**Chapter 6 Water Supply and Distribution**

User note:

About this chapter: Many plumbing fixtures require a supply of potable water. Other fixtures could be supplied with nonpotable water such as reclaimed water. Chapter 6 covers the requirements for water distribution piping systems to and within buildings. The regulations include the types of materials and the connection methods for such systems. The prevention of backflow of contaminated or polluted water into any potable water system is critical for protection of users of potable water. This chapter regulates the assemblies, devices and methods that are used for this purpose.

Section 601 General

601.1 Scope

This chapter shall govern the materials, design and installation of water supply systems, both hot and cold, for utilization in connection with human occupancy and habitation and shall govern the installation of individual water supply systems.

601.2 Solar Energy Utilization

Solar energy systems used for heating potable water or using an independent medium for heating potable water shall comply with the applicable requirements of this code. The use of solar energy shall not compromise the requirements for cross connection or protection of the potable water supply system required by this code.

601.3 Existing Piping Used for Grounding

Existing metallic water service piping used for electrical grounding shall not be replaced with nonmetallic pipe or tubing until other approved means of grounding is provided.

601.4 Tests

The potable water distribution system shall be tested in accordance with Section 312.5.

601.5 Rehabilitation of Piping Systems

Where pressure piping systems are rehabilitated using an epoxy lining system, such lining system shall comply with ASTM F2831.

Section 602 Water Required

The Delaware Division of Public Health Plumbing Permit and Inspection Program does not test drinking water.

602.1 General

Structures equipped with plumbing fixtures and utilized for human occupancy or habitation shall be provided with a potable supply of water in the amounts and at the pressures specified in this chapter.

602.2 Potable Water Required

Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. Unless otherwise provided in this code, potable water shall be supplied to all plumbing fixtures.

602.3 Individual Water Supply

Where a potable public water supply is not available, individual sources of potable water supply shall be utilized.

602.3.1 Sources

Dependent on geological and soil conditions and the amount of rainfall, individual water supplies are of the following types: drilled well, driven well, dug well, bored well, spring, stream or cistern. Surface bodies of water and land cisterns shall not be sources of individual water supply unless properly treated by approved means to prevent contamination. Individual water supplies shall be constructed and installed in accordance with the applicable state and local laws. Where such laws do not address all of the requirements set forth in NGWA-01, individual water supplies shall comply with NGWA-01 for those requirements not addressed by state and local laws.

602.3.2 Minimum Quantity

The combined capacity of the source and storage in an individual water supply system shall supply the fixtures with water at rates and pressures as required by this chapter.

602.3.3 Water Quality

Water from an individual water supply shall be approved as potable by the authority having jurisdiction prior to connection to the plumbing system.

602.3.4 Disinfection of System

After construction, the individual water supply system shall be purged of deleterious matter and disinfected in accordance with Section 610.

602.3.5 Pumps

Pumps shall be rated for the transport of potable water. Pumps in an individual water supply system shall be constructed and installed so as to prevent contamination from entering a potable water supply through the pump units. Pumps intended to supply drinking water shall conform to NSF 61. Pumps shall be sealed to the well casing or covered with a watertight seal. Pumps shall be designed to maintain a prime and installed such that ready access is provided to the pump parts of the entire assembly for repairs.

602.3.5.1 Pump Enclosure

The pump room or enclosure around a well pump shall be drained and protected from freezing by heating or other approved means. Where pumps are installed in basements, such pumps shall be mounted on a block or shelf not less than 18 inches (457 mm) above the basement floor. Well pits shall be prohibited.

Section 603 Water Service

Upcodes Diagrams

603.1 Size of Water Service Pipe

The water service pipe shall be sized to supply water to the structure in the quantities and at the pressures required in this code. The water service pipe shall be not less than 3/4 inch (19.1 mm) in diameter.

603.2 Separation of Water Service and Building Sewer

Diagram

Where water service piping is located in the same trench with the building sewer, such sewer shall be constructed of materials listed in Table 702.2. Where the building sewer piping is not constructed of materials listed in Table 702.2, the water service pipe and the building sewer shall be horizontally separated by not less than 5 feet (1524 mm) of undisturbed or compacted earth. The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided that the water service is sleeved to a point not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing. The sleeve shall be of pipe materials listed in Table 605.3, 702.2 or 702.3. The required separation distance shall not apply where the bottom of the water service pipe, located within 5 feet (1524 mm) of the sewer, is not less than 12 inches (305 mm) above the highest point of the top of the building sewer.

UpCodes Diagrams

P

Separation of Water Service and Building Sewer

603.2.1 Water Service Near Sources of Pollution

Potable water service pipes shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Where soil or ground water causes contaminated conditions for piping, analysis shall be required in accordance with Section 605.1.

Section 604 Design of Building Water Distribution System

604.1 General

The design of the water distribution system shall conform to accepted engineering practice. Methods utilized to determine pipe sizes shall be approved.

604.2 System Interconnection

At the points of interconnection between the hot and cold water supply piping systems and the individual fixtures, appliances or devices, provisions shall be made to prevent flow between such piping systems.

604.3 Water Distribution System Design Criteria

The water distribution system shall be designed, and pipe sizes shall be selected such that under conditions of peak demand, the capacities at the fixture supply pipe outlets shall be not less than shown in Table 604.3. The minimum flow rate and flow pressure provided to fixtures and appliances not listed in Table 604.3 shall be in accordance with the manufacturer's installation instructions.

TABLE 604.3

WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS

FIXTURE SUPPLY OUTLET SERVING FLOW RATEa (gpm) FLOW PRESSURE (psi)

Bathtub, balanced-pressure, thermostatic or combination balanced-pressure/thermostatic mixing valve 4 20

Bidet, thermostatic mixing valve 2 20

Combination fixture 4 8

Dishwasher, residential 2.75 8

Drinking fountain 0.75 8

Laundry tray 4 8

Lavatory, private 0.8 8

Lavatory, private, mixing valve 0.8 8

Lavatory, public 0.4 8

Shower 2.5 8

Shower, balanced-pressure, thermostatic or combination balanced-pressure/thermostatic mixing valve 2.5b 20

Sillcock, hose bibb 5 8

Sink, residential 1.75 8

Sink, service 3 8

Urinal, valve 12 25

Water closet, blow out, flushometer valve 25 45

Water closet, flushometer tank 1.6 20

Water closet, siphonic, flushometer valve 25 35

Water closet, tank, close coupled 3 20

Water closet, tank, one piece 6 20

For SI: 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 3.785 L/m.

For additional requirements for flow rates and quantities, see Section 604.4.

Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.

604.4 Maximum Flow and Water Consumption

Diagram

The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4.

Exceptions:

Blowout design water closets having a water consumption not greater than 31/2 gallons (13 L) per flushing cycle.

Vegetable sprays.

Clinical sinks having a water consumption not greater than 41/2 gallons (17 L) per flushing cycle.

Service sinks.

Emergency showers.

