Bill No. 12453-22

No. 31-22-OR

AN ORDINANCE

An Ordinance of the Council of the County of Allegheny ratifying amendments to the Allegheny County Health Department's Rules and Regulations, Article XV, "Plumbing and Building Drainage."

Whereas, Allegheny County, pursuant to the Pennsylvania Local Health Administration Law, 16 P.S. §§ 12001 – 12028, created the Allegheny County Health Department, and the Allegheny County Board of Health; and

Whereas, Section 12011 of the Local Health Administration Law provides for the Board of Health to adopt regulations and submit such regulations to Allegheny County for approval or rejection; and

Whereas, on September 7, 2022, during its regularly scheduled public meeting, the Allegheny County Board of Health adopted by unanimous vote the attached amendments to the Allegheny County Health Department Rules and Regulations, Article XV, "Plumbing and Building Drainage"; and

Whereas, it is the desire of Council to ratify the Allegheny County Health Department regulation amendments as approved by the Board of Health.

The Council of the County of Allegheny hereby resolves as follows:

SECTION 1. ***Incorporation of Preamble.***

The provisions set forth in the preamble to this Ordinance are incorporated by reference in their entirety herein.

SECTION 2. ***Ratification of Regulations.***

Acting pursuant to the Pennsylvania Local Health Administration Law and the Allegheny County Home Rule Charter, County Council hereby ratifies the amendments to the Allegheny County Health Department Rules and Regulations, Article XV, "Plumbing and Building Drainage", attached hereto as Exhibit "A."

SECTION 3. ***Severability.***

If any provision of this Ordinance shall be determined to be unlawful, invalid, void or unenforceable, then that provision shall be considered severable from the remaining provisions of this Ordinance which shall be in full force and effect.

SECTION 4. ***Repealer.***

Any Resolution or Ordinance or part thereof conflicting with the provisions of this Ordinance is hereby repealed so far as the same affects this Ordinance.

SECTION 5 ***Effective Date.***

In accordance with Section 12011(c) of the Local Health Administration Law, this Ordinance shall become effective ten days after it has been approved.

Enacted in Council, this 25th *day of* October, *2022.*

Council Agenda No. 1248-22.

Patrick J. Catena
President of Council

Attest:
Jared Barker
Chief Clerk of Council

Chief Executive Office October 26th, *2022*

Approved:
Rich Fitzgerald
Chief Executive

Attest:
Jennifer M. Liptak
Chief of Staff

MEMORANDUM

OFFICE OF THE COUNTY MANAGER

TO: Jared E. Barker
Allegheny County Council

FROM: William D. McKain CPA
County Manager

DATE: September 15, 2022

RE: Proposed Ordinance

Attached is an Ordinance of the Council of the County of Allegheny ratifying amendments to the Allegheny County Health Department's Rules and Regulations, Article XV, "Plumbing and Building Drainage."

The Allegheny County Law Department has reviewed this legislation prior to submitting it to Council.

I am requesting that this item be placed on the agenda at the next Regular Meeting of Council.

Proposed Revisions to Allegheny County Health Department Rules and Regulations, Article XV. Plumbing and Building Drainage

LEGISLATIVE SUMMARY

Pursuant to the authority granted under the Pennsylvania Local Health Administration Law, Sections 12010(f) and 12011(c), on September 7, 2022, the Allegheny County Board of Health voted unanimously to approve changes to its Rules and Regulations, Article XV, "Plumbing and Building Drainage". A summary of the changes to Article XV are as follows:

> **ARTICLE XV ("PLUMBING AND BUILDING DRAINAGE")**: Changes to this regulation are proposed to make the County's Plumbing regulations consistent with the 2018 International Plumbing Code. Additionally, the revisions were made to make the County's plumbing regulations consistent with analogous regulations promulgated by the Commonwealth on February 14, 2022, which also incorporated changes to coincide with the 2018 International Plumbing Code.

When drafting these changes, over the course of more than a year, the Health Department conducted numerous internal code review meetings with plumbing staff, legal staff, and management. The changes were also vetted before the Allegheny County Plumbing Advisory Board and that body voted unanimously to recommend that these changes be approved on June 29, 2022. Furthermore, the Board of Health's vote was preceded by a 30-day public comment period that opened on July 11, 2022 via publication in the Pittsburgh Post-Gazette and closed on August 12, 2022. Additionally, a public hearing concerning the revisions was conducted on August 11, 2022.

EXHIBIT "A"

PROPOSED REVISION

Allegheny County Health Department Rules and Regulations
Article XV, Plumbing and Building Drainage

ALLEGHENY COUNTY HEALTH DEPARTMENTRULES & REGULATIONS
ARTICLE XV – PLUMBING AND BUILDING DRAINAGE

Deletions are shown with strikethroughs.
Additions are shown in larger font, bolded, and underlined.

CHAPTER 1
ADMINISTRATION

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SECTION 102
APPLICABILITY

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102.2 Existing installations. Plumbing systems lawfully in existence at the time of the adoption of this code shall be permitted to have their use and maintenance continued if the use, maintenance or repair is in accordance with the original design and no hazard to life, health or property is created by such plumbing system.

102.2.1 Existing buildings. Additional, alterations, renovations or repairs related to building or structural issues shall be regulated by the *International Existing Building Code.*

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SECTION 106
PERMITS

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AC-106.7.9 Journeyman plumber qualifications. No journeyman plumber's license shall be

granted a registered apprentice plumber until he has:

1. Acquired a minimum four (4) years experience or the equivalent of 8,000 hours worked;

2. Completed 576 hours of plumbing training at an accredited school, preferably within six (6) years of the beginning of the apprenticeship training; ~~and~~

3. If a Master Plumber refuses to qualify records of legitimate past work hours for apprentices, they will be subject to penalties up to and including revocation of plan filing rights and/or more severe penalties as determined by the ACHD plumbing program; and

~~3.~~**4.** Passed the required examination.

