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**TABLE 308.5
HANGER SPACING**

| PIPING MATERIAL | MAXIMUM HORIZONTAL SPACING (feet) | MAXIMUM VERTICAL SPACING (feet) |
|--------------------------------------------------------------------------------|-----------------------------------|---------------------------------|
| ABS pipe | 4 | 10 ^b |
| Aluminum tubing | 10 | 15 |
| Brass pipe | 10 | 10 |
| Cast-iron pipe | 5 ^a | 15 |
| Copper or copper-alloy pipe | 12 | 10 |
| Copper or copper-alloy tubing, 1 1/4-inch diameter and smaller | 6 | 10 |
| Copper or copper-alloy tubing, 1 1/2-inch diameter and larger | 10 | 10 |
| Cross-linked polyethylene (PEX) pipe | 2.67 (32 inches) | 10 ^b |
| Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe | 2.67 (32 inches) | 4 |
| CPVC pipe or tubing, 1 inch and smaller | 3 | 10 ^b |
| CPVC pipe or tubing, 1 1/4 inches and larger | 4 | 10 ^b |
| Steel pipe | 12 | 15 |
| Lead pipe | Continuous | 4 |
| PB pipe or tubing | 2.67 (32 inches) | 4 |
| Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe | 2.67 (32 inches) | 4 |
| Polypropylene (PP) pipe or tubing 1 inch and smaller | 2.67 (32 inches) | 10 ^b |
| Polypropylene (PP) pipe or tubing, 1 1/4 inches and larger | 4 | 10 ^b |
| PVC pipe | 4 | 10 ^b |
| Stainless steel drainage systems | 10 | 10 ^b |

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. Midstory guide for sizes 2 inches and smaller.

308.8 Expansion joint fittings. Expansion joint fittings shall be used only where necessary to provide for expansion and contraction of the pipes. Expansion joint fittings shall be of the typical material suitable for use with the type of piping in which such fittings are installed.

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 installation instructions. Hot and cold water piping shall not be grouped in the same bundle.

**SECTION 309
FLOOD HAZARD RESISTANCE**

309.1 General. Plumbing systems and equipment in structures erected in flood hazard areas shall be constructed in accordance with the requirements of this section and the *International Building Code*.

[B] 309.2 Flood hazard. For structures located in flood hazard areas, the following systems and equipment shall be located at or above the design flood elevation.

Exception: The following systems are permitted to be located below the design flood elevation provided that the systems are designed and installed to prevent water from entering or accumulating within their components and the systems are constructed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation.

1. All water service pipes.
2. Pump seals in individual water supply systems where the pump is located below the design flood elevation.
3. Covers on potable water wells shall be sealed, except where the top of the casing well or pipe sleeve is elevated to at least 1 foot (305 mm) above the design flood elevation.
4. All sanitary drainage piping.
5. All storm drainage piping.
6. Manhole covers shall be sealed, except where elevated to or above the design flood elevation.
7. All other plumbing fixtures, faucets, fixture fittings, piping systems and equipment.
8. Water heaters.
9. Vents and vent systems.

[B] 309.3 Flood hazard areas subject to high-velocity wave action. Structures located in flood hazard areas subject to high-velocity wave action shall meet the requirements of Section 309.2. The plumbing systems, pipes and fixtures shall not be mounted on or penetrate through walls intended to break away under flood loads.

**SECTION 310
WASHROOM AND TOILET ROOM REQUIREMENTS**

310.1 Light and ventilation. Washrooms and toilet rooms shall be illuminated and ventilated in accordance with the *International Building Code* and *International Mechanical Code*.

310.2 Location of fixtures and piping. Piping, fixtures or equipment shall not be located in such a manner as to interfere with the normal operation of windows, doors or other means of egress openings.

