INTERNATIONAL PLUMBING CODE UPDATES

2018 IPC

2021 IPC

2024 IPC

Chapter 1 SCOPE AND ADMINISTRATION

Note: Most of this chapter has not been included in the review, leaving administration items to the IBC review.

Section 101.2

Exception: Detached one- and two family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with *this code or* the International Residential Code.

101.2.1 Appendices.

Provisions in the appendices shall not apply unless specifically adopted.

Chapter 2 DEFINITIONS

Section 202

General Definitions

[BG] AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less than 24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipient already incapable.

[A] APPROVED AGENCY. An established and recognized ~~agency~~ organization that is regularly engaged in conducting tests or furnishing inspection services, or furnishing product evaluation or ~~furnishing product~~ certification where such ~~agency~~ organization has been approved by the code official.

COPPER ALLOY. A homogenous mixture of two or more metals ~~alloy where~~ in which copper is the ~~principle~~ primary component, ~~is copper~~ such as brass and bronze.

DUAL FLUSHING DEVICE. A feature that allows the user to flush a water closet with either a reduced or full volume of water, depending on bowl contents.

[BG] FAMILY OR ASSISTED-USE BATHING ROOM. A room separate from other bathing rooms that: is intended to be used by all persons regardless of sex, families and those needing assisted care; has an independent entrance, not more than one shower or bathtub, not more than one adult-height water

closet and one adult-height lavatory; and is permitted to have one urinal, one child-height water closet and one child-height lavatory.

[BG] FAMILY OR ASSISTED-USE Toilet FACILITY. A room separate from other toilet facilities that: is intended to be used by all persons regardless of sex, families and those needing assisted care; has an independent entrance, not more than one adult-height water closet and one adult-height lavatory; and is permitted to have one urinal, one child-height water closet and one child-height lavatory.

GROUP WASH FIXTURE. A type of lavatory that allows more than one person to utilize the fixture at the same time.

[A] PEER REVIEW. An independent and objective technical review conducted by an approved third party.

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

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

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

SERVICE SINK. A sink exclusively intended to be used for facilitating the cleaning of a building or tenant space.

TOILET FACILITY. A room or space that contains not less than one water closet and one lavatory.

> Multiple-user toilet facility. A toilet facility intended to be used by multiple occupants. Such facilities have more than one water closet and one lavatory. Each water closet is located in its own compartment that is created by vertical partitions.
>
> Single-user toilet facility. A toilet facility intended to be used by a single occupant and that contains not less than one water closet and one lavatory.

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

Chapter 3 GENERAL REGULATIONS

SECTION 305

PROTECTION OF PIPES AND PLUMBING SYSTEM COMPONENTS

305.6 Protection against physical damage.

In concealed locations where piping, other than cast iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1-1/4 inches (32 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. ~~Such shield plates shall have a~~

~~thickness of not less than 0.0575 inches (1.463 mm) (No. 16 gage).~~ Such shield plates shall cover the area of the pipe where the member is notched or bored and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

305.6.1 Shield plates.

Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

305.8 Expansive soil.

Where expansive soil is identified under buildings in accordance with Section 1803.5.3 of the International Building Code, but not removed in accordance with Section 1808.6.3 of the International Building Code, plumbing shall be protected in accordance with Section 305.8.1 0r 305.8.2.

305.8.1 Nonisolated foundations.

Under foundations with slabs or framing that are structurally supported by a subgrade, buried plumbing shall be permitted.

305.8.2 Isolated foundations.

Under foundations with a slab or framing that structurally spans over an under-floor space that isolates the slab or framing from the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the International Building Code, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a voidspace, from the effects of expansive soil swelling and shrinking.