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~~**AC-106.7.9.1 Advanced standing examination**. Applicants for advanced standing examination must meet one of the following requirements:~~

~~1. Successful completion of a related training program consisting of at least one (1) school year of instruction.~~

~~2. Successful completion of related training provided by the military during active service.~~

~~3. Successful completion of college credits toward a major in a related field.~~

~~4. Successful completion of other comparable training/college credits satisfying the requirements of 1, 2, or 3.~~

~~5. Successful Completion of a Bachelor's Degree from an accredited institution.~~

~~Credit granted shall be applicable to the first year of apprentice training only. A passing score of 75% is required on the advanced standing examination. If an applicant fails the examination, he may retake the examination once within thirty (30) days of the original examination date. The applicant will be required to pay an additional examination fee to retake the examination.~~

~~If an applicant is claiming college technical credits, an official transcript, with the university/technical school's raised or watermark seal and the registrar's signature on the transcript, must be submitted. The transcript must be mailed directly from the university or technical school to the Allegheny County Health Department Plumbing Program. A transcript that states "issued to the student" is not acceptable. A certificate indicating completion of a training program and military documents verifying training must be submitted if an applicant is claiming this training.~~

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SECTION 107
INSPECTIONS AND TESTING

107.1 General. The code official is authorized to conduct such inspections as are deemed necessary to determine compliance with the provisions of this code. Construction or work for which a permit is required shall be subject to inspection by the code official, and such construction or work shall remain ~~accessible and exposed~~ **visible and able to be accessed** for inspection purposes until *approved*. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid. It shall be the duty of the permit applicant to cause the work to remain ~~accessible and exposed~~ **visible and able to be accessed** for inspection purposes. Neither the code official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

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CHAPTER 2
DEFINITIONS

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SECTION 202
GENERAL DEFINITIONS

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[BE] ACCESSIBLE. A site, building, facility or portion thereof that complies with Chapter 11 of the *International Building Code*.

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[A] BUILDING. Any structure ~~occupied~~ **utilized** or intended for supporting or sheltering any occupancy.

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AC-GREASE INTERCEPTOR. ~~A plumbing appurtenance that is installed in a sanitary drainage system to intercept oily and greasy wastes from a wastewater discharge. Such device has the ability to intercept free-floating fats and oils.~~

Fats, oils and greases (FOG) disposal system. A plumbing appurtenance that reduces nonpetroleum fats, oils and greases in effluent by

separation or mass and volume reduction.

Gravity. Plumbing appurtenances of not less than 1000 gallons (3786 L) capacity that are installed in the sanitary drainage system to intercept free-floating fats, oils and grease from wastewater discharge. Separation is accomplished by gravity during a retention time of not less than 30 minutes.

Hydromechanical. Plumbing appurtenances that are installed in the sanitary drainage system to intercept free-floating fats, oils and grease from wastewater discharge. Continuous separation is accomplished by air entrainment, buoyancy and interior baffling.

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FULL-OPEN VALVE. A water control or shutoff component in the water supply system piping that, where adjusted for maximum flow, the flow path through the component's closure member is not a restriction in the component's through-flow area.

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[M] PRESS-CONNECT JOINT. A permanent mechanical joint incorporating an elastomeric seal or an elastomeric seal and corrosion-resistant grip ring. The joint is made with a pressing tool and jaw or ring approved by the fitting manufacturer.

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PUBLIC SWIMMING POOL. A pool, other than a residential pool, that is intended to be used for swimming or bathing and is operated by an owner, lessee, operator, licensee or concessionaire, regardless of whether a fee is charged for use.

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[A] REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice ~~professional architecture or engineering~~ **their respective design profession,** as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

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[A] STRUCTURE. That which is built or constructed. ~~or a portion thereof.~~

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SWIMMING POOL. ~~Any structure, basin, chamber or tank containing an artificial body of water for swimming, diving or recreational bathing having a depth of 2 feet (610 mm) or more at any point.~~ **A permanent or temporary structure that is intended to be used for swimming, bathing or wading and that is designed and manufactured or built to be connected to a circulation system. A swimming pool can be open to the public regardless of whether a fee is charged for its use or can be accessory to a residential setting where the pool is available only to the household and guests of the household.**

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CHAPTER 3
GENERAL REGULATIONS

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SECTION 303
MATERIALS

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

303.5 Cast-iron soil pipe, fitting and components. Cast-iron soil pipes and fittings, and the couplings used to join these products together, shall be third-party listed and labeled. Third-party certifiers or inspectors shall comply with the minimum inspection requirements of Annex A or Annex A1 of the ASTM and CISPI product standards indicated in the code for such products.

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SECTION 305
PROTECTION OF PIPES AND PLUMBING COMPONENTS

AC-305.1 ~~Corrosion.~~ **Protection against contact.** ~~Pipes passing 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 movement including expansion and contraction of piping. Minimum wall thickness of material shall be 0.025 inch (0.64 mm).~~ **Metallic piping, except for cast iron, ductile iron and galvanized steel, shall not be placed in direct contact with steel framing members, concrete or cinder walls and floors or masonry. Metallic piping shall not be placed in direct contact with corrosive soil. Where sheathing is used to prevent direct contact, the sheathing shall have a thickness of not less than 0.025 inch (25 mil) (0.64 mm) and the sheathing shall be made of plastic. Where the sheathing protects piping that penetrates concrete or masonry walls or floors, the sheathing shall be installed in a manner that allows movement of the piping within the sheathing.**

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SECTION 308
PIPING SUPPORT

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308.6 Sway bracing. ~~Rigid support sway bracing shall be provided at changes in direction greater than 45 degrees (0.79 rad) for pipe sizes 4 inches (102 mm) and larger.~~ **Where horizontal pipes 4 inches (102 mm) and larger convey drainage or waste, and where a pipe fitting in that piping changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of pipe flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.**

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308.10 Thermal expansion tanks. A thermal expansion tank shall be supported in accordance with the manufacturer's instructions. Thermal expansion tanks shall not be supported by the piping that connects to such tanks.