TABLE 403.1—continued
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES^a
(See Sections 403.2 and 403.3)

| NO. | CLASSIFICATION | OCCUPANCY | DESCRIPTION | WATER CLOSETS (URINALS SEE SECTION 419.2) | | LAVATORIES | | BATHTUBS/ SHOWERS | DRINKING FOUNTAIN (SEE SECTION 410.1) | OTHER |
|-----|--------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------|----------------------|---------------------------------------------------|--------------------------|
| | | | | MALE | FEMALE | MALE | FEMALE | | | |
| | | A-4 | Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities | 1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500 | 1 per 40 for the first 1,500 and 1 per 60 for the remainder exceeding 1,500 | 1 per 200 | 1 per 150 | — | 1 per 1,000 | 1 service sink |
| | | A-5 | Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities | 1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500 | 1 per 40 for the first 1,500 and 1 per 60 for the remainder exceeding 1,500 | 1 per 200 | 1 per 150 | — | 1 per 1,000 | 1 service sink |
| 2 | Business (see Sections 403.2, 403.4 and 403.4.1) | B | Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses | 1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 | | 1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80 | | — | 1 per 100 | 1 service sink |
| 3 | Educational | E | Educational facilities | 1 per 50 | | 1 per 50 | | — | 1 per 100 | 1 service sink |
| 4 | Factory and industrial | F-1 and F-2 | Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials | 1 per 100 | | 1 per 100 | | (see Section 411) | 1 per 400 | 1 service sink |
| 5 | Institutional | I-1 | Residential care | 1 per 10 | | 1 per 10 | | 1 per 8 | 1 per 100 | 1 service sink |
| | | I-2 | Hospitals, ambulatory nursing home patients ^b | 1 per room ^c | | 1 per room ^c | | 1 per 15 | 1 per 100 | 1 service sink per floor |
| | | | Employees, other than residential care ^b | 1 per 25 | | 1 per 35 | | — | 1 per 100 | — |
| | | | Visitors, other than residential care | 1 per 75 | | 1 per 100 | | — | 1 per 500 | — |
| | | I-3 | Prisons ^b | 1 per cell | | 1 per cell | | 1 per 15 | 1 per 100 | 1 service sink |
| | | I-3 | Reformatories, detention centers, and correctional centers ^b | 1 per 15 | | 1 per 15 | | 1 per 15 | 1 per 100 | 1 service sink |
| I-4 | Adult day care and child care | 1 per 15 | | 1 per 15 | | — | 1 per 100 | 1 service sink | | |

(continued)

[B] 403.1.1 Unisex toilet and bath fixtures. Fixtures located within unisex toilet and bathing rooms complying with Section 404 are permitted to be included in determining the minimum required number of fixtures for assembly and mercantile occupancies.

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

Exceptions:

1. Separate facilities shall not be required for dwelling units and sleeping units.
2. Separate facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or less.
3. Separate facilities shall not be required in mercantile occupancies in which the maximum occupant load is 50 or less.

403.3 Number of occupants of each sex. The required water closets, lavatories, and showers or bathtubs shall be distributed equally between the sexes based on the percentage of each sex anticipated in the occupant load. The occupant load shall be composed of 50 percent of each sex, unless statistical data approved by the code official indicate a different distribution of the sexes.

403.4 Required public toilet facilities. Customers, patrons and visitors shall be provided with public toilet facilities in structures and tenant spaces intended for public utilization. The accessible route to public facilities shall not pass through kitchens, storage rooms, closets or similar spaces. Employees shall be provided with toilet facilities in all occupancies. Employee toilet facilities shall be either separate or combined employee and public toilet facilities.

403.4.1 Location of toilet facilities in occupancies other than covered malls. In occupancies other than covered malls, the required public and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

Exception: The location and maximum travel distances to required employee facilities in factory and industrial occupancies are permitted to exceed that required by this section, provided that the location and maximum travel distance are approved.

403.4.2 Location of toilet facilities in covered malls. In covered mall buildings, the required public and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 300 feet (91 440 mm). In covered mall buildings, the required facilities shall be based on total square footage, and facilities shall be installed in each individual store or in a central toilet area located in accordance with this section. The maximum travel distance to central toilet facilities in covered mall buildings shall be measured from the main entrance of any store or tenant space. In covered mall buildings, where employees' toilet facilities are

not provided in the individual store, the maximum travel distance shall be measured from the employee's work area of the store or tenant space.

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

403.5 Signage. Required public facilities shall be designated by a legible sign for each sex. Signs shall be readily visible and located near the entrance to each toilet facility.

**SECTION 404
ACCESSIBLE PLUMBING FACILITIES**

404.1 Where required. Accessible plumbing facilities and fixtures shall be provided in accordance with the *International Building Code*.