TABLE 604.4

MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING MAXIMUM FLOW RATE OR QUANTITYb

Lavatory, private 2.2 gpm at 60 psi

Lavatory, public (metering) 0.25 gallon per metering cycle

Lavatory, public (other than metering) 0.5 gpm at 60 psi

Shower heada 2.5 gpm at 80 psi

Sink faucet 2.2 gpm at 60 psi

Urinal 1.0 gallon per flushing cycle

Water closet 1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

A hand-held shower spray is a shower head.

Consumption tolerances shall be determined from referenced standards.

Upcodes Diagrams

604.5 Size of Fixture Supply

Diagram

The minimum size of a fixture supply pipe shall be as shown in Table 604.5. The fixture supply pipe shall terminate not more than 30 inches (762 mm) from the point of connection to the fixture. A reduced-size flexible water connector installed between the supply pipe and the fixture shall be of an approved type. The supply pipe shall extend to the floor or wall adjacent to the fixture. The minimum size of individual distribution lines utilized in gridded or parallel water distribution systems shall be as shown in Table 604.5.

TABLE 604.5

MINIMUM SIZES OF FIXTURE WATER SUPPLY PIPES

FIXTURE MINIMUM PIPE SIZE (inch)

Bathtubsa (60" × 32" and smaller) 1/2

Bathtubsa (larger than 60" × 32") 1/2

Bidet 3/8

Combination sink and tray 1/2

Dishwasher, domestica 1/2

Drinking fountain 3/8

Hose bibbs 1/2

Kitchen sinka 1/2

Laundry, 1, 2 or 3 compartmentsa 1/2

Lavatory 3/8

Shower, single heada 1/2

Sinks, flushing rim 3/4

Sinks, service 1/2

Urinal, flush tank 1/2

Urinal, flushometer valve 3/4

Wall hydrant 1/2

Water closet, flush tank 3/8

Water closet, flushometer tank 3/8

Water closet, flushometer valve 1

Water closet, one piecea 1/2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

Where the developed length of the distribution line is 50 feet or less, and the available pressure at the meter is 35 psi or greater, the minimum size of an individual distribution line supplied from a manifold and installed as part of a parallel water distribution system shall be one nominal tube size smaller than the sizes indicated.

UpCodes Diagrams

P

Urinals and Partitions (ADA)

604.6 Variable Street Pressures

Where street water main pressures fluctuate, the building water distribution system shall be designed for the minimum pressure available.

604.7 Inadequate Water Pressure

Wherever water pressure from the street main or other source of supply is insufficient to provide flow pressures at fixture outlets as required under Table 604.3, a water pressure booster system conforming to Section 606.5 shall be installed on the building water supply system.

604.8 Water Pressure-Reducing Valve or Regulator

Where water pressure within a building exceeds 80 psi (552 kPa) static, an approved water pressure-reducing valve conforming to ASSE 1003 or CSA B356 with strainer shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static.

Exception: Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

604.8.1 Valve Design

The pressure-reducing valve shall be designed to remain open to permit uninterrupted water flow in case of valve failure.

604.8.2 Repair and Removal

Water pressure-reducing valves, regulators and strainers shall be so constructed and installed as to permit repair or removal of parts without breaking a pipeline or removing the valve and strainer from the pipeline.

604.9 Water Hammer

The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water-hammer arrestor shall be installed where quick-closing valves are utilized. Water-hammer arrestors shall be installed in accordance with the manufacturer's instructions. Water-hammer arrestors shall conform to ASSE 1010.

604.10 Gridded and Parallel Water Distribution System Manifolds

Hot water and cold water manifolds installed with gridded or parallel connected individual distribution lines to each fixture or fixture fitting shall be designed in accordance with Sections 604.10.1 through 604.10.3.

604.10.1 Manifold Sizing

Hot water and cold water manifolds shall be sized in accordance with Table 604.10.1. The total gallons per minute is the demand of all outlets supplied.

TABLE 604.10.1

MANIFOLD SIZING

NOMINAL SIZE INTERNAL DIAMETER (inches) MAXIMUM DEMAND (gpm)

Velocity at 4 feet per second Velocity at 8 feet per second

1/2 2 5

3/4 6 11

1 10 20

11/4 15 31

11/2 22 44

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m, 1 foot per second = 0.305 m/s.

604.10.2 Valves

Individual fixture shutoff valves installed at the manifold shall be identified as to the fixture being supplied.

604.10.3 Access

Access shall be provided to manifolds with integral factory- or field-installed valves.

604.11 Individual Pressure Balancing In-Line Valves for Individual Fixture Fittings

Where individual pressure balancing in-line valves for individual fixture fittings are installed, such valves shall comply with ASSE 1066. Such valves shall be installed in a location with access. The valves shall not be utilized alone as a substitute for the balanced pressure, thermostatic or combination shower valves required in Section 412.3.

Section 605 Materials, Joints and Connections

605.1 Soil and Ground Water

The installation of a water service or water distribution pipe shall be prohibited in soil and ground water contaminated with solvents, fuels, organic compounds or other detrimental materials causing permeation, corrosion, degradation or structural failure of the piping material. Where detrimental conditions are suspected, a chemical analysis of the soil and ground water conditions shall be required to ascertain the acceptability of the water service or water distribution piping material for the specific installation. Where detrimental conditions exist, approved alternative materials or routing shall be required.

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 not more than 8-percent lead content.

605.2.1 Lead Content of Drinking Water Pipe and Fittings

Pipe, pipe fittings, joints, valves, faucets and fixture fittings utilized to supply water for drinking or cooking purposes shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent or less.

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. Water service pipe or tubing, installed underground and outside of the structure, shall have a working pressure rating of not less than 160 psi (1100 kPa) at 73.4°F (23°C). Where the water pressure exceeds 160 psi (1100 kPa), piping material shall have a working pressure rating not less than the highest available pressure. Water service piping materials not third-party certified for water distribution shall terminate at or before the full open valve located at the entrance to the structure. Ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104/A21.4.

TABLE 605.3

WATER SERVICE PIPE

MATERIAL STANDARD

Acrylonitrile butadiene styrene (ABS) plastic pipe ASTM D1527; ASTM D2282

Chlorinated polyvinyl chloride (CPVC) plastic pipe ASTM D2846; ASTM F441; ASTM F442; CSA B137.6

Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) ASTM F2855

Copper or copper-alloy pipe ASTM B42; ASTM B43; ASTM B302

Copper or copper-alloy tubing (Type K, WK, L, WL) ASTM B75; ASTM B88; ASTM B251; ASTM B447

Cross-linked polyethylene (PEX) plastic pipe and tubing ASTM F876; AWWA C904; CSA B137.5

Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe ASTM F1281; ASTM F2262; CSA B137.10

Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) ASTM F1986

Ductile iron water pipe AWWA C151/A21.51; AWWA C115/A21.15

Galvanized steel pipe ASTM A53

Polyethylene (PE) plastic pipe ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1

Polyethylene (PE) plastic tubing ASTM D2737; AWWA C901; CSA B137.1

Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe ASTM F1282; CSA B137.9

Polyethylene of raised temperature (PE-RT) plastic tubing ASTM F2769; CSA B137.18

Polypropylene (PP) plastic pipe or tubing ASTM F2389; CSA B137.11

Polyvinyl chloride (PVC) plastic pipe ASTM D1785; ASTM D2241; ASTM D2672; CSA B137.3

Stainless steel pipe (Type 304/304L) ASTM A269/A269M; ASTM A312; ASTM A778

Stainless steel pipe (Type 316/316L) ASTM A269/A269M; ASTM A312; ASTM A778

605.3.1 Dual Check-Valve-Type Backflow Preventer

Dual check-valve backflow preventers installed on the water supply system shall comply with ASSE 1024 or CSA B64.6.