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TABLE 308.5
HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Acrylonitrile butadiene styrene (ABS) pipe	4	10[b]
Aluminum tubing	10	15
Brass pipe	10	10
Cast-iron pipe	5[a]	15
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 inch and smaller	3	10[b]
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 ¼ inches and larger	4	10[b]
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing, 1 ¼ -inch diameter and smaller	6	10
Copper or copper-alloy tubing, 1 ½ -inch diameter and larger	10	10
Cross-linked polyethylene (PEX) pipe, **1 inch and smaller**	2.67 (32 inches)	10[b]
Cross-linked polyethylene (PEX) pipe, 1 ¼ inches and larger	**4**	**10[b]**
Cross-linked polyethylene/aluminum/ cross-linked polyethylene (PEX-AL-PEX) pipe	2.67 (32 inches)	4
Lead pipe	Continuous	4
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	2.67 (32 inches)	4
Polyethylene of raised temperature (PE-RT) pipe 1 inch and smaller	**2.67 (32 inches)**	**10[b]**
Polyethylene of raised temperature (PE-RT) pipe 1 ¼ inch and larger	**4**	**10[b]**
Polypropylene (PP) pipe or tubing 1 inch and smaller	2.67 (32 inches)	10[b]
Polypropylene (PP) pipe or tubing, 1 ¼ inches and larger	4	10[b]
Polyvinyl chloride (PVC) pipe	4	10[b]

Stainless steel drainage systems	10	10[b]
Steel pipe	12	15

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

a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

b. For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.

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SECTION 310
WASHROOM AND TOILET ROOM REQUIREMENTS

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310.5 Urinal partitions. Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. **The horizontal dimension between walls or partitions at each urinal shall be not less than 30 inches (762 mm).** The walls or partitions shall begin at a height not more than 12 inches (305 mm) from and extend not less than 60 inches (1524 mm) above the finished floor surface. The walls or partitions shall extend from the wall surface at each side of the urinal a minimum of 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished back wall surface, whichever is greater.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.

2. Toilet rooms located in ~~day care and~~ child **day** care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

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SECTION 314
CONDENSATE DISPOSAL

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[M] 314.2.2 Drain pipe materials and sizes. Components of the condensate disposal system shall be cast iron, galvanized steel, copper **and copper alloy**, cross-linked polyethylene, ~~polybutylene,~~ polyethylene, ABS, CPVC, ~~or~~ PVC **or polypropylene** pipe or tubing. ~~All~~ e**C**omponents shall be selected for the pressure and temperature rating of the installation. Joints

and connections shall be made in accordance with the applicable provisions of Chapter 7 relative to the material type. Condensate waste and drain line size shall be not less than 3/4-inch (19.**1** mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 314.2.2.

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CHAPTER 4
FIXTURE, FAUCETS, AND FIXTURE FITTINGS

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SECTION 403
MINIMUM PLUMBING FACILITIES

403.1 Minimum number of fixtures. Plumbing fixtures shall be provided for the type of occupancy and in the minimum number shown in Table 403.1. Types of occupancies not shown in Table 403.1 shall be considered individually by the code official. The number of occupants shall be determined by the International Building Code. Occupancy classification shall be determined in accordance with the International Building Code.

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403.1.2 ~~Family or assisted-use toilet and bath fixtures.~~ Single-user toilet facility and bathing room fixtures. The plumbing ~~F~~**f**ixtures located **in single-user toilet facilities and bathing rooms, including** ~~within~~ family or assisted-use toilet and bathing rooms **that are** required by Section 1109.2.1 of the *International Building Code*, **shall contribute toward the total number of required plumbing fixtures for a building or tenant space.** ~~are permitted to be included in the number of required fixtures for either the male or female occupants in assembly and mercantile *occupancies*.~~ **Single-user toilet facilities and bathing rooms, and** ~~F~~**f**amily or assisted- use toilet ~~facilities~~ **rooms and bathing rooms** shall ~~not~~ be ~~required to be~~ identified for ~~exclusive~~ use by either sex ~~as required by Section 403.4~~.

403.1.3 Lavatory distribution. Where two or more toilet rooms are provided for each sex, the required number of lavatories shall be distributed proportionately to the required number of water closets.

AC-403.2 Separate facilities. Where plumbing fixtures are required, separate facilities shall beprovided for each sex.

Exceptions:

1. Separate facilities shall not be required for dwelling units and sleepingunits.

2. Separate facilities shall not be required in structures. or tenant spaces witha total occupant load, including both employees and customers, of 15 or less.

3. Separate facilities shall not be required in mercantile occupancies in whichthe maximum occupant load is 50 or less.

4. Separate facilities shall not be required in business occupancies in which the maximum occupant load is 15 or fewer.

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403.3 ~~Required public toilet facilities~~. **Employee and public toilet facilities. For structures and tenant spaces intended for public utilization,** ~~C~~**c**ustomers, patrons and visitors shall be provided with *public* toilet facilities**.** ~~in structures and tenant spaces intended for public utilization. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users.~~ Employees **associated with structures and tenant spaces** shall be provided with toilet facilities ~~in all occupancies~~. **The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users.** Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities.

Exception: *Public* toilet facilities shall not be required ~~in~~ **for**:

1. ~~Open or enclosed~~ ~~p~~**P**arking garages ~~where there are no~~ **operated without** parking attendants.

2. Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop- off, having a public access arealess than or equal to 300 square feet (28 m^2).

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SECTION 405
INSTALLATION OF FIXTURES

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405.3 Setting. Fixtures shall be set level and in proper alignment with reference to adjacent walls.