**SECTION 405
INSTALLATION OF FIXTURES**

405.1 Water supply protection. The supply lines and fittings for every plumbing fixture shall be installed so as to prevent backflow.

405.2 Access for cleaning. Plumbing fixtures shall be installed so as to afford easy access for cleaning both the fixture and the area around the fixture.

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 closer than 30 inches (762 mm) center-to-center between adjacent fixtures. There shall be at least 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).

405.3.2 Public lavatories. In employee and public toilet rooms, the required lavatory shall be located in the same room as the required water closet.

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, 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.

ature of 110°F (43°C) by a water temperature limiting device conforming to ASSE 1070.

SECTION 409 DISHWASHING MACHINES

409.1 Approval. Domestic dishwashing machines shall conform to ASSE 1006. Commercial dishwashing machines shall conform to ASSE 1004 and NSF 3.

409.2 Water connection. The water supply to a dishwashing machine shall be protected against backflow by an air gap or backflow preventer in accordance with Section 608.

409.3 Waste connection. The waste connection of a dishwashing machine shall comply with Section 802.1.6 or 802.1.7, as applicable.

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 ARI 1010. Drinking fountains and water coolers 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.

410.2 Prohibited location. Drinking fountains shall not be installed in public restrooms.

SECTION 411 EMERGENCY SHOWERS AND EYEWASH STATIONS

411.1 Approval. Emergency showers and eyewash stations shall conform to ISEA Z358.1.

411.2 Waste connection. Waste connections shall not be required for emergency showers and eyewash stations.

SECTION 412 FLOOR AND TRENCH DRAINS

412.1 Approval. Floor drains shall conform to ASME A112.6.3, ASME A112.3.1 or CSA B79. Trench drains shall comply with ASME A112.6.3.

412.2 Floor drains. Floor drains shall have removeable strainers. The floor drain shall be constructed so that the drain is capable of being cleaned. Access shall be provided to the drain inlet.

412.3 Size of floor drains. Floor drains shall have a minimum 2-inch-diameter (51 mm) drain outlet.

412.4 Public laundries and central washing facilities. In public coin-operated laundries and in the central washing facilities of multiple-family dwellings, the rooms containing automatic clothes washers shall be provided with floor drains located to readily drain the entire floor area. Such drains shall

have a minimum outlet of not less than 3 inches (76 mm) in diameter.

SECTION 413 FOOD WASTE GRINDER UNITS

413.1 Approval. Domestic food waste grinders shall conform to ASSE 1008. Commercial food waste grinders shall conform to ASSE 1009. Food waste grinders shall not increase the drainage fixture unit load on the sanitary drainage system.

413.2 Domestic food waste grinder waste outlets. Domestic food waste grinders shall be connected to a drain of not less than 1.5 inches (38 mm) in diameter.

413.3 Commercial food waste grinder waste outlets. Commercial food waste grinders shall be connected to a drain a minimum of 2 inches (51 mm) in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments.

413.4 Water supply required. All food waste grinders shall be provided with a supply of cold water.

SECTION 414 GARBAGE CAN WASHERS

414.1 Water connection. The water supply to a garbage can washer shall be protected against backflow by an air gap or a backflow preventer in accordance with Section 608.13.1, 608.13.2, 608.13.3, 608.13.5, 608.13.6 or 608.13.8.

414.2 Waste connection. Garbage can washers shall be trapped separately. The receptacle receiving the waste from the washer shall have a removable basket or strainer to prevent the discharge of large particles into the drainage system.

SECTION 415 LAUNDRY TRAYS

415.1 Approval. Laundry trays shall conform to ANSI Z124.6, ASME A112.19.1M, ASME A112.19.3M, ASME A112.19.9M, CSA B45.2 or CSA B45.4.

415.2 Waste outlet. Each compartment of a laundry tray shall be provided with a waste outlet a minimum of 1.5 inches (38 mm) in diameter and a strainer or crossbar to restrict the clear opening of the waste outlet.

SECTION 416 LAVATORIES

416.1 Approval. Lavatories shall conform to ANSI Z124.3, ASME A112.19.1M, ASME A112.19.2M, ASME A112.19.3M, ASME A112.19.4M, ASME A112.19.9M, CSA B45.1, CSA B45.2, CSA B45.3 or CSA B45.4. Group wash-up equipment shall conform to the requirements of Section 402. Every 20 inches (508 mm) of rim space shall be considered as one lavatory.

