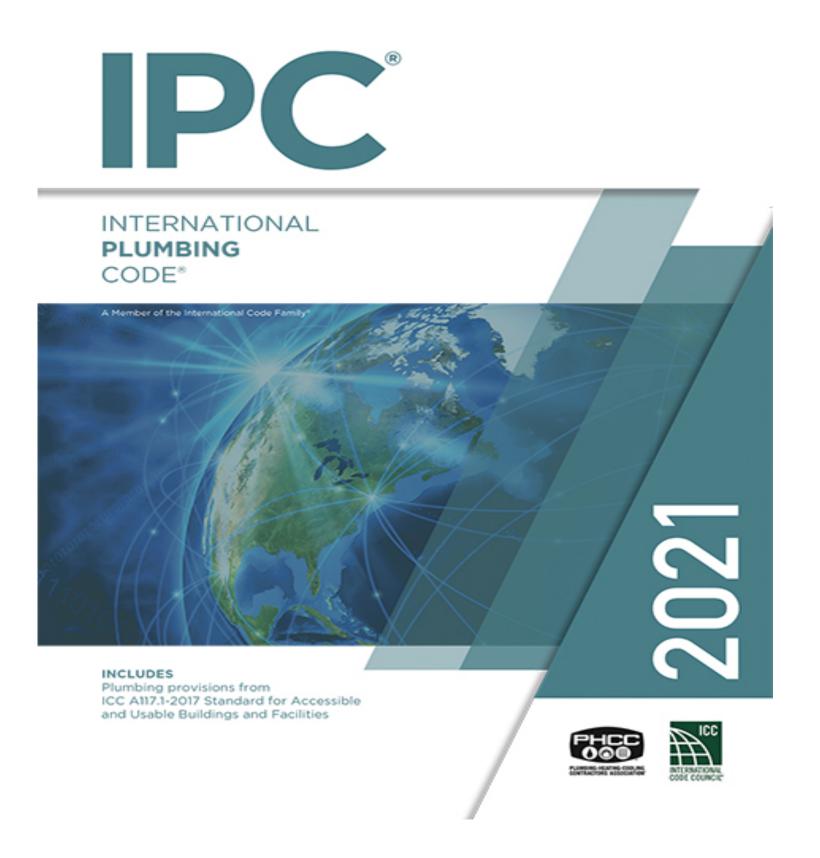


## 2021 International Plumbing Code Significant Changes

Shawn Strausbaugh

## The International Code Council Presents



Significant Changes





## Shawn Strausbaugh

ICC Sr. Director of PMG Technical Resources

Shawn was a Commercial Code Official for Manheim Township, Lancaster County PA and previously was a Building Code Official for Manchester Township, York County PA. Shawn served as the Chair of the ICC Plumbing Code Action Committee (PMGCAC) on the inaugural Committee and also as general member on his second term. Previously, while employed with Arlington County, VA Shawn served as Chair of the Code Change Committee for the Virginia Plumbing & Mechanical Inspectors Association, Virginia Building Code Officials Association and the ICC Region VII. Shawn has served on several ICC Code Development Committees as a general member and Chairperson.

Shawn has over 20 years of experience as a code official and plans examiner and holds numerous ICC inspection and plan review certifications in not only Plumbing and Mechanical but also Building, Accessibility and Energy. Shawn is also Master Plumber.



#### Welcome!

**Ground Rules** 

#### Housekeeping

- Technical issues
  - If you are having trouble with your audio, make sure your audio settings at the top are correct.

WebEx 1-866-229-3239



### Ways to Interact

Use the chat box to ask questions.

Raise your hand.

Use annotation tools to draw, type or point out something.



#### Identify key changes made in the 2021 IPC



### Objectives

Upon completion, you will be better able to:

- Identify the most significant differences between the 2018 IPC and the 2021 IPC
- Explain the differences between the current and previous edition
- Identify key changes in organization and code requirements
- Identify the applicability of design, plan review and inspection requirements.



## Let's see where everyone is from!





## Marginal Markings within the codebook

Solid vertical lines indicate a technical change from the requirements of the 2018 edition.

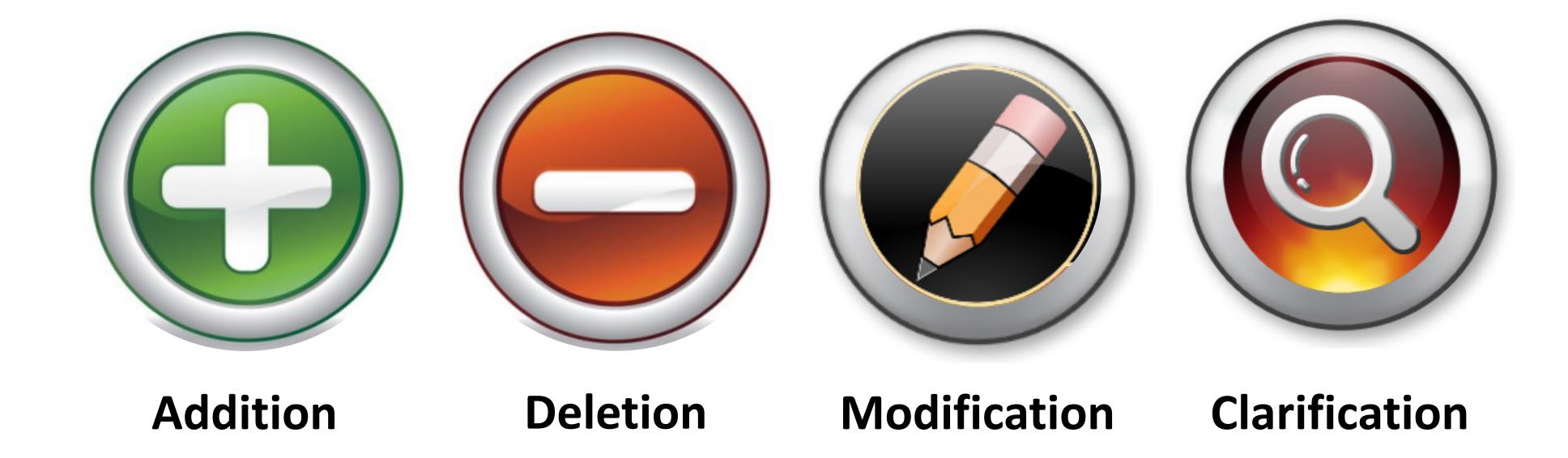
Arrows indicate where a section, paragraph, item in a list, exception or table has been deleted.