405.3.1 Water closets, urinals, lavatories and bidets. A water closet, urinal, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition, vanity or other obstruction~~, or~~. **Where partitions or other obstructions do not separate adjacent fixtures, fixtures shall not be set** closer than 30 inches (762 mm) center-to-center between adjacent fixtures. There shall be ~~at least~~ **not less than** a 21-inch (533 mm) clearance in front of the water closet, urinal, lavatory or bidet to any wall, fixture or door. Water closet compartments shall not be less than 30 inches (762 mm) wide and 60 inches (1524 mm) ~~deep (see Figure 405.3.1).~~ in depth for floor mounted water closets and not less than 30 inches (762 mm) in width and 56 inches (1422 mm) in depth for wall-hung water closets.

Exception: An accessible children's water closet shall be set not closer than 12 inches (305 mm) from its center to the required partition or to the wall on one side.

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405.4 Floor and wall drainage connections. Connections between the drain and floor outlet plumbing fixtures shall be made with a floor flange. The flange shall be attached to the drain and anchored to the structure. Connections between the drain and wall-hung water closets shall be made with an approved extension nipple or horn adaptor. The water closet shall be bolted to the hanger with corrosion-resistant bolts or screws. Joints shall be sealed with an approved elastomeric gasket, flange-to-fixture connection complying with ASME A112.4.3 or an approved setting compound.

405.4.1 Floor flanges. Floor flanges for water closets or similar fixtures shall not be less than 0.125 inch (3.2 mm) thick for ~~brass~~ **copper alloy**, 0.25 inch (6.4 mm) thick for plastic, and 0.25 inch (6.4 mm) thick and not less than a 2-inch (51 mm) caulking depth for cast-iron or galvanized malleable iron.

Floor flanges of hard lead shall weigh not less than 1 pound, 9 ounces (0.7 kg) and shall be composed of lead alloy with not less than 7.75-percent antimony by weight. Closet screws and bolts shall be of ~~brass~~ **copper alloy**. Flanges shall be secured to the building structure with corrosion-resistant screws or bolts.

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SECTION 408
BIDETS

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408.3 Bidet water temperature. The discharge water temperature from a bidet fitting shall be limited to a maximum temperature of 110°F (43°C) by a water temperature limiting device conforming to ASSE 1070/**ASME A112.1070/CSA B125.70 or CSA B125.3**.

******

SECTION 409
DISHWASHING MACHINES

409.1 Approval. ~~Domestic~~ **Commercial** dishwashing machines shall conform to ASSE ~~1006. Commercial dishwashing machines shall conform to~~ ASSE 1004 and NSF 3. **Residential dishwashers shall conform to NSF 184.**

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SECTION 410
DRINKING FOUNTAINS

410.1 Approval. Drinking fountains shall conform to ASME A112.19.1M, ASME A112.19.2M or ASME A112.19.9M and water coolers shall conform to ~~AHRI 1010~~ **ASHRAE 18**. Drinking fountains, ~~and~~ water coolers **and water dispensers** shall conform to NSF 61, Section 9. ~~Where water is served in restaurants, drinking fountains shall not be required. In other occupancies, where drinking fountains are required, water coolers or bottled water dispensers shall be permitted to be substituted for not more than 50 percent of the required drinking fountains.~~ **Electrically operated, refrigerated drinking *water coolers* and *water dispensers* shall be listed and labeled in accordance with UL 399.**

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SECTION 411
EMERGENCY SHOWER AND EYEWASH STATIONS

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411.3 Water supply. Where hot and cold water is supplied to an emergency shower or eyewash station, the temperature of the water supply shall only be controlled by a temperature actuated mixing valve complying with ASSE 1071.

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SECTION 416
LAVATORIES

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AC-416.5 Tempered water for ~~public~~ hand-washing facilities. *Tempered water* shall be delivered from ~~public~~ hand-washing facilities. *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070/**ASME A112.1070/CSA B125.70** or CSA B125.3.

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SECTION 423
SPECIALTY PLUMBING FIXTURES

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423.3 Footbaths~~,~~ and pedicure baths ~~and head shampoo sinks~~. The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub~~,~~ **and** footbaths, ~~and head shampoo sinks,~~ shall be limited to ~~a maximum temperature~~ **not greater than** of 120°F (49°C) by a water-temperature-limiting device that conforms to ASSE 1070/**ASME A112.1070/CSA B125.70** or CSA B125.3.

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SECTION 425
FLUSHING DEVICES FOR WATER CLOSETS AND URINALS

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425.2 Flushometer valves and tanks. Flushometer valves and tanks shall comply with ASSE 1037/**ASME A112.1037/CSA B1.125.37 or CSA B125.3**. Vacuum breakers on flushometer valves shall conform to the performance requirements of ASSE 1001 or ~~CAN~~/CSA B64.1.1. *Access* shall be provided to vacuum breakers. Flushometer valves shall be of the water-conservation type and shall not be utilized where the water pressure is lower than the minimum required for normal operation. When operated, the valve shall automatically complete the cycle of operation, opening fully and closing positively under the water supply pressure. Each flushometer valve shall be provided with a means for regulating the flow through the valve. The trap seal to the fixture shall be automatically refilled after each valve flushing cycle.

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

425.3.1 Fill valves. ~~All~~ f**F**lush tanks shall be equipped with an antisiphon fill valve conforming to ASSE 1002/**ASME A112.1002/CSA B125.12** or CSA B125.3. The

fill valve backflow preventer shall be located at least 1 inch (25 mm) above the full opening of the overflow pipe.

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CHAPTER 5
WATER HEATERS

SECTION 501
GENERAL

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501.7 Pressure marking of storage tanks. Storage tanks and water heaters installed for domestic hot water shall have the maximum allowable working pressure clearly and indelibly stamped in the metal or marked on a plate welded thereto or otherwise permanently attached. Such markings shall be ~~in an accessible~~ position **with *access* on the** outside of the tank so as to make inspection or reinspection readily possible.

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SECTION 502
INSTALLATION

502.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code*. **Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300.**

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SECTION 504
SAFETY DEVICES

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AC- 504.6 Requirements for discharge piping. The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.