> **Exception:** Plumbing shall be permitted to be buried where it provides drainage of an under-floor space.
>
> To protect the voidspace, soil shall be sloped, benched or retained in accordance with an approved design methodology. Plumbing, hangers and supports below the slab or framing shall not be in contact with the soil or any assemblage of materials that is in contact with soil in the active zone. A slab and plumbing shall not be permitted to be lifted as an assembly to create the voidspace unless the under-floor space is a crawl space with access to allow inspection of plumbing after lifting.
>
> **Exception:** Plumbing shall be permitted to be buried where it provides drainage of an under-floor space.
>
> Organic materials subject to decay shall not be used for hangers, supports and soil retention systems unless protected in an approved manner. Where plumbing transitions to a buried condition beyond the perimeter of the foundation, an adequately flexible expansion joint shall be provided in the plumbing system to accommodate the effects of expansive soil swelling and shrinking.

SECTION 306
TRENCHING, EXCAVATION AND BACKFILL

306.2.4 Tracer wire.

For plastic sewer piping, an insulated copper tracer wire or other approved conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the building drain and the building sewer. The tracer wire size shall be not less than 14 American Wire Gauge (2.5 mm^2) and the insulation type shall be listed for direct burial.

SECTION 307
STRUCTURAL SAFETY

307.2 Cutting, notching and boring in wood framing.

The cutting, notching and boring of structural wood framing members shall comply with Section2308.10 of the International Building Code.

307.3 Cutting and notching in cold-formed steel framing.

The cutting and notching of holes in cold-formed steel framing members shall be in accordance with AISI S240 for structural members and AISI S220 for nonstructural members.

SECTION 308
PIPING SUPPORT

308.2 Piping seismic supports.

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

Section 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 piping shall be insulated in accordance with Section 607.5.

SECTION 310
TOILET FACILITIES REQUIREMENTS

310.1 Light and ventilation.

Toilet facilities shall be illuminated and ventilated in accordance with the International Building Code and International Mechanical Code.

Section 312
Tests and Inspections

312.4 Drainage and vent vacuum test.

The portion of the drainage and vent system under test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of negative 5 pounds per square inch or a negative 10 inches of mercury column (-34 kPa) This pressure shall be held without the removal of additional air for a period of 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

312.11.2 Testing.

Reduced pressure principle, double check, pressure vacuum breaker, reduced pressure detector fire protection, double check detector fir 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 procedures shall be performed in accordance with one of the following standards: ASSE 5013, ASSE 5015, ASSE 5020, ASSE 5047, ASSE 5048, ASSE 5052, ASSE 5056, CSA B64.10 OR CSA B64.10.1. Test gauges shall comply with ASSE 1064.

SECTION 314
CONDENSATE DISPOSAL.

[M] 314.1.1 Identification.

The termination of concealed condensate piping shall be marked to indicate whether the piping is connected to the primary or secondary drain.

[M] 314.2.1.1 Condensate discharge.

Condensate drains shall not directly connect to any plumbing drain, waste, or vent pipe. Condensate drains shall not discharge into a plumbing fixture other than a floor sink, floor drain, trench drain, mop sink, hub drain, standpipe, utility sink or laundry sink. Condensate drain connections to a lavatory wye branch tailpiece or to a bathtub overflow pipe shall not be considered as discharging to a plumbing fixture. Except where discharging to grade outdoors, the point of discharge of condensate drains shall be located within the same occupancy, tenant space or dwelling unit as the source of the condensate.

[M] 314.2.2 Drain pipe materials and sizes.

Components of the condensate disposal system shall be ABS, cast-iron, copper and copper alloy, CPVC, cross-linked polyethylene, galvanized steel, PE-RT, polyethylene, polypropylene, PVC or PVDF pipe or tubing. Components 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 not be less than ¾-inch (19.1mm) pipe size and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where he 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.

[M] 314.2.3.3 Identification.

The termination of concealed condensate piping shall be marked to indicate whether the piping is connected to the primary or secondary drain.

CHAPTER 4 FIXTURES, FAUCETS, AND FIXTURE FITTINGS

SECTION 403

MINIMUM PLUMBING FACILITIES

403.1.1 Fixture calculations.

Exceptions:

1. The total occupant load shall not be required to be divided in half where approved statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 and each urinal thet is provided shall be located in a stall.
3. 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.