- A single asterisk [\*] indicates that text or a table has been relocated elsewhere in the code.
- A double asterisk [\*\*] indicates that the section or table immediately following has been relocated here from a different section.





### Course Icons



## 2021 IPC Chapter 2 Definitions

Section 202
General Definitions
COPPER ALLOY.

A metal alloy where the principle component is copper.



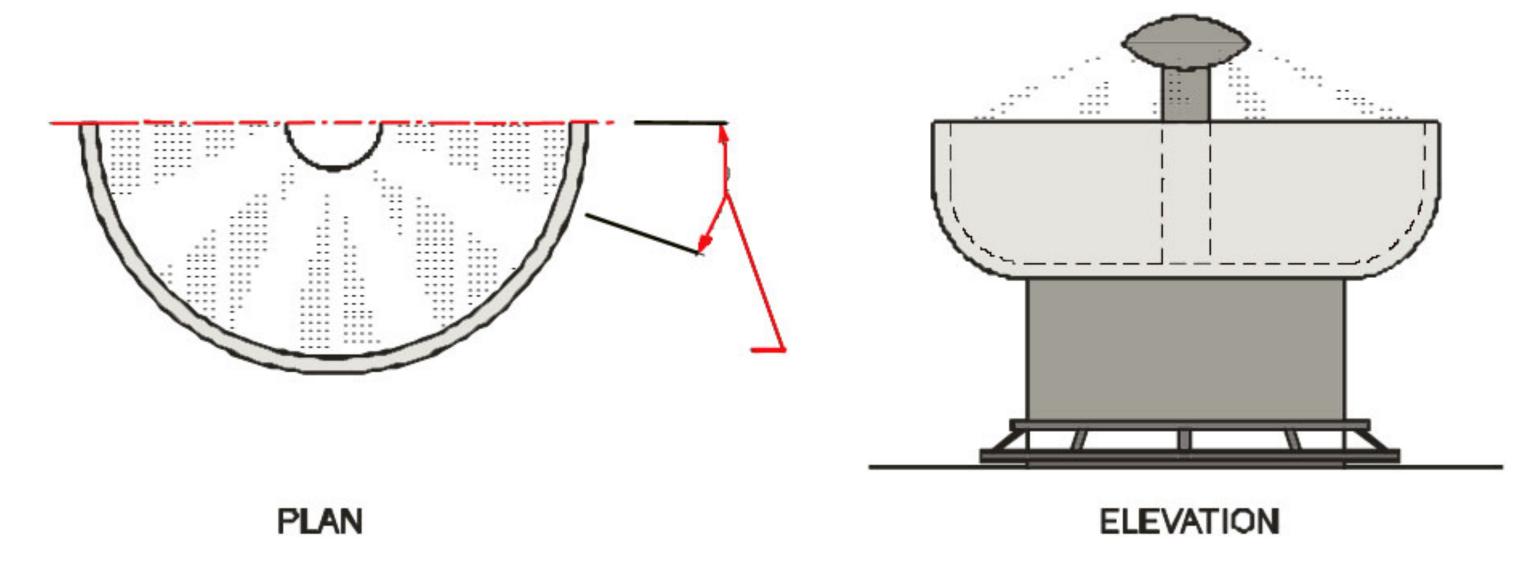




# Section 202 General Definitions GROUP WASH FIXTURE.



A type of lavatory that allows more than one person to utilize the fixture at the same time. The fixture has one or more drains and one or more faucets.









A mechanical fitting that joins pipes or tubes and achieves a seal by mating the pipe or tube into the fitting.



Photo courtesy of Sharkbite.c

Push-fit fitting



## Section 202 General Definitions

#### PUBLIC OR PUBLIC UTILIZATION.

In the classification of plumbing fixtures, "public" applies to fixtures with unrestricted exposure to walk-in traffic.

#### PRIVATE.

In the classification of plumbing fixtures, "private" applies to fixtures that are not public.







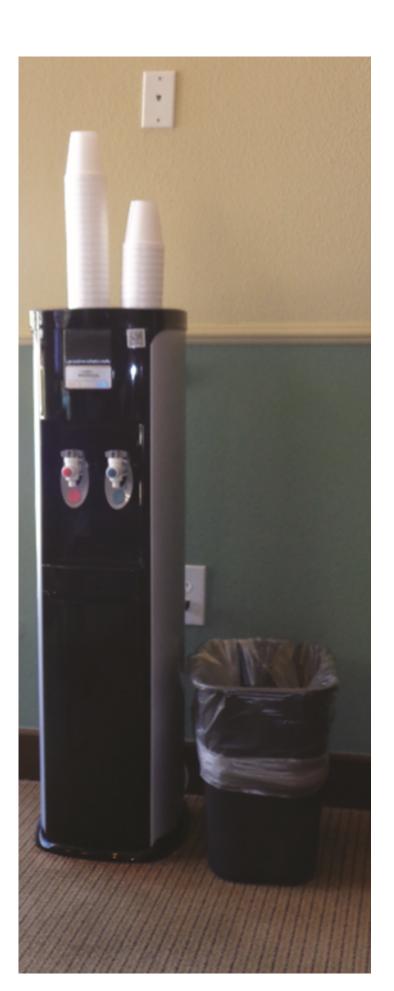


## Section 202 General Definitions



#### WATER DISPENSER.

A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. This definition ludes a freestanding apparatus