605.4 Water Distribution Pipe

Water distribution pipe and tubing shall conform to NSF 61 and shall conform to one of the standards listed in Table 605.4. Hot water distribution pipe and tubing shall have a pressure rating of not less than 100 psi (690 kPa) at 180°F (82°C).

TABLE 605.4

WATER DISTRIBUTION PIPE

MATERIAL STANDARD

Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing ASTM D2846; ASTM F441; ASTM F442; CSA B137.6

Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) ASTM F2855

Copper or copper-alloy pipe ASTM B42; ASTM B43; ASTM B302

Copper or copper-alloy tubing (Type K, WK, L, WL) ASTM B75; ASTM B88; ASTM B251; ASTM B447

Cross-linked polyethylene (PEX) plastic tubing ASTM F876; CSA B137.5

Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe ASTM F1281; ASTM F2262; CSA B137.10

Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) ASTM F1986

Ductile iron pipe AWWA C115/A21.15; AWWA C151/A21.51

Galvanized steel pipe ASTM A53

Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe ASTM F1282

Polyethylene of raised temperature (PE-RT) plastic tubing ASTM F2769; CSA B137.18

Polypropylene (PP) plastic pipe or tubing ASTM F2389; CSA B137.11

Stainless steel pipe (Type 304/304L) ASTM A312; ASTM A778

Stainless steel pipe (Type 316/316L) ASTM A312; ASTM A778

605.5 Fittings

Pipe fittings shall be approved for installation with the piping material installed and shall comply with the applicable standards listed in Table 605.5. Pipe fittings utilized in water supply systems shall also comply with NSF 61. Ductile and gray iron pipe and pipe fittings utilized in water service piping systems shall be cement mortar lined in accordance with AWWA C104/A21.4.

TABLE 605.5

PIPE FITTINGS

MATERIAL STANDARD

Acrylonitrile butadiene styrene (ABS) plastic ASTM D2468

Cast iron ASME B16.4

Chlorinated polyvinyl chloride (CPVC) plastic ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6

Copper or copper alloy ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226

Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE) ASTM F1986

Fittings for cross-linked polyethylene (PEX) plastic tubing ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; CSA B137.5

Fittings for polyethylene of raised temperature (PE-RT) plastic tubing ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; CSA B137.18

Gray iron and ductile iron ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;

Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10

Malleable iron ASME B16.3

Metal (brass) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) ASTM F1974

Polyethylene (PE) plastic pipe ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1

Polypropylene (PP) plastic pipe or tubing ASTM F2389; CSA B137.11

Polyvinyl chloride (PVC) plastic ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3

Stainless steel (Type 304/304L) ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226

Stainless steel (Type 316/316L) ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226

Steel ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548

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 serving as a 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 1/4 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/CSA B125.6. Access shall be provided to all flexible water connectors.

605.7 Valves

Valves shall be compatible with the type of piping material installed in the system. Valves shall conform to one of the standards listed in Table 605.7 or shall be approved. Valves intended to supply drinking water shall meet the requirements of NSF 61.

TABLE 605.7

VALVES

MATERIAL STANDARD

Chlorinated polyvinyl chloride (CPVC) plastic ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122

Copper or copper alloy ASME A112.4.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139

Cross-linked polyethylene (PEX) plastic ASME A112.4.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359

Gray iron and ductile iron AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78

Polypropylene (PP) plastic ASME A112.4.14; ASTM F2389; IAPMO Z1157

Polyvinyl chloride (PVC) plastic ASME A112.4.14; ASTM F1970; IAPMO Z1157; MSS SP-122

605.8 Manufactured Pipe Nipples

Manufactured pipe nipples shall conform to one of the standards listed in Table 605.8.

TABLE 605.8

MANUFACTURED PIPE NIPPLES

MATERIAL STANDARD

Copper, copper alloy, and chromium-plated ASTM B687

Steel ASTM A733

605.9 Prohibited Joints and Connections

The following types of joints and connections shall be prohibited:

Cement or concrete joints.

Joints made with fittings not approved for the specific installation.

Solvent-cement joints between different types of plastic pipe.

Saddle-type fittings.

605.10 ABS Plastic

Joints between ABS plastic pipe and fittings shall comply with Sections 605.10.1 through 605.10.3.

605.10.1 Mechanical Joints

Mechanical joints on water pipes shall be made with an elastomeric seal conforming to ASTM D3139. Mechanical joints shall only be installed in underground systems, unless otherwise approved. Joints shall be installed only in accordance with the manufacturer's instructions.

605.10.2 Solvent Cementing

Joint surfaces shall be clean and free from moisture. Solvent cement that conforms to ASTM D2235 shall be applied to all joint surfaces. The joint shall be made while the cement is wet. Joints shall be made in accordance with ASTM D2235. Solvent-cement joints shall be permitted above or below ground.

605.10.3 Threaded Joints

Threads shall conform to ASME B1.20.1. Where pipe is to be threaded, the pipe shall have a wall thickness of not less than Schedule 80. Pipe threads shall be made with dies specifically designed for plastic pipe. Approved thread lubricant or tape shall be applied on the male threads only.

605.11 Gray Iron and Ductile Iron Joints

Joints for gray and ductile iron pipe and fittings shall comply with AWWA C111/A21.11 and shall be installed in accordance with the manufacturer's instructions.

605.12 Copper Pipe

Joints between copper or copper-alloy pipe and fittings shall comply with Sections 605.12.1 through 605.12.5.

605.12.1 Brazed Joints

Joint surfaces shall be cleaned. An approved flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

605.12.2 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.12.3 Solder Joints

Solder joints shall be made in accordance with ASTM B828. Cut tube ends shall be reamed to the full inside diameter of the tube end. Joint surfaces shall be cleaned. A flux conforming to ASTM B813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32. The joining of water supply piping shall be made with lead-free solder and fluxes. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead. Solder and flux joining pipe or fittings intended to supply drinking water shall conform to NSF 61.

605.12.4 Threaded Joints

Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

605.12.5 Welded Joints

Joint surfaces shall be cleaned. The joint shall be welded with an approved filler metal.