403.1.2 Fixtures in single-user toilet facilities and bathing rooms ~~fixtures~~.

The plumbing fixtures located in single-user toilet facilities and single-user bathing rooms, including family or assisted-use toilet facilities and bathing rooms ~~that are required by Section 1110.2.1 of the International Building Code~~, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. The number of fixtures in single-user toilet facilities, single-user bathing rooms and family or assisted-use toilet facilities shall be deducted proportionately from the required gender ratios of Table 403.1. 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 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 multiple-user facilities.

403.1.3 Lavatory distribution.

Where two or more toilet facilities are provided for each sex, the required number of lavatories shall be distributed proportionately to the required number of male and female designated water closets.

403.2 Separate Facilities.

Where plumbing fixtures are required, separate toilet facilities shall be provided for each sex.

Exceptions:

1. Separate toilet facilities shall not be required for dwelling units and sleeping units.
2. Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.
3. Separate toilet facilities shall not be required in mercantile occupancies in which the maximum occupant load is 100 or fewer.
4. Separate toilet facilities shall not be required in business occupancies in which the maximum occupant load is 25 or fewer.
5. Separate toilet facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2.
6. Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by ~~both sexes~~ all persons regardless of sex and privacy ~~for water closets~~ is provided in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5. ~~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.~~

403.3.1 Access.

The route to the public toilet facilities required by Section 403.3 shall not pass through kitchens, storage rooms or closets. Access to the required facilities shall be from within the building or from the exterior of the building. The public shall have access to the required toilet facilities at all times that the building is occupied.

403.3.3 Locations 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 shall be permitted to exceed that required by this section, provided that the location and maximum travel distances of travel are approved.
2. The location and maximum distances of travel to required public and employee facilities in Group S occupancies shall be permitted to exceed tat required by this section, provided that the location and maximum distances of travel are approved.

403.3.5 Pay Facilities

Where pay toilet facilities are installed, such toilet facilities shall be in excess of the required minimum facilities. Required toilet facilities shall be free of charge.

[BE] 403.3.6 Door Locking.

Where a toilet facility is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet facilities.

> Exception: The egress door of a multiple-occupant toilet room shall be permitted to be lockable from inside the room where all the following criteria are met:
>
> 1. The egress door shall be lockable from inside of the room only by authorized personnel by the use of a key or other approved means.
> 2. The egress door shall be readily openable from the toilet room in accordance with International Building Code Section 1010.2.
> 3. The egress door shall be capable of being unlocked from outside the room with a key or other approved means.

403.4 Signage

Required public toilet facilities shall be provided with signs that indicate whether the facility is to be used by males, by females, or by all persons regardless of sex. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111 of the International Building Code.

403.5 Drinking fountain location.

Drinking fountains shall not be required to be located in individual tenant spaces provided that public drinking fountains are located within a distance of travel of 500 feet (152 m) of the most remote location in the tenant space and not more than one story above or below the tenant space. Where the tenant space is in a covered or open mall, such distance shall not exceed 300 feet (91 m).

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 travel distance 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.

SECTION 404

ACCESSIBLE PLUMBING FIXTURES

404.1 Where required.

Accessible plumbing facilities and fixtures shall be provided in accordance with Chapter 11 of the International Building Code.

404.2 Accessible fixture requirements.

Accessible plumbing fixtures shall be installed in accordance with ICC A117.1

SECTION 405

INSTALLATION OF FIXTURES

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. Where partitions or other obstructions do not separate adjacent water closets, urinals, or bidets, the fixtures shall not be set closer than 30 inches (762 mm) center to center between adjacent fixtures or adjacent water closets, urinals, or bidets. There shall be not less than a 21-inch (533 mm) clearance in front of water closet, urinal, lavatory or bidet to any wall, fixture or door. Water closet compartments shall not be less than 30 inches (762 mm) in width and not less than 60 inches (1524 mm) 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.