416.2 Cultured marble lavatories. Cultured marble vanity tops with an integral lavatory shall conform to ANSI Z124.3 or CSA B45.5.

605.22.2 Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564 or CSA-B137.3 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be permitted above or below ground.

605.22.3 Threaded joints. Threads shall conform to ASME B1.20.1. Schedule 80 or heavier pipe shall be permitted to be threaded with dies specifically designed for plastic pipe, but the pressure rating of the pipe shall be reduced by 50 percent. Thread by socket molded fittings shall be permitted. Approved thread lubricant or tape shall be applied on the male threads only.

605.23 Stainless steel. Joints between stainless steel pipe and fittings shall comply with Sections 605.23.1 and 605.23.2.

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

605.23.2 Welded joints. All joint surfaces shall be cleaned. The joint shall be welded autogenously or with an approved filler metal as referenced in ASTM A 312.

605.24 Joints between different materials. Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical-sealing type, or as permitted in Sections 605.24.1, 605.24.2 and 605.24.3. Connectors or adapters shall have an elastomeric seal conforming to ASTM D 1869 or ASTM F 477. Joints shall be installed in accordance with the manufacturer's instructions.

605.24.1 Copper or copper-alloy tubing to galvanized steel pipe. Joints between copper or copper-alloy tubing and galvanized steel pipe shall be made with a brass 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.

605.24.2 Plastic pipe or tubing to other piping material. Joints between different grades of plastic pipe or between plastic pipe and other piping material shall be made with an approved adapter fitting.

605.24.3 Stainless steel. Joints between stainless steel and different piping materials shall be made with a mechanical joint of the compression or mechanical sealing type or a dielectric fitting.

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.
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.

606.2 Location of shutoff valves. Shutoff valves shall be installed in the following locations:

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

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

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

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

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

606.5.2 Support. All water supply tanks shall be supported in accordance with the *International Building Code*.

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

606.5.4 Overflows for water supply tanks. Each gravity or suction water supply tank shall be provided with an overflow with a diameter not less than that shown in Table 606.5.4. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or floor drain; or over an open water-supplied fixture.

CHAPTER 9

VENTS

SECTION 901 GENERAL

901.1 Scope. The provisions of this chapter shall govern the materials, design, construction and installation of vent systems.

901.2 Trap seal protection. The plumbing system shall be provided with a system of vent piping that will permit the admission or emission of air so that the seal of any fixture trap shall not be subjected to a pneumatic pressure differential of more than 1 inch of water column (249 Pa).

901.2.1 Venting required. Every trap and trapped fixture shall be vented in accordance with one of the venting methods specified in this chapter.

901.3 Chemical waste vent system. The vent system for a chemical waste system shall be independent of the sanitary vent system and shall terminate separately through the roof to the open air.

901.4 Use limitations. The plumbing vent system shall not be utilized for purposes other than the venting of the plumbing system.

901.5 Tests. The vent system shall be tested in accordance with Section 312.

901.6 Engineered systems. Engineered venting systems shall conform to the provisions of Section 918.

SECTION 902 MATERIALS

902.1 Vents. The materials and methods utilized for the construction and installation of venting systems shall comply with the applicable provisions of Section 702.

902.2 Sheet copper. Sheet copper for vent pipe flashings shall conform to ASTM B 152 and shall weigh not less than 8 ounces per square foot (2.5 kg/m²).

902.3 Sheet lead. Sheet lead for vent pipe flashings shall weigh not less than 3 pounds per square foot (15 kg/m²) for field-constructed flashings and not less than 2.5 pounds per square foot (12 kg/m²) for prefabricated flashings.

SECTION 903 OUTDOOR VENT EXTENSION

903.1 Required vent extension. The vent system serving each building drain shall have at least one vent pipe that extends to the outdoors.

903.1.1 Installation. The required vent shall be a dry vent that connects to the building drain or an extension of a drain that connects to the building drain. Such vent shall not be an island fixture vent as allowed by Section 913.

903.1.2 Size. The required vent shall be sized in accordance with Section 916.2 based on the required size of the building drain.