605.13 Copper Tubing

Joints between copper or copper-alloy tubing and fittings shall comply with Sections 605.13.1 through 605.13.7.

605.13.1 Brazed Joints

Joint surfaces shall be cleaned. An approved flux shall be applied where required. The joint shall be brazed with a filler metal conforming to AWS A5.8.

605.13.2 Flared Joints

Flared joints for water pipe shall be made by a tool designed for that operation.

605.13.3 Grooved and Shouldered Mechanical Joints

Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.13.4 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.13.5 Press-Connect Joints

Press-connect joints shall conform to one of the standards indicated in Table 605.5, and shall be installed in accordance with the manufacturer's instructions. Cut tube ends shall be reamed to the full inside diameter of the tube end. Joint surfaces shall be cleaned. The tube shall be fully inserted into the press-connect fitting. Press-connect joints shall be pressed with a tool certified by the manufacturer.

605.13.6 Solder Joints

Solder joints shall be made in accordance with the methods of ASTM B828. Cut tube ends shall be reamed to the full inside diameter of the tube end. Joint surfaces shall be cleaned. A flux conforming to ASTM B813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32. The joining of water supply piping shall be made with lead-free solder and flux. "Lead free" shall mean a chemical composition equal to or less than 0.2-percent lead. Solder and flux joining pipe or fittings intended to supply drinking water shall conform to NSF 61.

605.13.7 Push-Fit Fitting Joints

Push-fit fittings shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

605.14 CPVC Plastic

Joints between CPVC plastic pipe and fittings shall comply with Sections 605.14.1 through 605.14.4.

605.14.1 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.14.2 Solvent Cementing

Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe manufacturer's installation instructions. Where such instructions require that a primer be used, the primer shall be applied to the joint surfaces and a solvent cement orange in color and conforming to ASTM F493 shall be applied to the joint surfaces. Where such instructions allow for a one-step solvent cement, yellow in color and conforming to ASTM F493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet and in accordance with ASTM D2846 or ASTM F493. Solvent-cemented joints shall be permitted above or below ground.

605.14.3 Threaded Joints

Threads shall conform to ASME B1.20.1. Where pipe is to be threaded, the pipe shall have a wall thickness of not less than Schedule 80. Pipe threads shall be made with dies specifically designed for plastic pipe. The pressure rating of threaded pipe shall be reduced by 50 percent. Thread-by-socket molded fittings shall be permitted. Approved thread lubricant or tape shall be applied on the male threads only.

605.14.4 Push-Fit Joints

Push-fit joints shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

605.15 Chlorinated Polyvinyl Chloride/Aluminum/Chlorinated Polyvinyl Chloride (CPVC/AL/CPVC) Pipe and Tubing

Joints between CPVC/AL/CPVC plastic pipe or CPVC fittings shall comply with Sections 605.15.1 and 605.15.2.

605.15.1 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.15.2 Solvent Cementing

Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent cement joints shall be permitted above or below ground. The use of all-purpose glue is prohibited unless it contains the specific ASTM certification for the utilized pipe and fittings.

Exception: A primer is not required where all of the following conditions apply:

The solvent cement used is third-party certified as conforming to ASTM F493.

The solvent cement used is yellow in color.

The solvent cement is used only for joining 1/2-inch (12.7 mm) through 2-inch-diameter (51 mm) CPVC/AL/CPVC pipe and CPVC fittings.

The CPVC fittings are manufactured in accordance with ASTM D2846.

605.16 PEX Plastic

Joints between cross-linked polyethylene plastic tubing and fittings shall comply with Sections 605.16.1 through 605.16.3.

605.16.1 Flared Joints

Flared pipe ends shall be made by a tool designed for that operation.

605.16.2 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions. Fittings for cross-linked polyethylene (PEX) plastic tubing shall comply with the applicable standards listed in Table 605.5 and shall be installed in accordance with the manufacturer's instructions. PEX tubing shall be factory marked with the appropriate standards for the fittings that the PEX manufacturer specifies for use with the tubing.

605.16.3 Push-Fit Joints

Push-fit joints shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

605.17 Steel

Joints between galvanized steel pipe and fittings shall comply with Sections 605.17.1 through 605.17.3.

605.17.1 Threaded Joints

Threads shall conform to ASME B1.20.1. Pipe-joint compound or tape shall be applied on the male threads only.

605.17.2 Mechanical Joints

Joints shall be made with an approved elastomeric seal. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.17.3 Grooved and Shouldered Mechanical Joints

Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.18 PE Plastic

Joints between polyethylene plastic pipe or tubing and fittings shall comply with Sections 605.18.1 through 605.18.4.

605.18.1 Flared Joints

Flared joints shall be permitted where so indicated by the pipe manufacturer. Flared joints shall be made by a tool designed for that operation.

605.18.2 Heat-Fusion Joints

Joint surfaces shall be clean and free from moisture. Joint surfaces shall be heated to melt temperature and joined. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM D2657.

605.18.3 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.18.4 Installation

Polyethylene pipe shall be cut square, with a cutter designed for plastic pipe. Except where joined by heat fusion, pipe ends shall be chamfered to remove sharp edges. Kinked pipe shall not be installed. The minimum pipe bending radius shall be not less than 30 pipe diameters, or the minimum coil radius, whichever is greater. Piping shall not be bent beyond straightening of the curvature of the coil. Bends shall be prohibited within 10 pipe diameters of any fitting or valve. Stiffener inserts installed with compression-type couplings and fittings shall not extend beyond the clamp or nut of the coupling or fitting.

605.19 Polypropylene (PP) Plastic

Joints between PP plastic pipe and fittings shall comply with Section 605.19.1 or 605.19.2.

605.19.1 Heat-Fusion Joints

Heat-fusion joints for polypropylene pipe and tubing joints shall be installed with socket-type heat-fused polypropylene fittings, butt-fusion polypropylene fittings or electrofusion polypropylene fittings. Joint surfaces shall be clean and free from moisture. The joint shall be undisturbed until cool. Joints shall be made in accordance with ASTM F2389.

605.19.2 Mechanical and Compression Sleeve Joints

Mechanical and compression sleeve joints shall be installed in accordance with the manufacturer's instructions.

605.20 Polyethylene/Aluminum/Polyethylene (PE-AL-PE) and Cross-Linked Polyethylene/Aluminum/Cross-Linked Polyethylene (PEX-AL-PEX)

Joints between PE-AL-PE or PEX-AL-PEX pipe and fittings shall comply with Section 605.20.1.

605.20.1 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions. Fittings for PE-AL-PE and PEX-AL-PEX as described in ASTM F1281, ASTM F1282, ASTM F1974, CSA B137.9 and CSA B137.10 shall be installed in accordance with the manufacturer's instructions.

605.21 PVC Plastic

Joints between PVC plastic pipe and fittings shall comply with Sections 605.21.1 through 605.21.3.

