

## CHAPTER 9

### VENTS

#### 901.0 Vents Required.

Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage and back-pressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.

#### 902.0 Vents Not Required.

**902.1** Vent piping may be omitted on an interceptor when such interceptor acts as a primary settling tank and discharges through a horizontal indirect waste pipe into a secondary interceptor. The second interceptor shall be properly trapped and vented.

**902.2** Traps serving sinks that are part of the equipment of bars, soda fountains, and counters need not be vented when the location and construction of such bars, soda fountains, and counters is such as to make it impossible to do so. When such conditions exist, said sinks shall discharge by means of approved indirect waste pipes into a floor sink or other approved type of receptor.

#### 903.0 Materials.

**903.1** Vent pipe shall be cast iron, galvanized steel, galvanized wrought iron, copper, brass, Schedule 40 ABS DWV, Schedule 40 PVC DWV, stainless steel 304 or 316L (stainless steel 304 pipe and fittings shall not be installed underground and shall be kept at least six inches (152 mm) aboveground), or other approved materials having a smooth and uniform bore except that:

**903.1.1** No galvanized wrought-iron or galvanized steel pipe shall be used underground and shall be kept at least six (6) inches (152 mm) aboveground.

**903.1.2** ABS and PVC DWV piping installations shall be installed in accordance with IS 5, IS 9, and Chapter 15 "Firestop Protection." Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with the Test for Surface-Burning Characteristics of the Building

Materials (see the Building Code standards based on ASTM E-84 and ANSI/UL 723).

#### 903.2 Use of Copper Tubing.

**903.2.1** Copper tube for underground drainage and vent piping shall have a weight of not less than that of copper drainage tube type DWV.

**903.2.2** Copper tube for aboveground drainage and vent piping shall have a weight of not less than that of copper drainage tube type DWV.

**903.2.3** Copper tube shall not be used for chemical or industrial wastes as defined in Section 811.0.

**903.2.4** All hard-drawn copper tubing, in addition to the required incised marking, shall be marked in accordance with either ASTM B306, Copper Drainage Tube (DWV), or ASTM B88 Seamless Copper Water Tube as listed in Table 14-1. The colors shall be: Type K, green; Type L, blue; Type M, red; Type DWV, yellow.

**903.3** Vent fittings shall be cast iron, galvanized malleable iron or galvanized steel, copper, brass, ABS, PVC, stainless steel 304 or 316L, or other approved materials, except that no galvanized malleable iron or galvanized steel, or 304 stainless steel shall be used underground and shall be kept at least six (6) inches (152 mm) aboveground. Stainless steel 304 pipe and fittings shall not be installed underground and shall be kept at least 6 inches (152 mm) aboveground.

**903.4** Changes in direction of vent piping shall be made by the appropriate use of approved fittings, and no such pipe shall be strained or bent. Burred ends shall be reamed to the full bore of the pipe.

#### 904.0 Size of Vents.

**904.1** The size of vent piping shall be determined from its length and the total number of fixture units connected thereto, as set forth in Table 7-5. The diameter of an individual vent shall not be less than one and one-fourth (1-1/4) inches (32 mm) nor less than one-half (1/2) the diameter of the drain to which it is connected. In addition, the drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross-sectional area of which shall not be less than that of the largest required building

sewer, as determined from Table 7-5. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that in any way obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

**Exception:** When connected to a common building sewer, the drainage piping of two (2) or more buildings located on the same lot and under one (1) ownership may be vented by means of piping sized in accordance with Table 7-5, provided the aggregate cross-sectional area of all vents is not less than that of the largest required common building sewer.

**904.2** No more than one-third (1/3) of the total permitted length, per Table 7-5, of any minimum-sized vent shall be installed in a horizontal position.

**Exception:** When a minimum-sized vent is increased one (1) pipe size for its entire length, the maximum length limitation does not apply.

#### **905.0 Vent Pipe Grades and Connections.**

**905.1** All vent and branch vent pipes shall be free from drops or sags, and each such vent shall be level or shall be so graded and connected as to drip back by gravity to the drainage pipe it serves.

**905.2** Where vents connect to a horizontal drainage pipe, each vent pipe shall have its invert taken off above the drainage centerline of such pipe downstream of the trap being served.