2. Discharge through an *air gap* located in the same room as the water heater.

3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.

4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.

5. Discharge to the floor, or to an indirect waste receptor, or to the outdoors.

6. Discharge in a manner that does not cause personal injury or structural damage.

7. Discharge to a termination point that is readily observable by the building occupants.

8. Not be trapped.

9. Be installed so as to flow by gravity.

10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.

11. Not have a threaded connection at the end of such piping.

12. Not have valves or tee fittings.

13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.

14. **Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.**

504.7 Required pan. Where **a storage tank-type** water heaters or **a** hot water storage tanks ~~are~~ **is** installed in **a** locations where **water** leakage ~~of~~ **from** the tanks ~~or connections~~ will cause damage, the tank ~~or water heater~~ shall be installed in a ~~galvanized steel~~ pan ~~having a minimum thickness of 24 gauge, or other pans approved for such use.~~ **constructed of one of the following:**

1. **Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.**

2. **Plastic not less than 0.036 inch (0.9 mm) in thickness.**

3. **Other *approved* materials.**

A plastic pan shall not be installed beneath a gas-fired water heater.

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CHAPTER 6
WATER SUPPLY AND DISTRIBUTION

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SECTION 602
WATER REQUIRED

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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 no 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.**

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SECTION 604
DESIGN OF BUILDING WATER DISTRIBUTION SYSTEM

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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 ~~an accessible~~ **a** location **with access.** ~~and~~ **The valves** shall not be utilized alone as a substitute for the balanced pressure, thermostatic or combination shower valves required in Section 424.3.

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SECTION 605
MATERIALS, JOINTS AND CONNECTIONS

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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. ~~All h~~**H**ot water distribution pipe and tubing shall have a minimum pressure rating of 100 psi (690 kPa) at 180°F (82°C).

******

TABLE 605.3
WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
~~Brass pipe~~	~~ASTM B43~~
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CVPC)	**ASTM F2855**
Copper or copper-alloy pipe	ASTM B42; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic **pipe and** tubing	ASTM F876; ~~ASTM F877;~~ **AWWA C904;** CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10~~M~~
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C151/**A21.51**; AWWA C115/**A21.15**
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; **AWWA C901;** CSA B137.1**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 A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A312; ASTM A778

******

TABLE 605.4
WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
~~Brass pipe~~	~~ASTM B43~~
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846; ASTM F441; ASTM

	F442; CSA B137.6
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CVPC)	**ASTM F2855**
Copper or copper-alloy pipe	ASTM B42; ASTM B302**; ASTM B43**
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; ~~ASTM F877;~~ CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; ~~CAN/~~CSA B137.10~~M~~
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C151/A21.51; AWWA C115/A21.15
Polyethylene/aluminum/polyethylene (PE-AL-PE) 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

******

TABLE 605.5
PIPE FITTINGS

MATERIAL	STANDARD
Cast-iron	ASME B16.4~~; ASME B16.12~~
******	******
Copper or copper alloy	ASSE 1061; ASME B16.15; ASME B16.18; ASME B16.22; ~~ASME B16.23;~~ ASME B16.26; ~~ASME B16.29~~**; ASME B16.51; ASTM F1476; ASTM F1548**
******	******
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	ASTM F1974; ASTM F1281; ASTM F1282; ~~CAN/~~CSA B137.9; ~~CAN/~~CSA B137.10

polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	
******	******
Stainless steel (Type 304/304L)	ASTM A312; ASTM A778**; ASTM F1476; ASTM F1548**
Stainless steel (Type 316/316L)	ASTM A312; ASTM A778**; ASTM F1476; ASTM F1548**
Steel	ASME B16.9; ASME B16.11; ASME B16.28**; ASTM F1476; ASTM F1548**

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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; MSS SP-67; MSS SP-80; MSS SP-110; IAPMO Z1157; MSS SP-139**
Cross-linked polyethylene (PEX) plastic	**ASME A112.4.14; ASME A112.18.1/CSA B125.1; CSA B125.3; NSF 359; IAPMO Z1157**
Gray iron and ductile iron	**AWWA C500; AWWA C504; AWWA C507; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78; IAPMO Z1157**
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**

******

TABLE 605.8
MANUFACTURED PIPE NIPPLES

MATERIAL	STANDARD
~~Brass~~, e**C**opper, **copper alloy, and** chromium-plated	ASTM B687
Steel	ASTM A733

******

AC-605.15 Copper tubing. Joints between copper or copper-alloy pipe or fittings shall comply

with Sections 605.15.1 through 605.15.~~5~~ **6**.

******

AC-605.15.6 Push-fit joints. Push-fit joints shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

******

AC-605.16 CPVC plastic. Joints between CPVC plastic pipe and fitting shall comply with Sections 605.16.1 through 605.16.~~3~~**4**.

******

AC-605.16.4 Push-fit joints. Push-fit joints shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

******

605.17 PEX Plastic. Joints between cross-linked polyethylene plastic tubing or fittings shall comply with Sections 605.17.1 and 605.17.~~2~~**3**.

******

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

******

SECTION 606
INSTALLATION OF THE BUILDING WATER DISTRIBUTION SYSTEM

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

******

606.5.9 Pressure tanks, vacuum relief. ~~All w~~**W**ater 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 **not less than** 1/2 inch (12.7 mm).

******

SECTION 607
HOT WATER SUPPLY SYSTEM

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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.~~ **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.**

******

SECTION 608
PROTECTION OF POTABLE WATER SUPPLY

******

608.3 Devices, appurtenances, appliances and apparatus. ~~All d~~**D**evices, 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.~~

******

608.3.2 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.