SECTION 410

DRINKING FOUNTAINS

410.1 Approval.

Drinking fountains shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4~~, and water coolers shall conform to ASHRAE 18~~. Drinking fountains, water coolers and water dispensers shall conform to NSF 61, Section 9. Electrically operated, refrigerated drinking water coolers and water dispensers shall be listed and labeled in accordance with UL 399.

410.3 High and low drinking fountains.

Where drinking fountains are provided on an exterior site, on a floor or within a secured area, the drinking fountains shall be provided I accordance with Sections 410.3.1 and 410.3.2.

[BE] 410.3.1 Minimum number.

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.

[BE] 410.3.2 More than the minimum number.

Where more than the minimum number of drinking fountains specified in Section 410.3.1 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 yield 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 three or mor drinking fountains are required, *water dispensers* shall be permitted for not more than 50 percent of the required number of drinking fountains.

SECTION 411

EMERGENCY SHOWERS AND EYEWASH STATIONS

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. Where water is supplied directly to an emergency shower or eyewash station from a water heater, the water heater shall comply with ASSE 1085.

SECTION 412

FAUCETS AND FIXTURE FITTINGS

412.2 Hand showers.

Hand-held showers shall conform to ASME A112.18.1/CSA B125.1. Hand-held showers shall provide backflow protection in accordance with ASME A112.18.1/CSA B125.1 or shall be protected against backflow by a device complying with ASME A112.18.3 or ASSE 1014.

412.12 Electrically heated or cooled water dispensers.

Electrically heated or cooled water dispensers shall comply with ASSE 1023

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 fixtures shall conform to the requirements of Section 402. 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.

419.6 Soap Dispenser.

Soap dispensers shall be provided for public lavatories.

SECTION 424

URINALS

424.2 Substitution for water closets.

In each bathroom or toilet room, urinals shall not be substituted for more than 67 percent of the required water closets for males according to Table 403.1 in assembly and educational occupancies. Urinals shall not be substituted for more than 50 percent of the required water closets for males according to Table 403.1 in all other occupancies.

CHAPTER 5 WATER HEATERS

SECTION 501

GENERAL

501.9 Lead content.

Water heaters that are part of the potable water distribution system shall comply with NSF 372 and shall have a weighted average lead content of 0.25 percent or less.

SECTION 504

SAFETY DEVICES

504.7 Required pan.

Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan 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 installed beneath a gas-fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 of UL723.

Water heaters installed in pans shall comply with Section 314.2.3.2.

CHAPTER 6 WATER SUPPLY AND DISTRIBUTION

SECTION 606

INSTALLATION OF THE BUILDING WATER DISTRIBUTION SYSTEM

606.1 Location of full-open valves.

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

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

SECTION 604

DESIGN OF BUILDING WATER DISTRIBUTION SYSTEM

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS.

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY [b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head [a, c]	2.0 gpm at 60 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

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

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency shower heads in ASME A112.18.1-2020/CSA B125.1

SECTION 606

INSTALLATION OF THE BUILDING WATER DISTRIBUTION SYSTEM

606.1 Location of full-open valves

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

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 three stories or less in height, 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 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 to every water heater.

606.2 Location of shutoff valves.

1. On the fixture supply to each plumbing fixture other than bathtubs and showers in one- and two-family residential occupancies, and other than in individual dwelling or sleeping units that are provided with unit shutoff valves in hotels, motels, boarding houses and similar occupancies.
2. On the water supply pipe to each sill cock.
3. On the water supply pipe to each appliance or mechanical equipment.

SECTION 607

HOT WATER SUPPLY SYSTEM

607.1.1 Temperature limiting means.

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

607.1.2 Tempered water temperature control.

Tempered water shall be controlled by one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70 and set to no greater than 110°F (43°C).
2. A thermostatic mixing valve conforming to ASSE 1017.
3. A water heater conforming to ASSE 1082.
4. A water heater conforming to ASSE 1084.