## 2021 IPC Chapter 3

General Regulations

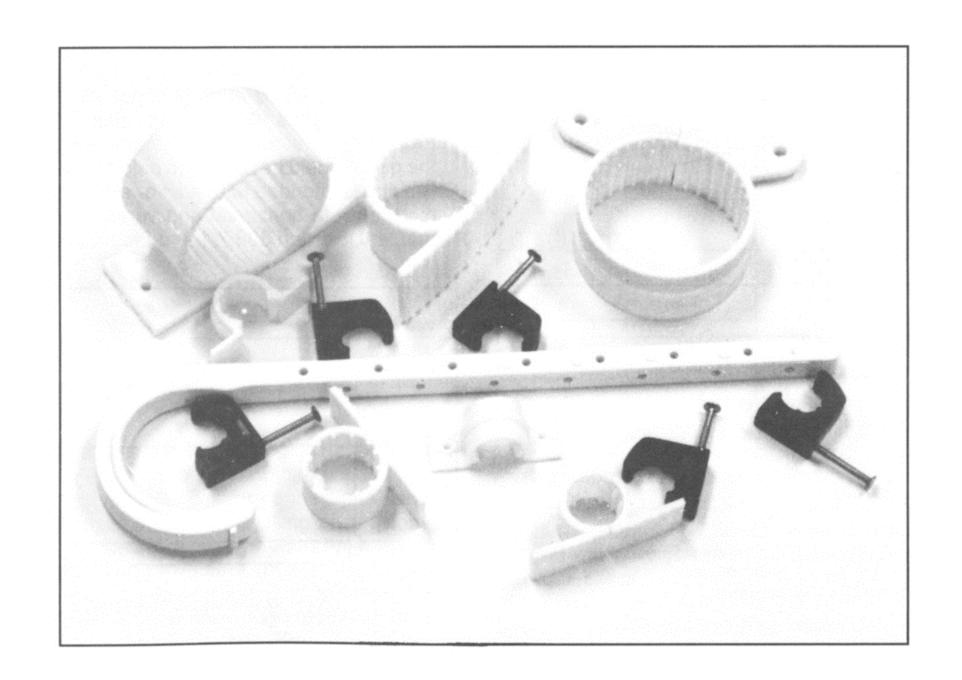


## Section 308 Piping Support



308.2 Piping seismic supports.

Where earthquake loads are applicable in accordance with the building code, plumbing piping supports, anchorage, and bracing shall be designed and installed for the seismic forces in accordance with Chapter 16 of the International Building Code.

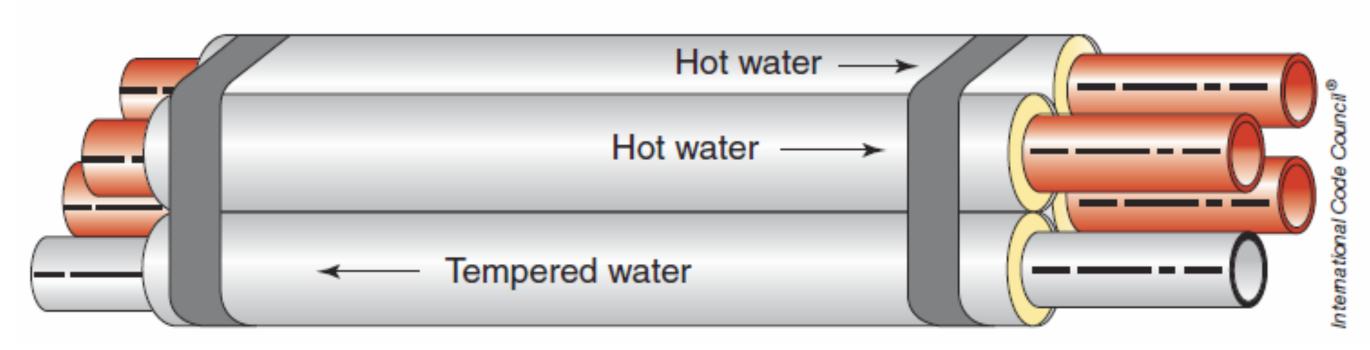


## Section 308 Piping Support



308.9 Parallel water distribution systems.

Piping bundles for manifold systems shall be supported in accordance with Table 308.5. Support at changes in direction shall be in accordance with the manufacturer's instructions. Where hot water piping is bundled with cold water piping, hot water <u>piping</u> shall be insulated <u>in</u> accordance with Section 607.5.





## Section 312 Test and Inspections

Test gauges shall comply with ASSE 1064.



#### 312.10.2 Testing.

Reduced pressure principle, double check, pressure vacuum breaker, reduced pressure detector fire protection, double check detector fire protection, and spill-resistant vacuum breaker backflow preventer assemblies and hose connection backflow preventers shall be tested at the time of installation, immediately after repairs or relocation and at least annually. The testing procedure shall be performed in accordance with one of the following standards: ASSE 5013, ASSE 5015, ASSE 5020, ASSE 5047, ASSE 5048, ASSE 5056, CSA B64.10 or CSA B64.10.1.

#ICCLEARNLIVE

## 2021 IPC Chapter 4

Fixtures, Faucets and Fixture Fittings





#### 403.1.1 Fixture calculations.

#### **Exceptions**:

- 1. The total occupant load shall not be required to be divided in half where approved statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
- 2. Where multi-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100%, based on total occupant load. In such multi-user user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal that is provided shall be located in a stall.
- 3. <u>Distribution of the sexes is not required where single-user water closets and bathing room fixtures are provided in accordance with Section 403.1.2.</u>





403.1.2 Single-user toilet and bathing room fixtures.

The plumbing fixtures located in single-user toilet facilities and bathing rooms, including 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. Single-user toilet facilities and bathing rooms, and family or assisted-use toilet rooms and bathing rooms shall be identified as being available for use by either all persons regardless of their sex. The total number of fixtures shall be permitted to be based on the required number of separate facilities or based on the aggregate of any combination of single-user or separate facilities.