**905.3** Unless prohibited by structural conditions, each vent shall rise vertically to a point not less than six (6) inches (152 mm) above the flood-level rim of the fixture served before offsetting horizontally, and whenever two or more vent pipes converge, each such vent pipe shall rise to a point at least six (6) inches (152 mm) in height above the flood-level rim of the plumbing fixture it serves before being connected to any other vent. Vents less than six (6) inches (152 mm) above the flood-level rim of the fixture shall be installed with approved drainage fittings, material, and grade to the drain.

**905.4** All vent pipes shall extend undiminished in size above the roof, or shall be reconnected with a soil or waste vent of proper size.

**905.5** The vent pipe opening from a soil or waste pipe, except for water closets and similar fixtures, shall not be below the weir of the trap.

**905.6** Two (2) fixtures may be served by a common vertical pipe when each such fixture wastes separately into an approved double fitting having inlet openings at the same level.

#### **906.0 Vent Termination.**

**906.1** Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than six (6) inches (152 mm) above the roof nor less than one (1) foot (305 mm) from any vertical surface.

**906.2** Each vent shall terminate not less than ten (10) feet (3048 mm) from, or at least three (3) feet (914 mm) above, any openable window, door, opening, air intake, or vent shaft, nor less than three (3) feet (914 mm) in every direction from any lot line, alley and street excepted.

**906.3** Vent pipes shall be extended separately or combined, of full required size, not less than six (6) inches (152 mm) above the roof or fire wall. Flagpoling of vents shall be prohibited except where the roof is used for purposes other than weather protection. All vents within ten (10) feet (3048 mm) of any part of the roof that is used for such other purposes shall extend not less than seven (7) feet (2,134 mm) above such roof and shall be securely stayed.

**906.4** Vent pipes for outdoor installations shall extend at least ten (10) feet (3,048 mm) above the surrounding ground and shall be securely supported.

**906.5** Joints at the roof around vent pipes shall be made watertight by the use of approved flashings or flashing material.

**906.6 Lead.** See Table 14-1. Sheet lead shall be not less than the following:

For safe pans – not less than four (4) pounds per square foot (19.5 kg/m<sup>2</sup>) or 1/16-inch (1.6 mm) thick.

For flashings or vent terminals – not less than three (3) pounds per square foot (14.7 kg/m<sup>2</sup>) or 1.2 mm thick.

Lead bends and lead traps shall not be less than one-eighth (1/8) inch (3.2 mm) wall thickness.

**906.7 Frost or Snow Closure.** Where frost or snow closure is likely to occur in locations having minimum design temperature below 0°F (-17.8°C), vent terminals shall be a minimum of two (2) inches (51 mm) in diameter, but in no event smaller than the required vent pipe. The change in diameter shall be made inside the building at least one (1) foot (305 mm) below the roof in an insulated space and terminate not less than ten (10) inches (254 mm) above the roof, or as required by the Authority Having Jurisdiction.

#### **907.0 Vent Stacks and Relief Vents.**

**907.1** Each drainage stack that extends ten (10) or more stories above the building drain or other horizontal drain, shall be served by a parallel vent

stack, which shall extend undiminished in size from its upper terminal and connect to the drainage stack at or immediately below the lowest fixture drain. Each such vent stack shall also be connected to the drainage stack at each fifth floor, counting down from the uppermost fixture drain, by means of a yoke vent, the size of which shall be not less in diameter than either the drainage or the vent stack, whichever is smaller.

**907.2** The yoke vent connection to the vent stack shall be placed not less than forty-two (42) inches (1,067 mm) above the floor level, and the yoke vent connection to the drainage stack shall be by means of a wye-branch fitting placed below the lowest drainage branch connection serving that floor.

### **908.0 Vertical Wet Venting.**

**908.1** Wet venting is limited to vertical drainage piping receiving the discharge from the trap arm of one (1) and two (2) fixture unit fixtures that also serves as a vent for not to exceed four (4) fixtures. All wet-vented fixtures shall be within the same story; provided, further, that fixtures with a continuous vent discharging into a wet vent shall be within the same story as the wet-vented fixtures. No wet vent shall exceed six (6) feet (1829 mm) in developed length.

