exceeding 40 feet (12 192 mm) in developed length shall be increased by one nominal size for the entire developed length of the vent pipe.

**916.5 Sump vents.** Sump vent sizes shall be determined in accordance with Sections 916.5.1 and 916.5.2.

**916.5.1 Sewage pumps and sewage ejectors other than pneumatic.** Drainage piping below sewer level shall be vented in a similar manner to that of a gravity system. Building sump vent sizes for sumps with sewage pumps or sewage ejectors, other than pneumatic, shall be determined in accordance with Table 916.5.1.

**TABLE 916.5.1  
SIZE AND LENGTH OF SUMP VENTS**

DISCHARGE CAPACITY OF PUMP (gpm)	MAXIMUM DEVELOPED LENGTH OF VENT (feet) <sup>a</sup>					
	Diameter of vent (inches)					
	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>	3	4
10	No limit <sup>b</sup>	No limit	No limit	No limit	No limit	No limit
20	270	No limit	No limit	No limit	No limit	No limit
40	72	160	No limit	No limit	No limit	No limit
60	31	75	270	No limit	No limit	No limit
80	16	41	150	380	No limit	No limit
100	10 <sup>c</sup>	25	97	250	No limit	No limit
150	Not permitted	10 <sup>c</sup>	44	110	370	No limit
200	Not permitted	Not permitted	20	60	210	No limit
250	Not permitted	Not permitted	10	36	132	No limit
300	Not permitted	Not permitted	10 <sup>c</sup>	22	88	380
400	Not permitted	Not permitted	Not permitted	10 <sup>c</sup>	44	210
500	Not permitted	Not permitted	Not permitted	Not permitted	24	130

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Developed length plus an appropriate allowance for entrance losses and friction due to fittings, changes in direction and diameter. Suggested allowances shall be obtained from NSB Monograph 31 or other approved sources. An allowance of 50 percent of the developed length shall be assumed if a more precise value is not available.

b. Actual values greater than 500 feet.

c. Less than 10 feet.

**916.5.2 Pneumatic sewage ejectors.** The air pressure relief pipe from a pneumatic sewage ejector shall be connected to an independent vent stack terminating as required for vent extensions through the roof. The relief pipe shall be sized to relieve air pressure inside the ejector to atmospheric pressure, but shall not be less than 1<sup>1</sup>/<sub>4</sub> inches (32 mm) in size.

## SECTION 917 AIR ADMITTANCE VALVES

**917.1 General.** Vent systems utilizing air admittance valves shall comply with this section. Individual and branch-type air admittance valves shall conform to ASSE 1051. Stack-type air admittance valves shall conform to ASSE 1050. Individual and branch-type air admittance valves shall conform to ASSE 1051.

**917.2 Installation.** The valves shall be installed in accordance with the requirements of this section and the manufacturer's installation instructions. Air admittance valves shall be installed after the DWV testing required by Section 312.2 or 312.3 has been performed.

**917.3 Where permitted.** Individual, branch and circuit vents shall be permitted to terminate with a connection to an individual or branch-type air admittance valve. Stack vents and vent stacks shall be permitted to terminate to stack-type air admittance valves. Individual and branch-type air admittance valves shall vent only fixtures that are on the same floor level and connect to a horizontal branch drain. The horizontal branch drain having individual and branch-type air admittance valves shall conform to Section 917.3.1 or Section 917.3.2.

**917.3.1 Location of branch.** The horizontal branch drain shall connect to the drainage stack or building drain a maximum of four branch intervals from the top of the stack.

**917.3.2 Relief vent.** Where the horizontal branch is located more than four branch intervals from the top of the stack, the horizontal branch shall be provided with a relief vent that shall connect to a vent stack, or stack vent, or extend outdoors to the open air. The relief vent shall connect to the horizontal branch drain between the stack or building drain and the most downstream fixture drain connected to the horizontal branch drain. The relief vent shall be sized in accordance with Section 916.2 and installed in accordance with Section 905. The relief vent shall be permitted to serve as the vent for other fixtures.

**917.3.3 Stack.** Stack-type air admittance valves shall not serve as the vent terminal for vent stacks or stack vents that serve drainage stacks exceeding six branch intervals.

**917.4 Location.** Individual and branch-type air admittance valve shall be located a minimum of 4 inches (102 mm) above the horizontal branch drain or above the fixture drain being vented. Stack-type air admittance valves shall be located not less than 6 inches (152 mm) above the flood level rim of the highest fixture being vented. The air admittance valve shall be located within the maximum developed length permitted for the vent. The air admittance valve shall be installed a minimum of 6 inches (152 mm) above insulation materials.

**917.5 Access and ventilation.** Access shall be provided to all air admittance valves. The valve shall be located within a ventilated space that allows air to enter the valve.

**917.6 Size.** The air admittance valve shall be rated in accordance with the standard for the size of the vent to which the valve is connected.

**917.7 Vent required.** Within each plumbing system, a minimum of one stack vent or vent stack shall extend outdoors to the open air.

**917.8 Prohibited installations.** Air admittance valves shall not be installed in nonneutralized special waste systems as described in Chapter 8. Valves shall not be located in spaces utilized as supply or return air plenums.

## SECTION 918 Deleted





**APPENDIX I**  
**RULES AND REGULATIONS PERTAINING TO AIR ADMITTANCE  
VALVES (AAV) FOR D.W.V. VENTING SYSTEMS**

*Appendix I has been repealed in its entirety.*

Pages 135 through 136 have been deleted without replacement.