903.2 Vent stack required. A vent stack shall be required for every drainage stack that has five branch intervals or more.

903.3 Vent termination. Every vent stack or stack vent shall terminate outdoors to the open air or to a stack-type air admittance valve in accordance with Section 917.

903.4 Vent connection at base. Every vent stack shall connect to the base of the drainage stack. The vent stack shall connect at or below the lowest horizontal branch. Where the vent stack connects to the building drain, the connection shall be located downstream of the drainage stack and within a distance of 10 times the diameter of the drainage stack.

903.5 Vent headers. Stack vents and vent stacks connected into a common vent header at the top of the stacks and extending to the open air at one point shall be sized in accordance with the requirements of Section 916.1. The number of fixture units shall be the sum of all fixture units on all stacks connected thereto, and the developed length shall be the longest vent length from the intersection at the base of the most distant stack to the vent terminal in the open air, as a direct extension of one stack.

SECTION 904 VENT TERMINALS

904.1 Roof extension. All open vent pipes that extend through a roof shall be terminated at least [NUMBER] inches (mm) above the roof, except that where a roof is to be used for any purpose other than weather protection, the vent extensions shall be run at least 7 feet (2134 mm) above the roof.

904.2 Frost closure. Where the 97.5-percent value for outside design temperature is 0°F (-18°C) or less, every vent extension through a roof or wall shall be a minimum of 3 inches (76 mm) in diameter. Any increase in the size of the vent shall be made inside the structure a minimum of 1 foot (305 mm) below the roof or inside the wall.

904.3 Flashings. The juncture of each vent pipe with the roof line shall be made water tight by an approved flashing.

904.4 Prohibited use. Vent terminals shall not be used as a flag pole or to support flag poles, television aerials or similar items, except when the piping has been anchored in an approved manner.

904.5 Location of vent terminal. An open vent terminal from a drainage system shall not be located directly beneath any door, openable window, or other air intake opening of the building or of an adjacent building, and any such vent terminal shall not be within 10 feet (3048 mm) horizontally of such an opening unless it is at least 2 feet (610 mm) above the top of such opening.

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

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

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

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

**TABLE 909.3
WET VENT SIZE**

| WET VENT PIPE SIZE (inches) | DRAINAGE FIXTURE UNIT LOAD (dfu) |
|-----------------------------|----------------------------------|
| 1½ | 1 |
| 2 | 4 |
| 2½ | 6 |
| 3 | 12 |

For SI: 1 inch = 25.4 mm.

**SECTION 910
WASTE STACK VENT**

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

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

910.3 Stack vent. A stack vent shall be provided for the waste stack. The size of the stack vent shall be not less than the size of the waste stack. Offsets shall be permitted in the stack vent, shall be located at least 6 inches (152 mm) above the flood level of the highest fixture and shall be in accordance with Section 905.2. The stack vent shall be permitted to connect with other stack vents and vent stacks in accordance with Section 903.5.

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

**TABLE 910.4
WASTE STACK VENT SIZE**

| STACK SIZE (inches) | MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu) | |
|---------------------|------------------------------------------------|---------------------------|
| | Total discharge into one branch interval | Total discharge for stack |
| 1½ | 1 | 2 |
| 2 | 2 | 4 |
| 2½ | No limit | 8 |
| 3 | No limit | 24 |
| 4 | No limit | 50 |
| 5 | No limit | 75 |
| 6 | No limit | 100 |

For SI: 1 inch = 25.4 mm.

**SECTION 911
CIRCUIT VENTING**

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

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

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

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

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

requirements of this section based on the anticipated conditions of use. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3 Grease interceptors. Grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3.5.

1003.3.1 Grease interceptors and automatic grease removal devices required. A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged.

1003.3.2 Food waste grinders. Where food waste grinders connect to grease interceptors, a solids interceptor shall separate the discharge before connecting to the grease interceptor. Solids interceptors and grease interceptors shall be sized and rated for the discharge of the food waste grinder. Emulsifiers, chemicals, enzymes and bacteria shall not discharge into the food waste grinder.

1003.3.3 Grease interceptors and automatic grease removal devices not required. A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any private living quarters.