******

TABLE 608.1
APPLICATION OF BACKFLOW PREVENTERS

DEVICE	DEGREE OF HAZARD [a]	APPLICATION [b]	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 assemblies	Low hazard	Backpressure or backsiphonage ~~(Fire sprinkler systems)~~ 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 ~~preventer~~ **prevention assembly** and reduced pressure principle fire protection backflow preventer	High or low hazard	Backpressure or backsiphonage Sizes 3/8″–16″	ASSE 1013, AWWA C511, ~~CAN~~/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
Spill-**resistant** ~~proof~~ 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, ~~CAN~~/CSA B64.3
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, ~~CAN/~~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, ~~CAN/~~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 608.13.4)

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

******

608.13.5 Pressure-type vacuum breakers. Pressure ~~type~~ vacuum breakers **assemblies** shall ~~conform to~~ **comply with** ASSE 1020 or CSA B64.1.2**.** ~~and spillproof~~ **Spill-resistant** vacuum breakers **assemblies** shall comply with ASSE 1056 **or CSA B64.1.3**. ~~These devices are designed for installation under continuous pressure conditions when the critical level is installed at the required height.~~ **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 ~~type~~ vacuum breakers **assemblies** shall not be installed in locations where spillage could cause damage to the structure.

******

608.16 Connections to the potable water system. Connections to the potable water system shall conform to Sections 608.16.1 through 608.16.~~10~~**11**.

******

608.16.11 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*.

******

SECTION 611
DRINKING WAER TREATMENT UNITS

611.1 Design. Point-of-use reverse osmosis drinking water treatment units shall comply with NSF 58 or CSA B483.1. Drinking water treatment units shall meet the requirements of NSF 42, NSF 44, NSF 53**,** ~~or~~ NSF 62**, or CSA B483.1**.

******

CHAPTER 7
SANITARY DRAINAGE

******

SECTION 702
MATERIALS

******

TABLE 702.1
ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
******	******
~~Brass pipe~~	~~ASTM B43~~
******	******
Copper or copper-alloy pipe	ASTM B42; **ASTM B43;** ASTM B302
******	******
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; ~~CAN/~~CSA B181.3
******	******

******

TABLE 702.2
UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
******	******
Polyethylene (PE) plastic pipe (SDR-PR)	**ASTM F714**
Polyolefin pipe	ASTM F1412; **ASTM F714;** ~~CAN/~~CSA B181.3
******	******
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; ~~CAN/~~CSA B181.3
******	******

For SI: 1 inch = 25.4 mm.

******

TABLE 702.3
BUILDING SEWER PIPE

MATERIAL	STANDARD
******	******
Concrete pipe	ASTM C14; ASTM C76; ~~CAN/~~CSA A257.1M; ~~CAN/~~CSA A257.2M
******	******
Polypropylene (PP) plastic pipe	**ASTM F2736; ASTM F2764; CSA B182.13**
******	******
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; ~~CAN/~~CSA B181.3
******	******

For SI: 1 inch = 25.4 mm.

******

TABLE 702.4
PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASTM D2661; ASTM F628; ~~CAN/~~CSA B181.1

******	******
Gray iron and ductile iron	AWWA C 110/**A21.10**
~~Malleable iron~~	~~ASME B 16.3~~
Polyethylene	**ASTM D2683**
Polyolefin	ASTM F1412; ~~CAN/~~CSA B181.3
******	******
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; ~~CAN/~~CSA B181.3
******	******

******

SECTION 703
BUILDING SEWER

******

703.2 Drainage pipe in filled ground. Where a *building sewer* or *building drain* is installed on filled or unstable ground, the drainage pipe shall conform to one of the standards for ABS plastic pipe, cast-iron pipe, copper or copper-alloy tubing, ~~or~~ PVC plastic pipe **or polypropylene plastic pipe** ~~listed~~ **indicated** in Table 702.3.

******

703.4 Existing building sewers and drains. ~~Existing building sewers and drains shall connect with new building sewer and drainage systems only where found by examination and test to conform to the new system in quality of material. The code official shall notify the owner to make the changes necessary to conform to this code.~~ **Where the entire sanitary drainage system of an existing building is replaced, existing building drains under concrete slabs and existing building sewers that will serve the new system shall be internally examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed.**

******

SECTION 705
JOINTS

******

705.19 Joints between different materials. Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical-sealing type conforming to ASTM C1173, ASTM C1460 or ASTM C1461. Connectors and adapters shall be *approved* for the application and such joints shall have an elastomeric seal conforming to ASTM C425, ASTM

C443, ASTM C564, ASTM C1440, ~~ASTM D1869,~~ ASTM F477, ~~CAN/~~CSA A257.3M or ~~CAN/~~CSA B602, or as required in Sections 705.19.1 through 705.19.~~7~~**9**. Joints between glass pipe and other types of materials shall be made with adapters having a TFE seal. Joints shall be installed in accordance with the manufacturer's instructions.

705.19.1 Copper pipe or ~~copper-alloy~~ tubing to cast-iron hub pipe. Joints between copper **pipe** or ~~copper-alloy~~ tubing and cast-iron hub pipe shall be made with a ~~brass~~ **copper or copper alloy** ferrule or compression joint. The copper **pipe** or ~~copper-alloy~~ tubing shall be soldered to the ferrule in an *approved* manner, and the ferrule shall be joined to the cast-iron hub by a caulked joint or a mechanical compression joint.

705.19.2 Copper or copper-alloy pipe or tubing to galvanized steel pipe. Joints between copper or copper-alloy **pipe or** tubing and galvanized steel pipe shall be made with a ~~brass converter~~ **copper-alloy** fitting or dielectric fitting. The copper tubing shall be soldered to the fitting in an *approved* manner, and the fitting shall be screwed to the threaded pipe.

******

705.19.9 Polypropylene plastic. The joint between polypropylene plastic pipe and fittings shall incorporate an elastomeric seal. The joint shall conform to ASTM D3212. Mechanical joints shall not be installed above ground.