605.21.1 Mechanical Joints

Mechanical joints on water pipe shall be made with an elastomeric seal conforming to ASTM D3139. Mechanical joints shall not be installed in above-ground systems unless otherwise approved. Joints shall be installed in accordance with the manufacturer's instructions.

605.21.2 Grooved and Shouldered Mechanical Joints

Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.21.3 Solvent Cementing

Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F656 shall be applied. Solvent cement not purple in color and conforming to ASTM D2564 or CSA B137.3 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D2855. Solvent-cement joints shall be permitted above or below ground.

605.21.4 Threaded Joints

Threads shall conform to ASME B1.20.1. Where pipe is to be threaded, the pipe shall have a wall thickness of not less than Schedule 80. Pipe threads shall be made with dies specifically designed for plastic pipe. The pressure rating of threaded pipe shall be reduced by 50 percent. Thread-by-socket molded fittings shall be permitted. Approved thread lubricant or tape shall be applied on the male threads only.

605.22 Stainless Steel

Joints between stainless steel pipe and fittings shall comply with Sections 605.22.1 through 605.22.3.

605.22.1 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions.

605.22.2 Welded Joints

Joint surfaces shall be cleaned. The joint shall be welded autogenously or with an approved filler metal as referenced in ASTM A312.

605.22.3 Grooved and Shouldered Mechanical Joints

Grooved and shouldered mechanical joints shall comply with ASTM F1476, shall be made with an approved elastomeric seal and shall be installed in accordance with the manufacturer's instructions. Such joints shall be exposed or concealed.

605.23 Joints Between Different Materials

Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical-sealing type, or shall be made in accordance with Section 605.23.1, 605.23.2 or 605.23.3. Connectors or adapters shall have an elastomeric seal conforming to ASTM F477. Joints shall be installed in accordance with the manufacturer's instructions.

605.23.1 Copper or Copper-Alloy Tubing to Galvanized Steel Pipe

Joints between copper pipe or tubing and galvanized steel pipe shall be made with a copper-alloy or dielectric fitting or a dielectric union conforming to ASSE 1079. The copper tubing shall be soldered to the fitting in an approved manner, and the fitting shall be screwed to the threaded pipe

605.23.2 Plastic Pipe or Tubing to Other Piping Material

Joints between different types of plastic pipe or between plastic pipe and other piping material shall be made with approved adapters or transition fittings.

605.23.3 Stainless Steel

Joints between stainless steel and different piping materials shall be made with a mechanical joint of the compression or mechanical sealing type or a dielectric fitting or a dielectric union conforming to ASSE 1079.

605.24 PE-RT Plastic

Joints between polyethylene of raised temperature plastic tubing and fittings shall be in accordance with Section 605.24.1.

605.24.1 Mechanical Joints

Mechanical joints shall be installed in accordance with the manufacturer's instructions. Fittings for polyethylene of raised temperature plastic tubing shall comply with the applicable standards indicated in Table 605.5 and shall be installed in accordance with the manufacturer's instructions. Polyethylene of raised temperature plastic tubing shall be factory marked with the applicable standards for the fittings that the manufacturer of the tubing specifies for use with the tubing.

Section 606 Installation of the Building Water Distribution System

606.1 Location of Full-Open Valves

Full-open valves shall be installed in the following locations:

On the building water service pipe from the public water supply near the curb.

On the water distribution supply pipe at the entrance into the structure.

2.1. In multiple-tenant buildings, where a common water supply piping system is installed to supply other than one- and two-family dwellings, a main shutoff valve shall be provided for each tenant.

On the discharge side of every water meter.

On the base of every water riser pipe in occupancies other than multiple-family residential occupancies that are two stories or less in height and in one- and two-family residential occupancies.

On the top of every water down-feed pipe in occupancies other than one- and two-family residential occupancies.

On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.

On the water supply pipe to a gravity or pressurized water tank.

On the water supply pipe to every water heater.

606.2 Location of Shutoff Valves

Shutoff valves shall be installed in the following locations:

On the fixture supply to each plumbing fixture other than bathtubs and showers in one- and two-family residential occupancies, and other than in individual sleeping units that are provided with unit shutoff valves in hotels, motels, boarding houses and similar occupancies.

On the water supply pipe to each sillcock.

On the water supply pipe to each appliance or mechanical equipment.

606.3 Access to Valves

Access shall be provided to all full-open valves and shutoff valves.

606.4 Valve Identification

Service and hose bibb valves shall be identified. Other valves installed in locations that are not adjacent to the fixture or appliance shall be identified, indicating the fixture or appliance served.

606.5 Water Pressure Booster Systems

Water pressure booster systems shall be provided as required by Sections 606.5.1 through 606.5.10.

606.5.1 Water Pressure Booster Systems Required

Where the water pressure in the public water main or individual water supply system is insufficient to supply the minimum pressures and quantities specified in this code, the supply shall be supplemented by an elevated water tank, a hydropneumatic pressure booster system or a water pressure booster pump installed in accordance with Section 606.5.5.

606.5.2 Support

Water supply tanks shall be supported in accordance with the International Building Code.

606.5.3 Covers

Water supply tanks shall be covered to keep out unauthorized persons, dirt and vermin. The covers of gravity tanks shall be vented with a return bend vent pipe with an area not less than the area of the down-feed riser pipe, and the vent shall be screened with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m).

606.5.4 Overflows for Water Supply Tanks

A gravity or suction water supply tank shall be provided with an overflow with a diameter not less than that shown in Table 606.5.4. The overflow outlet shall discharge at a point not 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 1/4-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 21/2

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 drain pipe with a valve 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 11/2

1,501 to 3,000 2

3,001 to 5,000 21/2

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

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 size of such vacuum relief valve shall be not less than 1/2 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 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.

607.1.1 Temperature Limiting Means

A thermostat control for a water heater shall only serve as the temperature limiting means for the purposes of complying with the requirements of this code for maximum allowable hot or tempered water delivery temperature at fixtures where the water heater complies with ASSE 1082 or ASSE 1085.

607.1.2 Tempered Water Temperature Control

Tempered water shall be controlled by one the following:

A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70 and set to not greater than 110°F (43°C).

A thermostatic mixing valve conforming to ASSE 1017.

A water heater conforming to ASSE 1082.

A water heater conforming to ASSE 1084.

This provision shall not supersede the requirement for protective shower valves in accordance with Section 412.3.

607.2 Hot or Tempered Water Supply to Fixtures

The developed length of hot or tempered water piping, from the source of hot water to the fixtures that require hot or tempered water, shall not exceed 50 feet (15 240 mm). Recirculating system piping and heat-traced piping shall be considered to be sources of hot or tempered water.

607.2.1 Circulation Systems and Heat Trace Systems for Maintaining Heated Water Temperature in Distribution Systems

Diagram

For Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, the installation of heated water circulation and temperature maintenance systems shall be in accordance with Section R403.5.1 of the International Energy Conservation Code. For other than Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, the installation of heated water circulation and heat trace systems shall be in accordance with Section C404.6 of the International Energy Conservation Code.