403.2 Separate facilities.

#### **Exceptions:**

- 5. Separate facilities shall not be required to be designated by sex where single-user toilets rooms are provided in accordance with Section 403.1.2.
- 6. Separate facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by both sexes and privacy for water closets are installed in accordance with Section 405.3.4. Urinals shall be located in an area visually separated from the remainder of the facility or each urinal that is provided shall be located in a stall.





## 403.3.3 Location of toilet facilities in occupancies other than malls.

#### **Exceptions:**

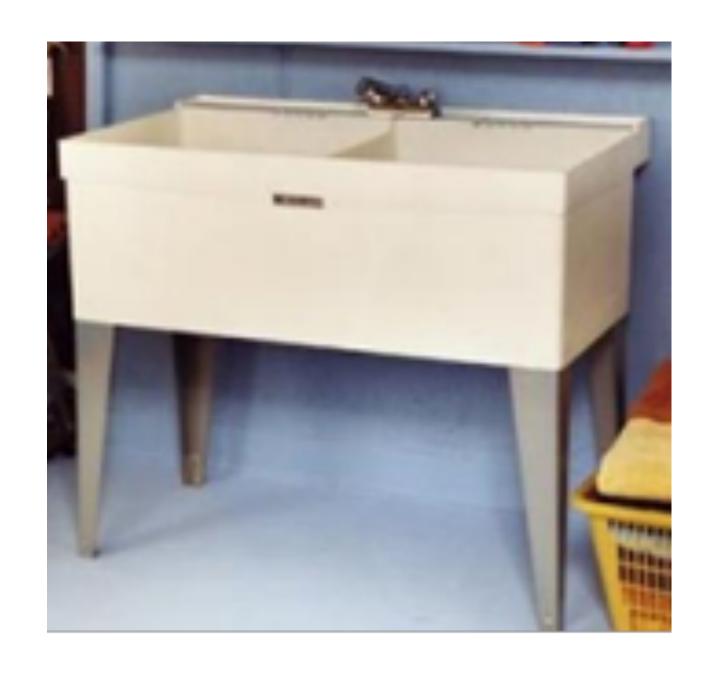
- 1. The location and maximum distances of travel to required employee facilities in factory and industrial occupancies are permitted to exceed that required by this section, provided that the location and maximum distance of travel are approved.
- 2. The location and maximum distances of travel to required public and employee facilities in Group S occupancies are permitted to exceed that required by this section, provided that the location and maximum distance of travel are approved.





#### 403.6 Service sink location.

Service sinks shall not be required to be located in individual tenant spaces in a covered mall provided that service sinks are located within a distance of travel of 300 feet (91 m) of the most remote location in the tenant space and not more than one story above or below the tenant space. Service sinks shall be located on an accessible route.

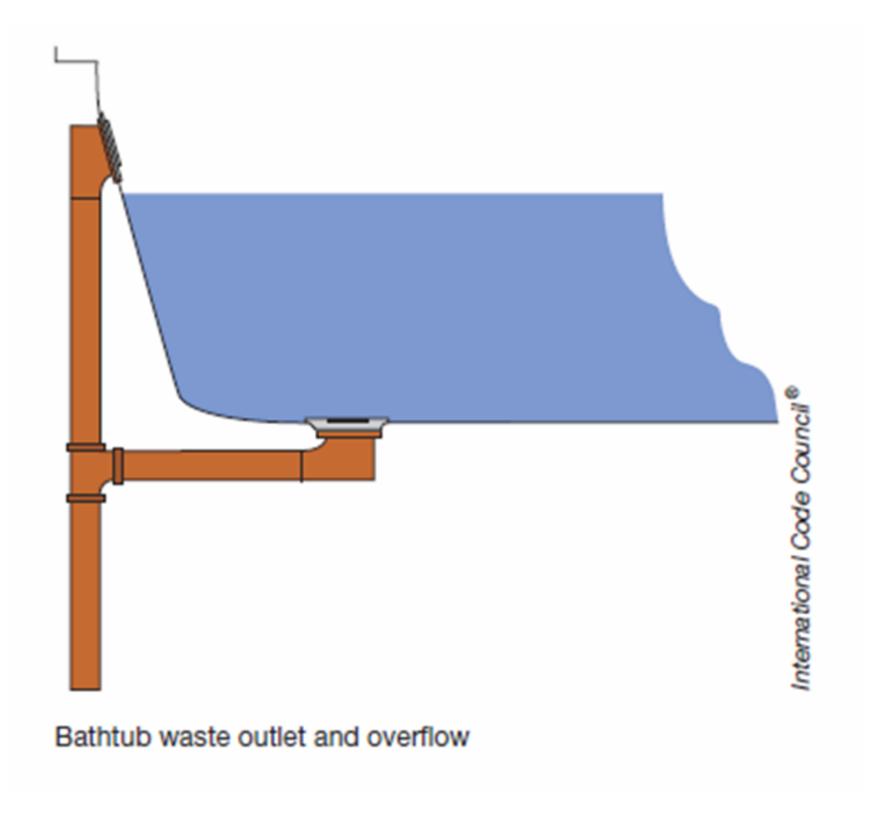






#### 407.2 Bathtub waste outlets and overflows.

Bathtubs shall be equipped with a waste outlet and an overflow outlet. The outlets shall be connected to waste tubing or piping that is not less than 1-1/2 inches (38 mm) in diameter. The waste outlet shall be equipped with a water-tight stopper. Where an overflow is installed, the overflow shall be not less than 1-1/2 inches (38mm) in diameter.





### Section 410 Drinking Fountains



410.3 High and low drinking fountains.

Where drinking fountains are provided on an exterior site, on a floor or within a

Where drinking fountains are provided on an exterior site, on a floor or within a secured area, the drinking fountains shall be provided in accordance with

Sections 410.3.1 and 410.3.2.

#### [BE] 410.3.1 Minimum number.

Where drinking fountains are required, not Not fewer than two drinking fountains shall be provided. One drinking fountain shall comply with the requirements for people who use a wheelchair and one drinking fountain shall comply with the requirements for standing persons.