1003.3.4 Grease interceptors and automatic grease removal devices. Grease interceptors or automatic grease removal devices shall conform to PDI G101, ASME A112.14.3 or ASME A112.14.4 and shall be installed in accordance with the manufacturer's instructions.

1003.3.4.1 Grease interceptor capacity. Grease interceptors shall have the grease retention capacity indicated in Table 1003.3.4.1 for the flow-through rates indicated.

1003.3.4.2 Rate of flow controls. Grease interceptors shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow. The flow-control device shall be vented and terminate not less than 6 inches (152 mm) above the flood rim level or be installed in accordance with the manufacturer's instructions.

1003.3.5 Automatic grease removal devices. Where automatic grease removal devices are installed, such devices shall be located downstream of each fixture or multiple fixtures in accordance with the manufacturer's instructions. The automatic grease removal device shall be sized to pretreat the measured or calculated flows for all connected fixtures or equipment. Ready access shall be provided for inspection and maintenance.

1003.4 Oil separators required. At repair garages, car-washing facilities, at factories where oily and flammable liquid wastes are produced and in hydraulic elevator pits, separators shall be installed into which all oil-bearing, grease-bearing or

flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.

Exception: An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed.

TABLE 1003.3.4.1
CAPACITY OF GREASE INTERCEPTORS^a

| TOTAL FLOW-THROUGH RATING (gpm) | GREASE RETENTION CAPACITY (pounds) |
|------------------------------------|---------------------------------------|
| 4 | 8 |
| 6 | 12 |
| 7 | 14 |
| 9 | 18 |
| 10 | 20 |
| 12 | 24 |
| 14 | 28 |
| 15 | 30 |
| 18 | 36 |
| 20 | 40 |
| 25 | 50 |
| 35 | 70 |
| 50 | 100 |
| 75 | 150 |
| 100 | 200 |

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

1003.4.1 Separation of liquids. A mixture of treated or untreated light and heavy liquids with various specific gravities shall be separated in an approved receptacle.

1003.4.2 Oil separator design. Oil separators shall be designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

1003.4.2.1 General design requirements. Oil separators shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening of the separator shall have not less than an 18-inch (457 mm) water seal.

1003.4.2.2 Garages and service stations. Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a minimum capacity of 6 cubic feet (0.168 m³) for the first 100 square feet (9.3 m²) of area to be drained, plus 1 cubic foot (0.28 m³) for each additional 100 square feet (9.3 m²) of area to be drained into the separator. Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.