**908.2** The vertical piping between any two (2) consecutive inlet levels shall be considered a wet-vented section. Each wet-vented section shall be a minimum of one (1) pipe size larger than the required minimum waste pipe size of the upper fixture or shall be one (1) pipe size larger than the required minimum pipe size for the sum of the fixture units served by such wet-vented section, whichever is larger, but in no case less than two (2) inches (51 mm).

**908.3** Common vent sizing shall be the sum of the fixture units served but, in no case, smaller than the minimum vent pipe size required for any fixture served, or by Section 904.0.

### **908.4 Bathroom Wet Venting.**

**908.4.1 Where permitted.** Any combination of fixtures within one (1) or two (2) bathrooms located on the same floor level in dwellings and guest rooms shall be permitted to be vented by a wet vent. The wet 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(s) shall connect to the wet-vented horizontal branch drain. Any additional

fixtures shall discharge downstream of the wet vent system and be conventionally vented.

**908.4.2 Vent Connection.** The dry vent connection to the wet vent shall be an individual vent or common vent for the lavatory, bidet, shower, or bathtub.

**908.4.3 Size.** The wet vent shall be sized based on the fixture unit discharge into the wet vent. The wet vent shall be a minimum size of 2 inches for 4 dfu or less, and 3 inches for more than 4 dfu.

### **909.0 Special Venting for Island Fixtures.**

Traps for island sinks and similar equipment shall be roughed in above the floor and may be vented by extending the vent as high as possible, but not less than the drainboard height and then returning it downward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain. The return vent shall be connected to the horizontal drain through a wye-branch fitting and shall, in addition, be provided with a foot vent taken off the vertical fixture vent by means of a wye branch immediately below the floor and extending to the nearest partition and then through the roof to the open air, or may be connected to other vents at a point not less than six (6) inches (152 mm) above the flood-level rim of the fixtures served. Drainage fittings shall be used on all parts of the vent below the floor level, and a minimum slope of one-quarter (1/4) inch per foot (20.9 mm/m) back to the drain shall be maintained. The return bend used under the drainboard shall be a one (1) piece fitting or an assembly of a forty-five (45) degree (0.79 rad), a ninety (90) degree (1.6 rad), and a forty-five (45) degree (0.79 rad) elbow in the order named. Pipe sizing shall be as elsewhere required in this code. The island sink drain, upstream of the returned vent, shall serve no other fixtures. An accessible cleanout shall be installed in the vertical portion of the foot vent.

### **910.0 Combination Waste and Vent Systems.**

**910.1** Combination waste and vent systems shall be permitted only where structural conditions preclude the installation of conventional systems as otherwise prescribed by this code.

**910.2** Plans and specifications for each combination waste and vent system shall first be approved by the Authority Having Jurisdiction before any portion of any such system is installed.

**910.3** Each combination waste and vent system, as defined in Chapter 2, shall be provided with a vent or vents adequate to ensure free circulation of air.

Any branch more than fifteen (15) feet (4,572 mm) in length shall be separately vented in an approved manner. The minimum area of any vent installed in a combination waste and vent system shall be at least one-half (1/2) the inside cross-sectional area of the drain pipe served. The vent connection shall be downstream of the uppermost fixture.

**910.4** Each waste pipe and each trap in any such system shall be at least two (2) pipe sizes larger than the sizes required by Chapter 7 of this code, and at least two (2) pipe sizes larger than any fixture tailpiece or connection.

→ **910.5** No vertical waste pipe shall be used in any such system, except the tailpiece or connection between the outlet of a plumbing fixture and the trap. Such tailpieces or connections shall be as short as possible, and in no case shall exceed two (2) feet (610 mm).

**Exception:** Branch lines may have forty-five (45) degree (0.79 rad) vertical offsets.

**910.6** An accessible cleanout shall be installed in each vent for the combination waste and vent system. Cleanouts may not be required on any wet-vented branch serving a single trap when the fixture tailpiece or connection is not less than two (2) inches (50 mm) in diameter and provides ready access for cleaning through the trap.

→ **910.7** No water closet or urinal shall be installed on any such system. Other one (1), two (2), or three (3) unit fixtures remotely located from the sanitary system and adjacent to a combination waste and vent system may be connected to such system in the conventional manner by means of waste and vent pipes of regular sizes, providing that the two (2) pipe size increase required in Section 910.4 is based on the total fixture unit load connected to the system.

**Note:**

See Appendix B of this code for explanatory notes on the design of combination waste and vent systems.