**Exceptions:** (Unchanged)



### Section 410 Drinking Fountains



#### 410.3.2 More than the minimum number.

Where more than the minimum number of drinking fountains

specified in Section 1109.5.1 is provided, 50 percent of the total number of drinking fountains provided shall comply with the requirements for persons who use a wheelchair and 50 percent of the total number of drinking fountains provided shall comply with the requirements for standing persons.

#### **Exceptions:**

- 1. Where 50 percent of the drinking fountains yields a fraction, 50 percent shall be permitted to be rounded up or down, provided that the total number of drinking fountains complying with this section equals 100 percent of the drinking fountains.
- 2. Where drinking fountains are primarily for children's use, drinking fountains for people using wheelchairs shall be permitted to comply with the children's provisions in ICC A117.1 and drinking fountains for standing children shall be permitted to provide the spout at 30 inches (762 mm) minimum above the floor.







410.4 Substitution.

Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other occupancies where <a href="three or more">three or</a> drinking fountains are required, water dispensers shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains.

#### Section 419 Lavatories



#### 419.1 Approval.

Lavatories shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. Group wash -up equipment fixtures shall conform to the requirements of Section 402. Every For determining the number of lavatories required by Table 403.1, every 20 inches (508 mm) of rim space of a group wash fixture shall be considered as one lavatory.

#### 419.3 Lavatory waste outlets.

Lavatories and group wash fixtures shall have a waste outlets outlet not less than 1-1/4 inches (32 mm) in diameter. A strainer, pop-up stopper, crossbar or other device shall be provided to restrict the clear opening of the waste outlet.



## 2021 IPC Chapter 5

Water Heaters

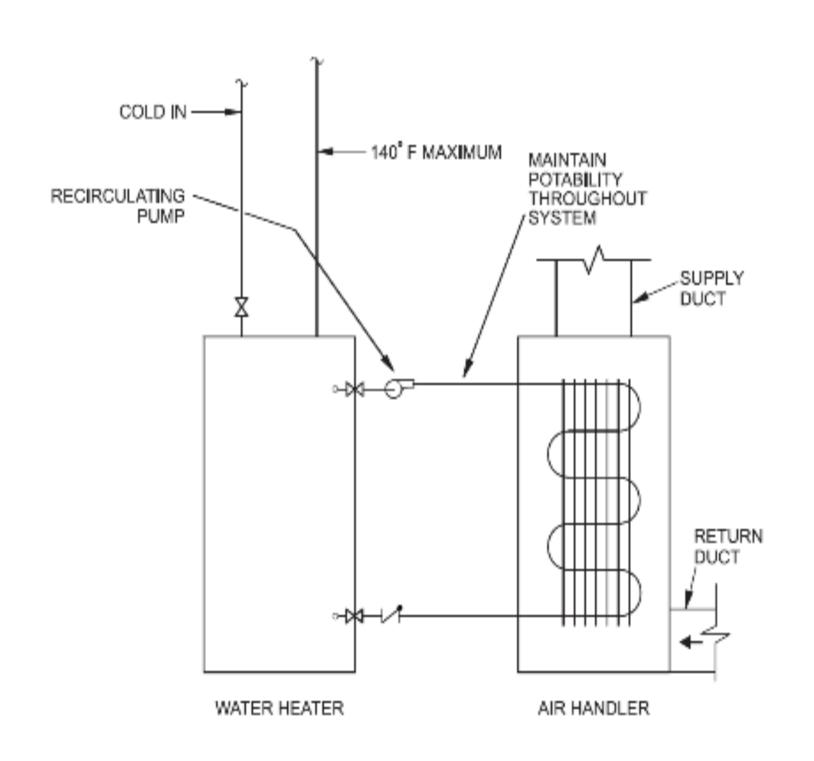


### Section 501 Water Heaters, General



#### 501.2 Water heater as space heater.

Where a combination potable water heating and space heating system requires water for space heating at temperatures greater than 140°F (60°C), a master thermostatic mixing valve complying with ASSE 1017 shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 140°F (60°C) or less. The potability of the water shall be maintained throughout the system. Requirements for combination potable water heating and space heating systems shall be in accordance with the International Mechanical Code.





## 2021 IPC Chapter 6

Water Supply and Distribution



## Section 602 Water Required



#### 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 water-tight 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.



## Section 605 Materials, Joints and Connections



### 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**.



# Section 605 Materials, Joints and Connections



605.13.7 Push-fit fitting joints.

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



Photo courtesy of Sharkbite.co

Push-fit fitting



# Section 606 Installation of Building Water Distribution Systems



#### 606.1 Location of full-open valves.

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

- 1.On the building water service pipe from the public water supply near the curb.
- 2.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.
- 3.On the discharge side of every water meter.
- 4.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.
- 5.On the top of every water down-feed pipe in occupancies other than one- and two-family residential occupancies.
- 6.On the entrance to every water supply pipe to a dwelling unit, except where supplying a single fixture equipped with individual stops.
- 7.On the water supply pipe to a gravity or pressurized water tank.
- 8.On the water supply pipe to every water heater.