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

607.2.1 Commercial energy provisions.

In occupancies that are required to comply with the commercial energy provisions of the International Energy Conservation Code, the developed length of hot or tempered water piping shall be limited in accordance with Sections C404.5.1 through C404.5.2.1 of that code.

607.2.3 Piping for recirculation systems having temperature-actuated mixing valves.

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

SECTION 609

HEALTH CARE PLUMBING

609.2 Water service for Group I-2, Condition 2 facilities

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

609.2.1 Tracer wire for non-metallic piping

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

CHAPTER 7 SANITARY DRAINAGE

SECTION 702

MATERIALS

702.6 Chemical waste system

A chemical waste drainage system, including its vent system, shall be completely independent from the sanitary drainage system. Separate drainage systems for chemical waste and vent pipes shall conform to one of the standards indicated in table 702.6. The chemical waste shall be treated in accordance with Section 803.2 before discharging to the sanitary drainage system. Chemical waste drainage pipe and fitting materials shall be resistant to corrosion and degradation for the concentrations of chemicals involved per manufacturer recommendations.

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS.

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene fluoride (PVDF)	ASTM F1673, CSA B181.3

SECTION 705

JOINTS

705.2.4 Mechanical joints above ground.

Mechanical joint couplings used above ground to connect ABS pipe to ABS pipe shall be of the shielded type and shall be marked by the manufacturer as being recommended for the application.

705.2.5 Push-fit joints

Push-fit DWV fittings shall be listed and labeled to ASME A112.4.4 and shall be installed in accordance with the manufacturer's instructions.

705.10.5 Mechanical joints above ground.

Mechanical joint couplings used above ground to connect PVC pipe to PVC pipe shall be of the shielded type and shall be marked by the manufacturer as being recommended for the application.

SECTION 708

CLEANOUTS

708.1.6 Cleanout equivalent

A fixture trap or a fixture with an 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 sewers 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 Preinstallation 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.

717.3.1 Preinstallation video camera survey.

The video survey shall include verification of the project address location. The video shall include notations of the cleanout and fitting locations, and the approximate depth of the existing piping. The video shall also include notations of the length of piping at intervals no greater than 25 feet (7620 mm).

717.4 Permitting.

Prior to permit issuance, the code official shall review and evaluate the preinstallation recorded video camera survey to determine if the piping system is able to be relined in accordance with the proposed relining system manufacturer’s installation requirements and applicable referenced standards.

717.5 Prohibited applications.

Where a review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly or defects exist, relining shall not be permitted. The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, backgrade or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.

717.6 Relining materials

The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

717.7 Installation

The installation of relining materials shall be performed in accordance with the manufacturer's installation instructions, applicable referenced standards and this code.

717.7.1 Material data report.

The installer shall record the data as required by the relining material manufacturer and applicable standards. The recorded data shall include but is not limited to the location of the project, relining material type, amount of product installed and conditions of the installation. A copy of the data report shall be provided to the code official prior to final approval.

717.8 Post-installation recorded video camera survey.

The completed, relined piping system shall be inspected internally by a recorded video camera survey after the system has been flushed and flow-tested with water. The video survey shall be submitted to the code official prior to finalization of the permit. The video survey shall be reviewed and evaluated to provide verification that no defects exist. Any defects shall be repaired and replaced in accordance with this code.

717.9 Certification.

A certification shall be provided in writing to the code official, from the permit holder, that the relining materials have been installed in accordance with the manufacturer's installation instructions, the applicable standards and this code.

717.10 Approval.

Upon verification of compliance with the requirements of Sections 717.1 through 717.9, the code official shall approve the installation.