1003.5 Sand interceptors in commercial establishments. Sand and similar interceptors for heavy solids shall be designed

CSA—continued

| | | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| B64.7—94 | Vacuum Breakers, Laboratory Faucet Type (LFVB) | Table 608.1, 608.13.6 |
| B64.10/B64.10.1—01 | Manual for the Selection and Installation of Backflow Prevention Devices/Manual for the Maintenance and Field Testing of Backflow Prevention Devices | 312.9.2 |
| B79—94(2000) | Floor, Area and Shower Drains, and Cleanouts for Residential Construction | 412.1 |
| B125—01 | Plumbing Fittings | 424.1, 424.3, 424.4, 425.3.1, 425.5, 607.4, Table 608.1 |
| B137.1—02 | Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services | Table 605.3 |
| B137.2—02 | PVC Injection-moulded Gasketed Fittings for Pressure Applications | Table 605.5, Table 1102.7 |
| B137.3—02 | Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications | Table 605.3, 605.21.2, 705.8.2, 705.14.2 |
| B137.5—02 | Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications—with Revisions through September 1992 | Table 605.3, Table 605.4 |
| B137.6—02 | CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems—with Revisions through May 1986 | Table 605.3, Table 605.4 |
| B137.11—02 | Polypropylene (PP-R) Pipe and Fittings for Pressure Applications | Table 605.3, Table 605.4, Table 605.5 |
| B181.1—02 | ABS Drain, Waste and Vent Pipe and Pipe Fittings | Table 702.1, Table 702.2, Table 702.4, 705.2.2, 705.7.2, 715.2 |
| B181.2—02 | PVC Drain, Waste, and Vent Pipe and Pipe Fittings—with Revisions through December 1993 | Table 702.1, Table 702.2, 705.8.2, 705.14.2, 715.2 |
| B182.1—02 | Plastic Drain and Sewer Pipe and Pipe Fittings | 705.8.2, 705.14.2, Table 1102.4 |
| B182.2—02 | PVC Sewer Pipe and Fittings (PSM Type) | Table 702.3, Table 1102.4, Table 1102.5 |
| B182.4—02 | Profile PVC Sewer Pipe and Fittings | Table 702.3, Table 1102.4, Table 1102.5 |
| B182.6—02 | Profile Polyethylene Sewer Pipe and Fittings for Leak-proof Sewer Applications | Table 1102.5 |
| B182.8—02 | Profile Polyethylene Storm Sewer and Drainage Pipe and Fittings | Table 1102.5 |
| CAN3-B137.8M—99 | Polybutylene (PB) Piping for Pressure Applications—with Revisions through July 1992 | Table 605.3, Table 605.4, 605.19.2, 605.19.3 |
| CAN/CSA-A257.1M—92 | Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings | Table 702.3, Table 1102.4 |
| CAN/CSA-A257.2M—92 | Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe and Fittings | Table 702.3, Table 1102.4 |
| CAN/CSA-A257.3M—92 | Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets | 705.6, 705.16 |
| CAN/CSA-B64.1.1—01 | Vacuum Breakers, Atmospheric Type (AVB) | 425.2, Table 608.1, 608.13.6 |
| CAN/CSA-B64.2—01 | Vacuum Breakers, Hose Connection Type (HCVB) | Table 608.1, 608.13.6 |
| CAN/CSA-B64.2.2—01 | Vacuum Breakers, Hose Connection Type (HCVB) with Automatic Draining Feature | Table 608.1, 608.13.6 |
| CAN/CSA-B64.3—01 | Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP) | Table 608.1, 608.13.3, 608.16.2 |
| CAN/CSA-B64.4—01 | Backflow Preventers, Reduced Pressure Principle Type (RP) | Table 608.1, 608.13.2, 608.16.2 |
| CAN/CSA-B64.10—01 | Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices | 312.9.2 |
| CAN/CSA-B137.9—02 | Polyethylene/Aluminum/Polyethylene Composite Pressure Pipe Systems | Table 605.3 |
| CAN/CSA-B137.10M—02 | Cross-linked Polyethylene/Aluminum/Polyethylene Composite Pressure Pipe Systems | Table 605.3, Table 605.4 |
| CAN/CSA-B181.3—02 | Polyolefin Laboratory Drainage Systems | Table 702.1, Table 702.2 |
| CAN/CSA-B182.4—02 | Profile PVC Sewer Pipe and Fittings | Table 702.3, Table 1102.4, Table 1102.5 |
| CAN/CSA-B602—02 | Mechanical Couplings for Drain, Waste and Vent Pipe and Sewer Pipe | 705.2.1, 705.5.3, 705.6, 705.7.1, 705.14.1, 705.15, 705.16 |

ICC
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| Standard Reference Number | Title | Referenced in code section number |
|---------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| IBC—06 | International Building Code® | 201.3, 305.4, 307.1, 307.2, 307.3, 308.2, 309.1, 310.1, 310.3, 403.1, Table 403.1, 404.1, 407.3, 417.6, 502.6, 606.5.2, 1106.5 |
| ICC EC—06 | ICC Electrical Code®—Administrative Provisions | 201.3, 502.1, 504.3, 1113.1.3 |
| IEBC—06 | International Existing Building Code® | 101.2 |
| IECC—06 | International Energy Conservation Code® | 313.1, 607.2, 607.2.1 |
| IFC—06 | International Fire Code® | 201.3, 1201.1 |
| IFGC—06 | International Fuel Gas Code® | 101.2, 201.3, 502.1 |
| IMC—06 | International Mechanical Code® | 201.3, 307.6, 310.1, 422.9, 502.1, 612.1, 1202.1 |
| IPSDC—06 | International Private Sewage Disposal Code® | 701.2 |
| IRC—06 | International Residential Code® | 101.2 |

EDITORIAL CHANGES – SECOND PRINTING

Page 20, Table 308.5: row 10, column 3 now reads . . . 4

Page 20, Table 308.5: row 16, column 3 now reads . . . 4

Page 26, Table 403.1—continued: row 14, column 6 now reads . . . 1 per 15