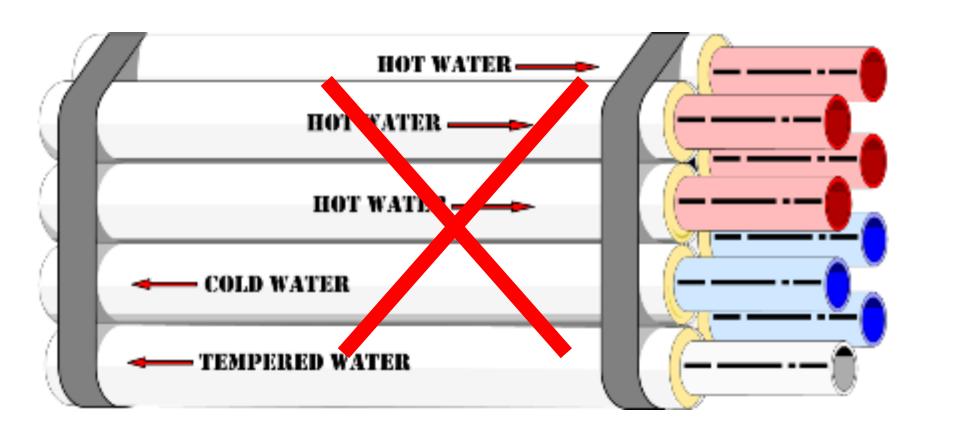


# Section 606 Installation of Building Water Distribution Systems



### 606.7 Labeling of water distribution pipes in bundles.

Where water distribution piping is bundled at installation, each pipe in the bundle shall be identified using stenciling or commercially available pipe labels. The identification shall indicate the pipe contents and the direction of flow in the pipe. The interval of the identification markings on the pipe shall not exceed 25 feet (7620 mm). There shall be not less than one identification label on each pipe in each room, space or story.









### 607.1.1 Temperature limiting means.

A thermostat control for a water heater shall **not** 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.** 







### Table 608.1 Application of Backflow Preventors

"Backflow preventer with intermediate atmospheric vent and pressure reducing valve" has been added to table 608.1. This new device must comply with ASSE 1081.

Device	Degree of Hazard	Application	Applicable Standard
Backflow preventer with intermediate atmospheric vent and pressure reducing valve	Low hazard	Backpressure or backsiphonage Sizes  1/4" - 1"	ASSE 1081



# Section 608 Protection of Potable Water Supply

### 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.



## 2021 IPC Chapter 7

Sanitary Drainage







### Table 702.3 Building Sewer Pipe

ASTM D2680, Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping, has been added to the approved list of standards for ABS plastic pipe.

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; <u>ASTM D2680;</u> ASTM F628; ASTM F1488; CSA B181.1





### Section 702 Materials



### Table 702.4 Pipe Fittings

ASME A112.4.4, Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping fittings, has been added to the approved list of standards for ABS plastic pipe and PVC pipe fittings.

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASTM D2661; ASTM F628; CSA B181.1; <u>ASME A112.4.4</u>
Polyvinyl chloride (PVC) plastic in IPS diameters	ASTM D2665; ASTM F1866; ASME A112.4.4



### Section 705 Joints



705.10.4 Push-fit joints.

Push-fit joints shall conform to ASME A112.4.4 and shall be installed in accordance with the manufacturer's instructions.





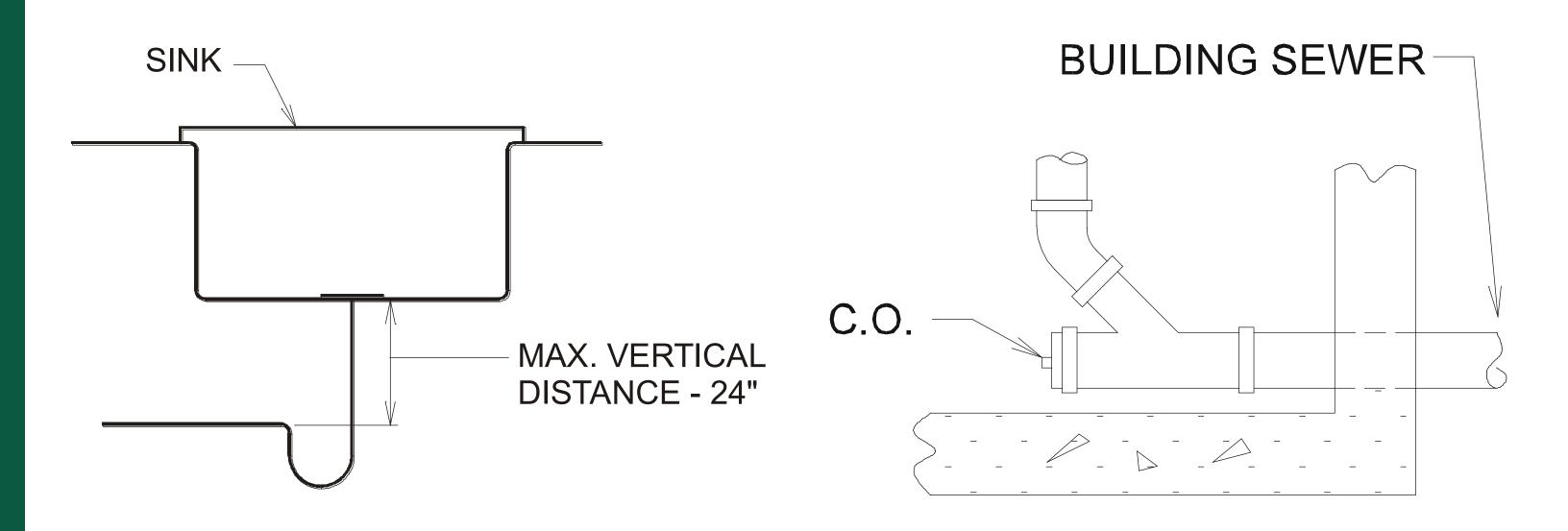






#### 708.1.6 Cleanout equivalent.

A fixture trap or a fixture with integral trap, removable without altering concealed piping, shall be acceptable as a cleanout equivalent.