UpCodes Diagrams

P

Grade Plane

607.2.1.1 Pump Controls for Hot Water Storage Systems

The controls on pumps that circulate water between a water heater and a storage tank for heated water shall limit operation of the pump from heating cycle startup to not greater than 5 minutes after the end of the cycle.

607.2.1.2 Demand Recirculation Controls for Distribution Systems

A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply pipe shall be a demand recirculation water system. Pumps shall have controls that comply with both of the following:

The control shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture, or sensing the flow of hot or tempered water to a fixture fitting or appliance.

The control shall limit the temperature of the water entering the cold water piping to 104°F (40°C).

607.2.2 Piping for Recirculation Systems Having Temperature-Actuated Mixing Valves

Where a temperature-actuated 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 temperature-actuated mixing valve.

607.3 Thermal Expansion Control

Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8. All public water installations shall be required to have an expansion tank on storage water heaters installed between the water heater shut off valve and the water heater on the cold side.

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/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1, where the flow of hot water corresponds to the markings on the device.

[E] 607.5 Insulation of Piping

For other than Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, piping to the inlet of a water heater and piping conveying water heated by a water heater shall be insulated in accordance with Section C404.4 of the International Energy Conservation Code. For Group R2, R3 and R4 occupancies that are three stories or less in height above grade plane, piping to the inlet of a water heater and piping conveying water heated by a water heater shall be insulated in accordance with Section R403.5.2 of the International Energy Conservation Code.

Upcodes Diagrams

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 608.17.10.

TABLE 608.1

APPLICATION OF BACKFLOW PREVENTERS

DEVICE DEGREE OF HAZARDa APPLICATIONb APPLICABLE STANDARDS

Backflow prevention assemblies:

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 Sizes 2"—16" ASSE 1048

Pressure vacuum breaker assembly High or low hazard Backsiphonage only Sizes 1/2"—2" ASSE 1020; CSA B64.1.2

Reduced pressure principle backflow prevention assembly and reduced pressure principle fire protection backflow assembly 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 (automatic sprinkler systems) ASSE 1047

Spill-resistant vacuum breaker assembly High or low hazard Backsiphonage only Sizes 1/4"—2" ASSE 1056; CSA B64.1.3

Backflow preventer plumbing devices:

Antisiphon-type fill valves for gravity water closet flush tanks High hazard Backsiphonage only ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3

Backflow preventer for carbonated beverage machines Low hazard Backpressure or backsiphonage Sizes 1/4"—3/8" ASSE 1022

Backflow preventer with intermediate atmospheric vents Low hazard Backpressure or backsiphonage Sizes 1/4"—3/4" ASSE 1012; CSA B64.3

Backflow preventer with intermediate atmospheric vent and pressure-reducing valve. Low hazard

Backpressure or backsiphonage Sizes 1/4"—3/4" ASSE 1081

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" ASME A112.21.3; 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" ASME A112.21.3; 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

Vacuum breaker wall hydrants, frost-resistant, automatic-draining-type High or low hazard Low head backpressure or backsiphonage Sizes 3/4", 1" ASME A112.21.3; ASSE 1019; CSA B64.2.2

Other means or methods:

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

Barometric loop High or low hazard Backsiphonage only (See Section 608.14.4)

For SI: 1 inch = 25.4 mm.

Low hazard—See Pollution (Section 202).

High hazard—See Contamination (Section 202).

See Backpressure, low head (Section 202, Backflow).

See Backsiphonage (Section 202, Backflow).

608.2 Plumbing Fixtures

The supply lines and fittings for plumbing fixtures shall be installed so as to prevent backflow. Plumbing fixture fittings shall provide backflow protection in accordance with ASME A112.18.1/CSA B125.1.

608.3 Devices, Appurtenances, Appliances and Apparatus

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.

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 prevention assembly, an atmospheric or spill-resistant vacuum breaker assembly, 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 be not less than 6 feet (1829 mm) above the floor.

608.3.2 Special Equipment, Water Supply Protection

There shall be sufficient space around special equipment for accessibility.

608.4 Potable Water Handling and Treatment Equipment

Water pumps, filters, softeners, tanks and other appliances and devices that handle or treat potable water to be supplied to the potable water distribution system shall be located to prevent contamination from entering the appliances and devices. Overflow, relief valve and waste discharge pipes from such appliances and devices shall terminate through an air gap.

608.5 Water Service Piping

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

608.6 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.

608.7 Cross Connection Control

Cross connections shall be prohibited, except where approved backflow prevention assemblies, backflow prevention devices or other means or methods are installed to protect the potable water supply.

608.7.1 Private Water Supplies

Cross connections between a private water supply and a potable public supply shall be prohibited.

608.8 Valves and Outlets Prohibited Below Grade

Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. A freezeproof yard hydrant that drains the riser into the ground shall be considered as having a stop-and-waste valve below grade.

Exception: Freezeproof yard hydrants that drain the riser into the ground shall be permitted to be installed, provided that the potable water supply to such hydrants is protected in accordance with Section 608.14.2 or 608.14.5, and the hydrants and the piping from the backflow preventer to the hydrant are identified in accordance with Section 608.9.

608.9 Identification of Nonpotable Water Systems

Where nonpotable water systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections 608.9.1 through 608.9.2.3.

608.9.1 Signage Required

Nonpotable water outlets, such as hose connections, open-ended pipes and faucets, shall be identified with signage that reads as follows: "Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER — DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure 608.9.1 shall appear on the required signage.

FIGURE 608.9.1

PICTOGRAPH—DO NOT DRINK

608.9.2 Distribution Pipe Labeling and Marking

Non-potable distribution piping shall be purple in color and shall be embossed, or integrally stamped or marked, with the words: "CAUTION: NONPOTABLE WATER — DO NOT DRINK" or the piping shall be installed with a purple identification tape or wrap. 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 intervals not exceeding 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.

608.9.2.1 Color

The color of the pipe identification shall be discernable and consistent throughout the building. The color purple shall be used to identify reclaimed, rain and graywater distribution systems.

608.9.2.2 Lettering Size

The size of the background color field and lettering shall comply with Table 608.9.2.2.

TABLE 608.9.2.2

SIZE OF PIPE IDENTIFICATION

PIPE DIAMETER (inches) LENGTH BACKGROUND COLOR FIELD (inches) SIZE OF LETTERS (inches)

3/4 to 11/4 8 0.5

11/2 to 2 8 0.75

21/2 to 6 12 1.25

8 to 10 24 2.5

over 10 32 3.5

For SI: 1 inch = 25.4 mm.

608.9.2.3 Identification Tape

Where used, identification tape shall be not less than 3 inches (76 mm) wide and have white or black lettering on a purple field stating "CAUTION: NONPOTABLE WATER — DO NOT DRINK." Identification tape shall be installed on top of nonpotable rainwater distribution pipes, fastened not less than every 10 feet (3048 mm) to each pipe length and run continuously the entire length of the pipe.