******

SECTION 709
FIXTURE UNITS

******

709.3 ~~Values for continuous and semicontinuous flow.~~ ~~Drainage fixture unit values for continuous and semicontinuous flow into a drainage system~~ **Conversion of gpm flow to dfu values. Where discharges to a waste receptor or to a drainage system are only known in gallons per minute (liters per second) values, the *drainage fixture unit* values for those flows** shall be computed on the basis that 1 gpm (0.06 L/s) of flow is equivalent to two ***drainage*** *fixture units*.

******

SECTION 712
SUMPS AND EJECTORS

******

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

******

712.3.3 Discharge piping pipe and fittings. Discharge pipe and fittings shall be constructed of approved materials. serving sump pumps and ejectors shall be constructed of materials in accordance with Sections 712.3.3.1 and 712.3.3.2 and shall be approved.

712.3.3.1 Materials. Pipe and ~~filling~~ **fitting** materials shall be constructed of ~~brass,~~ copper **or copper-alloy**, CPVC, ductile iron, PE, or PVC.

******

SECTION 717
REPLACEMENT OF UNDERGROUND SEWERS BY PIPE-BURSTING METHODS

******

~~717.1~~ **717.4 Pipe**. The replacement piping shall be **made of high-density polyethylene (HDPE) and** ~~manufactured with~~ **shall have** a standard dimension ratio (SDR) of 17**.** ~~and~~ **The pipe shall be** in compliance with ASTM F714.

~~717.2~~ **717.5 Pipe fittings.** Pipe fittings to be connected to the replacement pip**e**~~ing~~ shall be **made** of ~~extra- high molecular weight PE3408 material~~ **high-density polyethylene (HDPE)** and shall be ~~manufactured with an SDR of 17 and~~ in compliance with ASTM D2683.

******

CHAPTER 8
INDIRECT/SPECIAL WASTE

******

SECTION 801
GENERAL

801.1 Scope. This chapter shall govern matters concerning indirect waste piping and special wastes. This chapter shall further control matters concerning food-handling establishments, sterilizers, **humidifiers,** clear-water wastes, swimming pools, methods of providing *air breaks* or *air gaps*, and neutralizing devices for corrosive wastes.

801.2 Protection. ~~All d~~**D**evices, appurtenances, appliances and apparatus intended to serve some

special function, such as sterilization, **humidification,** distillation, processing, cooling, or storage of ice or foods, and that discharge to the drainage system, shall be provided with protection against backflow, flooding, fouling, contamination and stoppage of the drain.

******

CHAPTER 10
TRAPS, INTERCEPTORS, AND SEPARATORS

******

SECTION 1003
INTERCEPTORS AND SEPARATORS

******

1003.3 Grease interceptors. Grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3.~~5~~**8**.

******

CHAPTER 11
STORM DRAINAGE

******

SECTION 1102
MATERIALS

******

TABLE 1102.4
BUILDING STORM SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe **in IPS diameters, including Schedule 40, DR 22 (PS 200) and Dr 24 (PS140); with a solid, cellular core or composite wall.**	ASTM D2661; ~~ASTM D2751;~~ ASTM F628; **ASTM F1488;** ~~CAN/~~CSA B181.1; ~~CAN/~~CSA B182.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; ~~CAN/~~CSA A257.1M; ~~CAN/~~CSA A257.2M
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306

Polyethylene (PE) plastic pipe	**ASTM F667;** ASTM F2306/F2306M**; ASTM F2648/F2648M**
Polypropylene (PP) pipe	**ASTM F2881; CSA B182.13**
Polyvinyl chloride (PVC) plastic pipe (Type DWV, SDR26, SDR35, SDR41, PS50 or PS100) **in IPS diameters, including Schedule 40, DR 22 (PS 200) and Dr 24 (PS 140); with a solid, cellular core or composite wall.**	ASTM D2665; ASTM D3034; ASTM F891; **ASTM F1488;** CSA B182.4; CSA B181.2; CSA B182.2
Vitrified clay pipe	ASTM C4; ASTM C700
Stainless steel drainage systems, Type 316L	ASME A112.3.1

******

SECTION 1103
TRAPS

******

1103.4 Cleanout. An accessible cleanout shall be installed on the building side of the trap **and shall be provided with *access***.

******

SECTION 1113
SUMPS AND PUMPING SYSTEMS

******

1113.1 Pumping system. The sump pump, pit and discharge piping shall conform to Sections 1113.1.1 through 1113.1.4.

******

1113.1.2 Sump pit. The sump pit shall not be less than 18 inches (457 mm) in diameter and 24 inches (610 mm) ~~deep~~ **in depth**, unless otherwise *approved*. The pit shall be ~~accessible~~ **provided with access** and **shall be** located such that all drainage flows into the pit by gravity. The sump pit shall be constructed of tile, steel, plastic, cast-iron, concrete or other *approved* material, with a removable cover adequate to support anticipated loads in the area of use. The pit floor shall be solid and provide permanent support for the pump.

******

CHAPTER 13
NONPOTABLE WATER SYSTEMS

******

SECTION 1301
GENERAL

******

1301.6 ~~Approved~~ eComponents and materials. Piping, plumbing components and materials used in collection and conveyance systems shall be ~~manufactured~~ of material approved ~~for the intended application and compatible with any disinfection and treatment systems used~~ **by the manufacturer for the intended application**.

******

1301.9 Nonpotable water storage tanks. Nonpotable water storage tanks shall complywith Sections 1301.9.1 through 1301.9.11.

~~**1301.9.1 Sizing.** The holding capacity of the storage tank shall be sized inaccordance with the anticipated demand.~~

1301.9.~~2~~1 Location. ~~Storage tanks shall be installed above or below grade. Above- grade storage tanks shall be protected from direct sunlight and shall be constructedusing opaque, UV-resistant materials such as, but not limited to, heavily tinted plastic, fiberglass, lined metal, concrete, wood, or painted to prevent algae growth, or shall have specially constructed sun barriers including, but not limited to, installation in garages, crawl spaces or sheds. Storage tanks and their manholes shall not be located directly under soil piping, waste piping or any source of contamination.~~ **Any storage tank or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:**

1. **Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, wood, or painted to prevent algae growth.**
2. **Specially constructed sun barriers.**
3. **Installation in garages, crawl spaces or sheds.**

1301.9.~~3~~2 Materials. Where collected on site, water shall be collected in an approved tank constructed of durable, nonabsorbent and corrosion-resistant materials. The storage

tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality in the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.