# Section 717 Relining Building Sewers and Building Drains



#### **717.1** General.

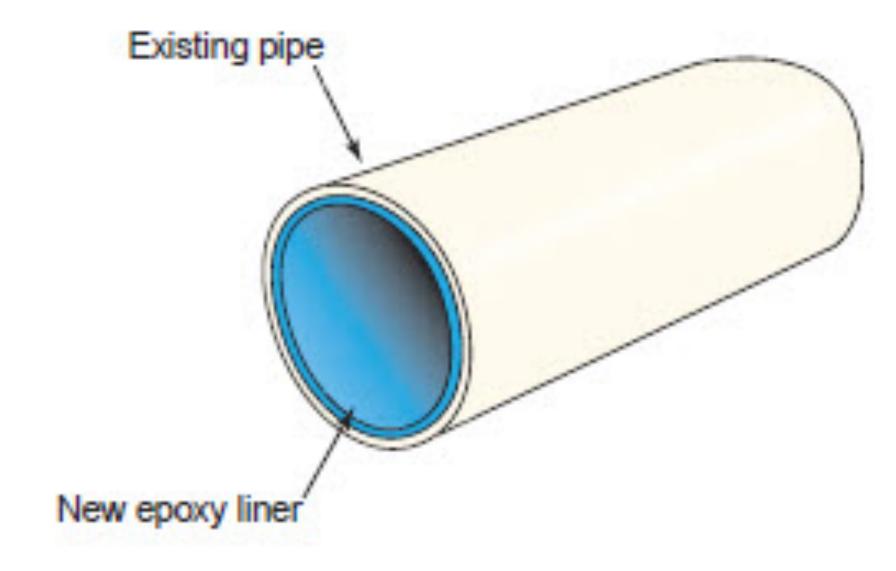
This section shall govern the relining of existing building sewers and building drainage piping.

#### 717.2 Applicability.

The relining of existing building sewer and building drainage piping shall be limited to gravity drainage piping,4 inches (102 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

#### 717.3 Pre-installation requirements.

Prior to commencement of the relining installation, the existing piping sections to be relined shall be descaled and cleaned. After the cleaning process has occurred and water has been flushed through the system, the piping shall be inspected internally by a recorded video camera survey.





# Section 718 Building Sewer and Sewer Service Lateral Rehabilitation



718.1 Building sewer and sewer service lateral rehabilitation.

Cured-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Cured-in-place rehabilitation of building sewer and sewer service lateral pipe and its connection to the main sewer pipe shall be in accordance with F2561. All cured-in-place rehabilitation of building sewer piping and sewer service laterals shall include the use of hydrophilic rings or gaskets meeting ASTM F3240 to assure water tightness and elimination of ground water penetration.



## 2021 IPC Chapter 9

Vents





### Section 903 Vent Terminals

#### 903.1 Roof extension Vent terminal required.

Open vent pipes that extend through a roof shall be terminated not less than [NUMBER] inches (mm) above the roof. Where a roof is to be used for assembly or as a promenade, observation deck, sunbathing deck or similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof. The vent pipe shall terminate by extending to the outdoors through the roof or the side wall in accordance with one of the methods identified in Section 903.1.1 through 903.1.4.



### Section 903 Vent Terminals



903.1.1 Roof extension unprotected.

Open vent pipes that extend through a roof shall be terminated not less than [NUMBER] inches (mm) above the roof.

903.1.2 Roof used for recreational or assembly purposes.

Where a roof is to be used as a promenade, restaurant, bar, observation deck, sunbathing deck, or similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof.

903.1.3 Protected vent terminal.

Where an open vent pipe terminates above a sloped roof and is covered by either a roof-mounted panel (such as a solar collector or photovoltaic panel mounted over the vent opening) or a roof element (such as an architectural feature or a decorative shroud), the vent pipe shall terminate not less than 2 inches (51 mm) above the roof surface. Such roof elements shall be designed to prevent the adverse effects of snow accumulation and wind on the function of the vent. The placement of a panel over a vent pipe and the design of a roof element covering the vent pipe shall provide for an open area for the vent pipe to the outdoors that is not less than the area of the pipe, as calculated from the inside diameter of the pipe. Such vent terminals shall be protected by a method that prevents birds and rodents from entering or blocking the vent pipe opening.



### Section 903 Vent Terminals

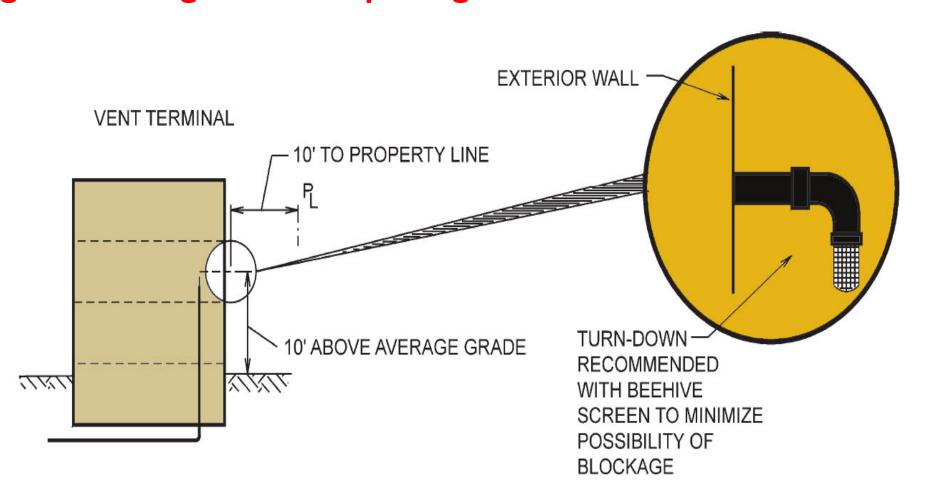


903.1.4 Sidewall vent terminal.

Vent terminals extending through the wall shall terminate not less than 10 feet (3048 mm) from the lot line and 10 feet (3048 mm) above the highest adjacent grade within 10 feet (3048 mm) horizontally of the vent terminal. Vent terminals shall not terminate under the overhang of a structure with soffit vents. Side wall vent terminals shall be protected to prevent birds or rodents from entering or blocking the vent opening.

#### 903.6 Extension through the wall.

Vent terminals extending through the wall shall terminate at a point not less than 10 feet (3048 mm) from a lot line and not less than 10 feet (3048 mm) above average ground level. Vent terminals shall not terminate under the overhang of a structure with soffit vents. Side wall vent terminals shall be protected to prevent birds or rodents from entering or blocking the vent opening.