608.10 Reutilization Prohibited

Water utilized for the heating or 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 nonpotable purposes.

608.11 Reuse of Piping

Piping that has been utilized for any purpose other than conveying potable water shall not be utilized for conveying potable water.

608.12 Potable Water Tanks

Where in contact with potable water intended for drinking water, water tanks, coatings for the inside of tanks and liners for water tanks shall conform to NSF 61. 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.

608.13 Pumps and Other Appliances

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

608.14 Backflow Protection

Means of protection against backflow shall be provided in accordance with Sections 608.14.1 through 608.14.9.

608.14.1 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. Products that are listed and labeled to ASME A112.1.2 or ASME A112.1.3 shall be considered to be in compliance with this section.

608.14.2 Reduced Pressure Principle Backflow Prevention Assemblies

Reduced pressure principle backflow prevention assemblies shall conform to ASSE 1013, AWWA C511, CSA B64.4 or CSA B64.4.1. 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.

608.14.3 Backflow Preventer With Intermediate Atmospheric Vent

Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012, ASSE 1081 or 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.

608.14.4 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.

608.14.5 Pressure Vacuum Breaker Assemblies

Pressure vacuum breaker assemblies shall comply with ASSE 1020 or CSA B64.1.2. Spill-resistant vacuum breaker assemblies shall comply with ASSE 1056 or CSA B64.1.3. These assemblies shall be installed with the critical level of the assembly located not less than 12 inches (305 mm) above all downstream piping and outlets. Pressure vacuum breaker assemblies shall not be installed in locations where spillage could cause damage to the structure.

608.14.6 Atmospheric-Type Vacuum Breakers

Pipe-applied atmospheric-type vacuum breakers shall conform to ASSE 1001 or CSA B64.1.1. Hose-connection vacuum breakers shall conform to ASME A112.21.3, ASSE 1011, ASSE 1019, ASSE 1035, ASSE 1052, CSA B64.2, CSA B64.2.1, CSA B64.2.1.1, 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.

608.14.7 Double Check Backflow Prevention Assemblies

Double check backflow prevention assemblies shall conform to ASSE 1015, CSA B64.5, CSA B64.5.1 or AWWA C510. Double check detector fire protection backflow prevention assemblies shall conform to ASSE 1048. These assemblies shall be capable of operating under continuous pressure conditions.

608.14.8 Chemical Dispenser Backflow Devices

Back-flow devices for chemical dispensers shall comply with ASSE 1055 or shall be equipped with an air gap fitting.

608.14.9 Dual Check Backflow Preventer

Dual check backflow preventers shall conform to ASSE 1024 or CSA B64.6.

608.15 Location of Backflow Preventers

Access shall be provided to backflow preventers as specified by the manufacturer's instructions.

608.15.1 Outdoor Enclosures for Backflow Prevention Devices

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

608.15.2 Protection of Backflow Preventers

Backflow preventers shall not be located in areas subject to freezing except where they can be removed by means of unions or are protected from freezing by heat, insulation or both.

608.15.2.1 Relief Port Piping

The termination of the piping from the relief port or air gap fitting of a backflow preventer shall discharge to an approved indirect waste receptor or to the outdoors where it will not cause damage or create a nuisance. The indirect waste receptor and drainage piping shall be sized to drain the maximum discharge flow rate from the relief port as published by the backflow preventer manufacturer.

608.16 Protection of Potable Water Outlets

Potable water openings and outlets shall be protected against backflow in accordance with Section 608.16.1, 608.16.2, 608.16.3, 608.16.4, 608.16.4.1 or 608.16.4.2.

608.16.1 Protection by Air Gap

Diagram

Openings and outlets shall be protected by an air gap between the opening and the fixture flood level rim as specified in Table 608.16.1. Openings and outlets equipped for hose connection shall be protected by means other than an air gap.

TABLE 608.16.1

MINIMUM REQUIRED AIR GAPS

FIXTURE MINIMUM AIR GAP

Away from a walla (inches) Close to a wall (inches)

Lavatories and other fixtures with effective openings not greater than 1/2 inch in diameter 1 11/2

Sinks, laundry trays, gooseneck back faucets and other fixtures with effective openings not greater than 3/4 inch in diameter 11/2 21/2

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 11/2

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, 1 square inch = 645 mm2.

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.

UpCodes Diagrams

P

Air Gaps

608.16.2 Protection by Reduced Pressure Principle Backflow Prevention Assembly

Openings and outlets shall be protected by a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly on potable water supplies.

608.16.3 Protection by a Backflow Preventer With Intermediate Atmospheric Vent

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

608.16.4 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 not less than 6 inches (152 mm) above the flood level rim of the fixture or device. Fill valves shall be set in accordance with Section 415.3.1. 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.

608.16.4.1 Deck-Mounted and Integral Vacuum Breakers

Approved deck-mounted or equipment-mounted vacuum breakers and faucets with integral atmospheric vacuum breakers or spill-resistant vacuum breaker assemblies shall be installed in accordance with the manufacturer's instructions and the requirements for labeling with the critical level not less than 1 inch (25 mm) above the flood level rim.

608.16.4.2 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:

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.

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.

608.17 Connections to the Potable Water System

Connections to the potable water system shall conform to Sections 608.17.1 through 608.17.10.

608.17.1 Beverage Dispensers

The water supply connection to beverage dispensers shall be protected against backflow in accordance with Sections 608.17.1.1 and 608.17.1.2 .

608.17.1.1 Carbonated Beverage Dispensers

The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or by an air gap . The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

608.17.1.2 Coffee Machines and Noncarbonated Drink Dispensers

The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024 , or protected by an air gap .

608.17.2 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, ASSE 1081 or 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, AWWA C511 or CSA B64.4 .

608.17.3 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.

608.17.4 Connections to Automatic Sprinkler Systems and Standpipe Systems

The potable water supply to automatic sprinkler systems and standpipe systems shall be protected against backflow by a double check backflow prevention assembly, a double check fire protection backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly.

Exceptions:

Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.

Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.

Fire sprinklers in 1 and 2 family dwelling units connected to the potable water system shall be regulated by The New Home Buyer's Fire Protection act, Title 6 Chapter 36 of Delaware code, requirements of local jurisdictions and requirements from the Delaware State Fire Marshal's office. Combined domestic and fire sprinkler systems in 1 and 2 family home systems shall utilize potable water piping and not require backflow protection to separate the fire sprinkler system from the potable water distribution system unless it is connected to a fire department connection or contains antifreeze in accordance with NFPA 13-D. The Division of Public Health does not approve the design of fire protection systems.

608.17.4.1 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 prevention assembly or a reduced pressure principle fire protection backflow prevention assembly. Where chemical additives or antifreeze are added to only a portion of an automatic sprinkler system or standpipe system, the reduced pressure principle backflow prevention assembly or the reduced pressure principle fire protection backflow prevention assembly 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 an atmospheric vacuum breaker conforming to ASSE 1001 or CSA B64.1.1.