1301.9.43 Foundation and Supports. Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with the International BuildingCode.

1301.9.43.1 Ballast. Where the soil can become saturated, an underground storage tank shall be ballasted, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the weight of the storage tank when full,consistent with the bearing capability of adjacent soil.

1301.9.43.2 Structural Support. Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

1301.9.54 Makeup Water. Where an uninterrupted supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by a reduced pressure backflow prevention assembly or an air gapinstalled in accordance with Section 608. A full-open valve located on the makeup water supply line to the storage tank shall be provided. Inlets to the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from droppingbelow a predetermined point. Where makeup water is provided, the water level shall not be permitted to drop below the source water inlet or the intake of any attached pump.

1301.9.65 Overflow. The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table 606.5.4. The overflow pipe shallbe protected from insects or vermin and shall discharge in a manner consistent withstorm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directedto prevent freezing on roof walkways. The overflow drain shall not be equipped witha shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.76 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade storage tanks, located outside of the building, shall be provided with a manhole either not less than 24 inches (610 mm)

square or with an inside diameter not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to prevent water infiltration. Finished grade shallbe sloped away from the manhole to divert surface water. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be notless than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access.

> **Exception:** **Treated water** ~~S~~storage tanks **that are** less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with a manhole~~, but shall have a~~ **provided that the tank has a** service port not less than 8 inches (203 mm) in diameter.

1301.9.8~~7~~ Venting. Storage tanks shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1301.7.

1301.9.9~~8~~ Draining of Tanks. ~~Where tanks require draining for~~ **Tanks shall be provided with a means of emptying the contents for the purpose of** service or cleaning~~.~~ ~~t~~**T**anks shall be drained by using a pump or by a drain located at the lowest point inthe 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. Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708.

1301.9.~~10~~9 Marking and Signage. Each nonpotable water storage tank shall be labeled with its rated capacity. The contents of storage tanks shall be identified with the words "CAUTION: NONPOTABLE WATER – DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER – CONFINED SPACE." Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1301.9.1~~1~~0 Storage Tank Tests. Storage tanks shall be tested in accordance with the following:

> Storage tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain water tight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.

2. The tank drain shall be observed for proper operation.

3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

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SECTION 1302
ON-SITE NONPOTABLE WATER REUSE SYSTEMS

1302.1 General. The provisions of **ASTM E2635 and** Section 1302 shall govern the construction, installation,alteration and repair of on-site nonpotable water reuse systems for the collection, storage,treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction.

1302.2 Sources. On-site nonpotable water reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. ~~Water from other approved nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, cooling tower blow-down water, foundation drain water, steam system condensate, fluid cooler discharge water, food steamer discharge water, combination oven discharge water, industrial process water and fire pump test water shall also be permitted to be collected for reuse by on-site nonpotable water reuse systems, as approved by the code official and as appropriate for the intended application.~~ **Where *approved* and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.**

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1302.8 Valves. Valves shall be supplied on on-site nonpotable water reuse systems inaccordance with Sections 1302.8.1 and 1302.8.2.

1302.8.1 Bypass Valve. One three-way diverter valve listed and labeled to NSF 50 or other approved device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources tothe sanitary *sewer* to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be ~~installed in accessible locations~~ **provided with *access* that**

allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

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SECTION 1303
NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS

1303.1 General. The provisions of Section 1303 shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications, as permittedby the jurisdiction.

1303.1.1 Fire protection systems. The storage, treatment and distribution of nonpotable water to be used for fire protection systems shall be in accordance with the *International Fire Code.*

1303.2 Collection Surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials~~. Collection of water from~~ **and where *approved,*** vehicular parking or pedestrian **walking** surfaces**.** ~~shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters, and solar waterheaters shall not discharge onto rainwater collection surfaces.~~

1303.3 Debris Excluders. Downspouts and leaders shall be connected to ~~a roof washer and shall be equipped with~~ a debris excluder or equivalent device ~~to prevent the contamination of collected rainwater with~~ **that is designed to remove** leaves, sticks, pine needles and similar ~~material~~ **debris to prevent such from entering the storage tank**. ~~Debris excluders and equivalent devices shall be self-cleaning.~~

1303.4 ~~Roof Washer~~ First-flush diverter. ~~A sufficient amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically.~~ **First-flush diverters shall operate automatically and shall not rely on manually operated valves or devices.** Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the storm water runoff requirements of the jurisdiction. ~~Roof washers~~ **First-flush diverters** shall be ~~accessible~~ **provided with *access*** for maintenance and service.

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1303.12 Pumping and Control System. Mechanical equipment including pumps, valves and filters shall be ~~easily accessible and removable~~ **provided with *access* that allows for removal** in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

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1303.15 Tests and Inspections. Tests and inspections shall be performed in accordance with Sections 1303.15.1 through 1303.15.~~8~~**9**.

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1303.15.2 ~~Roofwasher~~ First-flush diverter test. ~~Roofwashers~~ **First-flush diverters** shall be tested by introducing water into the ~~gutters~~ **the collection system upstream of the diverter**. Proper diversion of the first ~~quantity~~ **amount** of water **shall be** in accordance with the requirements of Section 1303.4 ~~shall be verified~~.

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1303.15.9 Collected raw rainwater quality. ASTM E2727 shall be used to determine what, if any, site conditions impact the quality of collected raw rainwater and whether those site conditions require treatment of the raw water for the intended end use or make the water unsuitable for specific end uses.