# Section 915 Combination Waste and Vent System



#### 915.1 Type of fixtures.

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





## 2021 IPC Chapter 10

Traps Interceptors and Separators



# Section 1002 Trap Requiremen

#### 1002.1 Fixture Traps

#### **Exceptions:**

3. A grease interceptor intended to serve as a fixture trap in accordance with the manufacturer's installation instructions shall be permitted to serve as the trap for a single fixture or a combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm) and the developed length of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm).

4.3. Floor drains in multilevel parking structures that discharge to a building storm sewer shall not be required to be individually trapped. Where floor drains in multilevel parking structures are required to discharge to a combined building sewer system, the floor drains shall not be required to be individually trapped provided that they are connected to a main trap in accordance with Section 1103.1.



# Section 1002 Trap Requiremen

#### 1002.1 Fixture Traps

#### **Exceptions:**

4. Where a hydromechanical grease interceptor serves a food utensil, dishes, pots and pans sink, in accordance with the manufacturer's installation instructions. The branch drain serving the interceptor shall be provided with an emergency floor drain down stream of the interceptor connection, and the branch shall serve only the emergency floor drain and the interceptor. Where the interceptor serves combination sink of not more than three compartments where the vertical distance from the fixture outlet to the inlet of the interceptor does not exceed 30 inches (762 mm) and the developed length of the waste pipe from the most upstream fixture outlet to the inlet of the interceptor does not exceed 60 inches (1524 mm). The food utensil, dishes, pots and pans sink shall be required to connect directly with the interceptor.



## 2021 IPC Chapter 11

Storm Drainage

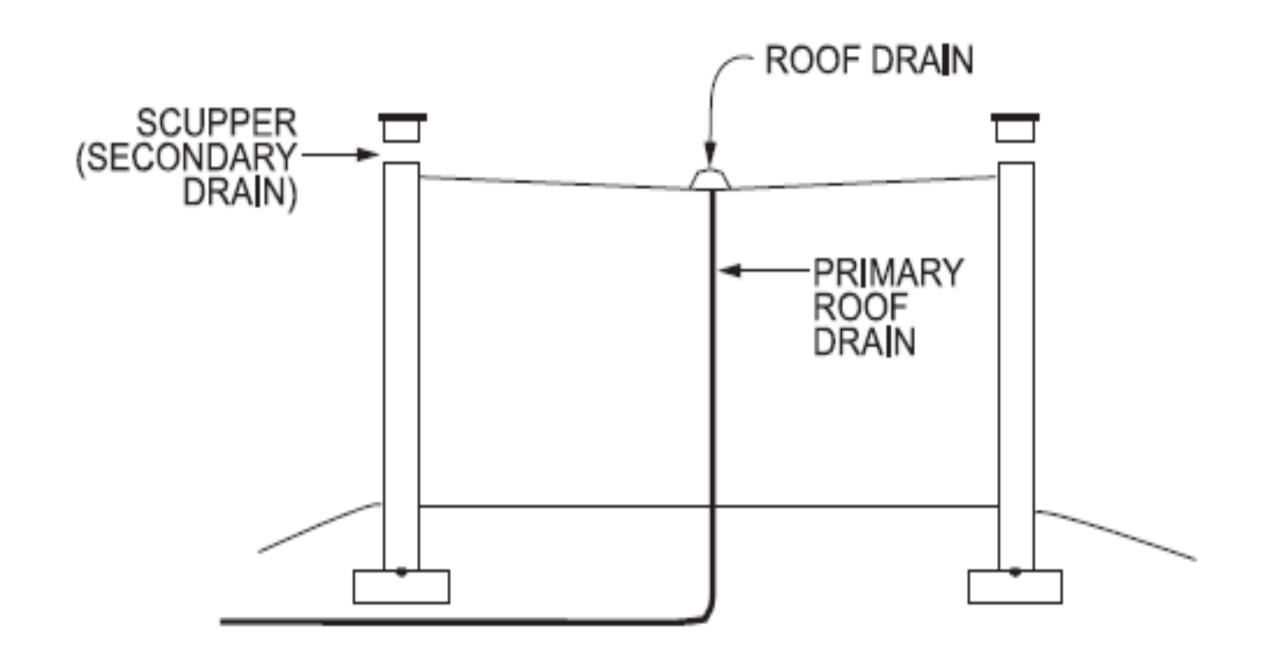






#### 1102.6 Roof Drains.

Roof drains shall conform to ASME A112.6.4 or ASME A112.3.1. Roof drains, other than siphonic roof drains, shall be tested and rated in accordance with ASME A112.6.4 or ASPE/IAPMO Z1034.





# Section 1106 Size of Conductors, Leaders and Storm Drains



1106.2 Size of storm drain piping.

Vertical and horizontal storm drain piping shall be sized based on the flow rate through the roof drain. The flow rate, as calculated in accordance with Section 1106.2.1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The flow rate in storm drain piping shall not exceed that specified in Table 1106.2.

#### 1106.2.1 Rainfall rate conversion method.

The rainfall rate falling on a roof surface shall be converted to a gallons per minute flow rate in accordance with Equation 11-1.

**GPM = R • A • 0.0104 (Equation 11-1)** 

where,

R = Rainfall intensity in inches per hour

A = Roof area in square feet



## 2021 IPC Chapter 13

Nonpotable Water Systems



### Section 1301 General



#### 1301.1 Scope. General.

The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.



## 2021 IPC Chapter 14

Subsurface Graywater Soil Absorption Systems



## Chapter 14 Subsurface Landscape Irrigation Systems



## Chapter 14 Subsurface Landscape Irrigation Gray Water Soil Absorption Systems

#### 1401.1 Scope.

The provisions of this chapter shall govern the materials, design, construction and installation of subsurface landscape irrigation graywater soil absorption systems connected to nonpotable water from on-site water reuse systems.

#### 1401.2 Materials.

Above-ground drain, waste and vent piping for subsurface landscape irrigation graywater soil absorption systems shall conform to one of the standards listed in Table 702.1. Subsurface landscape irrigation graywater soil absorption systems, underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.





## Thank you for participating!

















## Question & Answer

### Thank You

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