SECTION 718

REHABILITATION OF BUILDING SEWERS AND BUILDING DRAINS

718.1 Cure-in-place.

Sectional cure-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

CHAPTER 9

VENTS

SECTION 901

GENERAL

901.3 Chemical waste drainage vent system

The vent system for a chemical waste drainage system shall be independent of any sanitary drainage vent system. The termination of a chemical waste drainage vent system shall be through the roof to the outdoors or to an air admittance valve that complies with ASSE1049. Air admittance valves for chemical waste drainage systems shall be constructed of one of the materials indicated in Table 702.6 and shall be tested for chemical resistance in accordance with ASTM F1412.

SECTION 902

MATERIALS

902.1.1 Chemical Waste drainage system vents.

The pipe and fitting materials for a chemical waste drainage vent system shall be in accordance with Section702.6. The methods utilized for construction and installation of such venting system shall be in accordance with the pipe and fitting manufacturers' instructions.

SECTION 903

VENT TERMINALS

903.1 Vent terminal required.

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 Sections 903.1.1 t6hrough 903.1.4.

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, a restaurant, bar, or sunbathing deck, as an observation deck, or for 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 a 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 method that prevents birds and rodents from entering or blocking the vent pipe opening.

903.1.4 Sidewall vent terminal.

Vent terminals extending through the wall shall terminate not less than 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. Sidewall vent terminals shall be protected to prevent birds and rodents from entering or blocking the vent opening.

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1002

TRAP REQUIREMENTS

1002.1 Fixture traps

Each plumbing fixture shall be separately trapped by a liquid-seal trap, except as otherwise permitted by this code. The vertical distance from the fixture outlet to the trap weir shall not exceed 24 inches (610 mm), and the horizontal distance shall not exceed 30 inches (762 mm) measured from the centerline of the fixture outlet to the centerline of the inlet of the trap. The height of a clothes washer standpipe above a trap shall conform to Section 802.4.3. A fixture shall not be double-trapped.

Exceptions:

1. This section shall not apply to fixtures with integral traps.

2. A combination plumbing fixture is permitted to be installed on one trap, provided that one compartment is not more than 6 inches (152 mm) deeper than the other compartment and the waste outlets are not more than 30 inches (762 mm) apart.
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 a multilevel parking structure are required to discharge to a combined building sewer system, the floor drains shall not be required to be individually trapped provided they are connected to a main trap in accordance with Section 1103.1.
4. Where a hydromechanical grease interceptor serves a food utensil, dishes, pats 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 downstream of the interceptor connection, and the branch shall serve only the emergency floor drain and the interceptor. Where the interceptor serves 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 exceed30 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.

1002 4.1.5 Fixture drain connection for trap priming.

A fixture drain from a lavatory or hand sink shall serve a method of providing trap seal protection for an emergency floor drain, a trench drain, or a floor sink where such fixtures are located in the same room. A fixture drain from a drinking fountain shall serve a method of providing trap seal protection for an emergency floor drain, a trench drain, or a floor sink where such fixtures are located in the same room or in a room adjacent to the room having the drinking fountain. The fixture drain shall not be routed on or above the surface of the floor and shall connect to the floor drain, trench drain, or floor sink at a point that is below the flood level rim and above the inlet to the trap of the receiving fixture.

CHAPTER 11 STORM DRAINAGE

SECTION 1106

SIZE OF CONDUCTORS, LEADERS AND STORM DRAINS

1106.2 Size of storm drain piping.

Vertical and horizontal storm drain piping shall be 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 specific 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 gallon per minute (L/m) flow rate in accordance with Equation 11-1.

GPM = R x A x 0.0.0104 (Equation 11-1)

Where:

R = Rainfall intensity in inches (mm) per hour.

A = Roof area in square feet (m^2)

CHAPTER 12 SPECIAL PIPING AND STORAGE SYSTEMS

SECTION 1202

MEDICAL GASES

1202.1 Nonflammable medical gases.

Nonflammable medical gas systems, inhalation anesthetic systems and vacuum piping systems shall be installed, tested and labeled in accordance with NFPA 99.

Exceptions:

1. This section shall not apply to portable systems or cylinder storage.
2. Vacuum system exhaust terminations shall comply with the International Mechanical Code.