608.17.5 Connections to Lawn Irrigation Systems

The potable water supply to lawn irrigation systems shall be protected against backflow by an atmospheric vacuum breaker, a pressure vacuum -breaker assembly or a reduced pressure principle backflow prevention assembly. Valves 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 prevention assembly.

608.17.6 Connections Subject to Backpressure

Where a potable water connection is made to a nonpotable line, fixture, tank, vat, pump or other equipment subject to high-hazard backpressure, the potable water connection shall be protected by a reduced pressure principle backflow prevention assembly.

608.17.7 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 608.14.1, 608.14.2, 608.14.5, 608.14.6, or 608.14.8.

608.17.8 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 608.14.1, 608.14.2, 608.14.3, 608.14.7 or 608.14.8.

608.17.9 Dental Pumping Equipment

The water supply connection to each dental pumping equipment system, the water supply system shall be protected against backflow in accordance with Section 608.14.1, 608.14.2, 608.14.5, 608.14.6 or 608.14.8.

608.17.10 Humidifiers

The water supply connection to humidifiers that do not have internal backflow protection shall be protected against backflow by a backflow preventer conforming to ASSE 1012 or by an air gap.

608.18 Protection of Individual Water Supplies

An individual water supply shall be located and constructed so as to be safeguarded against contamination in accordance with Sections 608.18.1 through 608.18.8.

608.18.1 Well Locations

A potable ground water source or pump suction line shall not be located closer to potential sources of contamination than the distances shown in Table 608.18.1. In the event the underlying rock structure is limestone or fragmented shale, the local or state health department shall be consulted on well site location. The distances in Table 608.18.1 constitute minimum separation and shall be increased in areas of creviced rock or limestone, or where the direction of movement of the ground water is from sources of contamination toward the well.

TABLE 608.18.1

DISTANCE FROM CONTAMINATION TO PRIVATE WATER SUPPLIES AND PUMP SUCTION LINES

SOURCE OF CONTAMINATION DISTANCE (feet)

Barnyard 100

Farm silo 25

Pasture 100

Pumphouse floor drain of cast iron draining to ground surface 2

Seepage pits 50

Septic tank 25

Sewer 10

Subsurface disposal fields 50

Subsurface pits 50

For SI: 1 foot = 304.8 mm.

608.18.2 Elevation

Well sites shall be positively drained and shall be at higher elevations than potential sources of contamination.

608.18.3 Depth

Private potable well supplies shall not be developed from a water table less than 10 feet (3048 mm) below the ground surface.

608.18.4 Watertight Casings

Each well shall be provided with a watertight casing extending to not less than 10 feet (3048 mm) below the ground surface. Casings shall extend not less than 6 inches (152 mm) above the well platform. Casings shall be large enough to permit installation of a separate drop pipe. Casings shall be sealed at the bottom in an impermeable stratum or extend several feet (mm) into the water-bearing stratum.

608.18.5 Drilled or Driven Well Casings

Drilled or driven well casings shall be of steel or other approved material. Where drilled wells extend into a rock formation, the well casing shall extend to and set firmly in the formation. The annular space between the earth and the outside of the casing shall be filled with cement grout to a depth of not less than 10 feet (3048 mm) below the ground surface. In an instance of casing to rock installation, the grout shall extend to the rock surface.

608.18.6 Dug or Bored Well Casings

Dug or bored well casings shall be of watertight concrete, tile or galvanized or corrugated metal pipe extending to not less than 10 feet (3048 mm) below the ground surface. Where the water table is more than 10 feet (3048 mm) below the ground surface, the watertight casing shall extend below the table surface. Well casings for dug wells or bored wells constructed with sections of concrete, tile or galvanized or corrugated metal pipe shall be surrounded by 6 inches (152 mm) of grout poured into the hole between the outside of the casing and the ground and extending not less than 10 feet (3048 mm) below the ground surface.

608.18.7 Cover

Potable water wells shall be equipped with an overlapping watertight cover at the top of the well casing or pipe sleeve such that contaminated water or other substances are prevented from entering the well through the annular opening at the top of the well casing, wall or pipe sleeve. Covers shall extend downward not less than 2 inches (51 mm) over the outside of the well casing or wall. A dug well cover shall be provided with a pipe sleeve permitting the withdrawal of the pump suction pipe, cylinder or jet body without disturbing the cover. Where pump sections or discharge pipes enter or leave a well through the side of the casing, the circle of contact shall be watertight.

608.18.8 Drainage

Potable water wells and springs shall be constructed such that surface drainage will be diverted away from the well or spring.

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 the requirements of 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: Group I-1, Group I- 2, Group B ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

609.2 Water Service for Group I-2, Condition 2 Facilities

Group I-2, Condition 2 facilities shall have not fewer than two water service pipes sized such that with the loss of the largest service pipe, the remaining service pipes will meet the water demand for the entire facility. Each water service shall have a shutoff valve in the building and a shutoff valve at the utility-provided point of connection to the water main or other source of potable water.

609.2.1 Tracer Wire for Nonmetallic Piping

An insulated tracer wire listed for the purpose or other approved conductor shall be installed adjacent to underground nonmetallic piping serving as a water service for a hospital. Access shall be provided to the tracer wire or the tracer wire shall terminate above ground at each end of the nonmetalic piping. The tracer wire size shall be not less than 18 AWG and the wire insulation type shall be suitable for direct burial.

609.3 Hot Water

Hot water shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

609.4 Vacuum Breaker Installation

Vacuum breakers shall be installed not less than 6 inches (152 mm) above the flood level rim of the fixture or device in accordance with Section 608. The flood level rim of hose connections shall be the maximum height at which any hose is utilized.

609.5 Prohibited Water Closet and Clinical Sink Supply

Jet- or water-supplied orifices, except those supplied by the flush connections, shall not be located in or connected with a water closet bowl or clinical sink. This section shall not prohibit an approved bidet installation.

609.6 Clinical, Hydrotherapeutic and Radiological Equipment

Clinical, hydrotherapeutic, radiological or any equipment that is supplied with water or that discharges to the waste system shall conform to the requirements of this section and Section 608.

609.7 Condensate Drain Trap Seal

A water supply shall be provided for cleaning, flushing and resealing the condensate trap, and the trap shall discharge through an air gap in accordance with Section 608.

609.8 Valve Leakage Diverter

Each water sterilizer filled with water through directly connected piping shall be equipped with an approved leakage diverter or bleed line on the water supply control valve to indicate and conduct any leakage of unsterile water away from the sterile zone.

Section 610 Disinfection of Potable Water System

The Delaware Division of Public Health Plumbing Permit and Inspection Program does not test drinking water.

610.1 General

New 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.

The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.

The system or part thereof shall be filled with a water/chlorine solution containing not less than 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 not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.

Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.

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

Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, 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 CSA B483.1 or 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 the International 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. Such valves shall be installed at the hot water source.







