

A GUIDE TO PASSING THE PLUMBING EXAM

BASED ON THE INTERNATIONAL PLUMBING AND FUEL GAS CODES

WRITTEN BY JOHN WHITE
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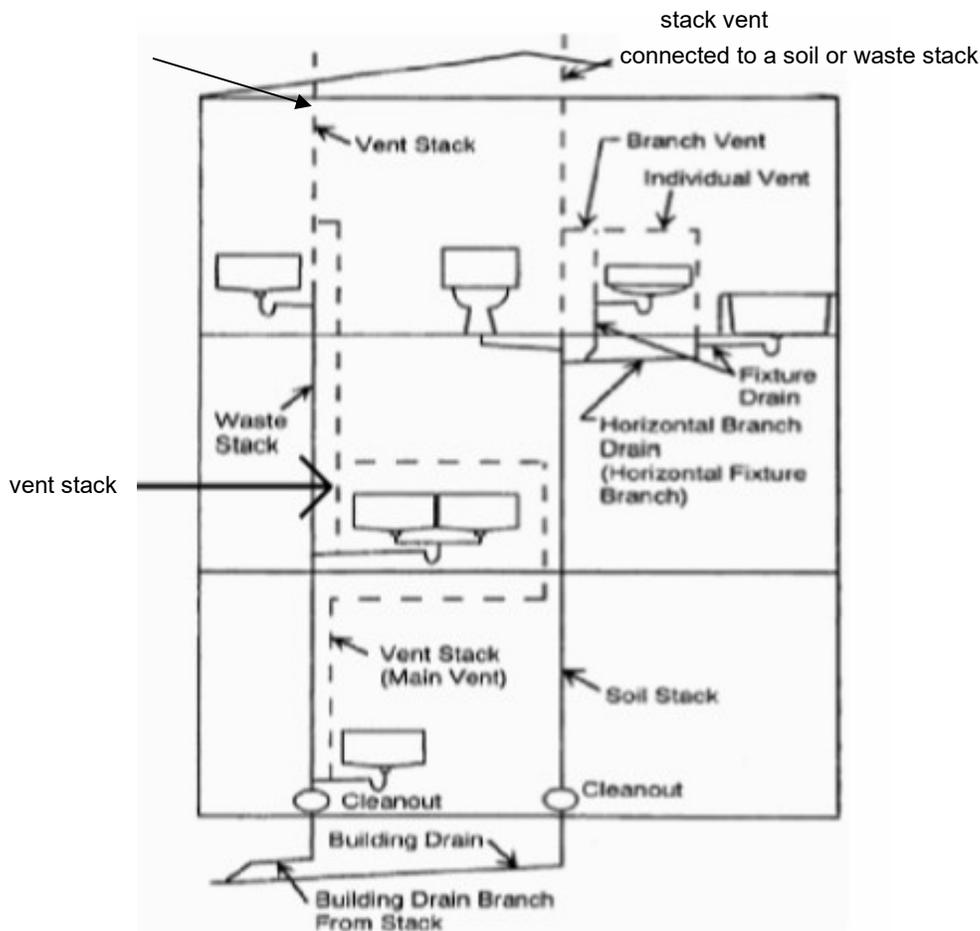
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Chapter 9

Vents

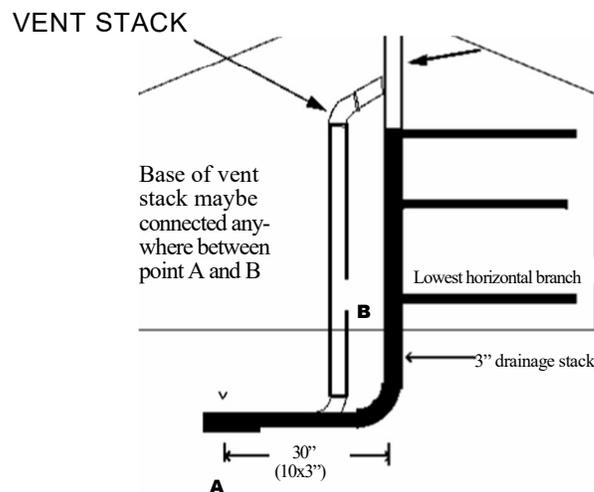
When waste water flows down a drain pipe, it must displace air that is in front of it. If this air is not given a place to go, such as up a vent, it will bubble into the fixture. This effect is experienced when emptying a soda bottle. Another reason for venting is to give the sewer gases a means to escape to the outside air. A third reason for venting is to prevent the discharged waste water from siphoning water from the primary fixture or other fixtures and traps. And lastly, venting also prevents water from backing up into lower fixtures.



A **stack** is any vertical soil, waste or vent with or without offsets that extend through at least one story. A **vent stack** is for venting only and does not carry, nor is it designed to carry, any waste. A **stack vent** is that portion of a soil or waste stack above the highest fixture or branch drain connection

Section 903

Every building must have at least one vent extended to the outside **1/2 size of building drain** (for most states, **2" minimum size**). If the outdoor temperature is likely to get to 0 degrees F or less, then the vent terminal must be minimum 3' diameter beginning 12 inches beneath the roof deck. A **vent stack** is only required in buildings with five branch intervals or more. When a vent stack is installed, its base must be connected to the drainage stack at or below the lowest horizontal branch on the stack. It may, however, be connected to the building drain as long as it is within a distance of 10 times the diameter of the drainage stack.



Section 904

The vent terminal (the part that goes out the roof) must be increased to three inches when located in climates likely to get 0 degrees F or lower

Sections 907 and 908

(Refer to the illustration for Yoke vent in Chapter 2 (Definitions) of this guide.)

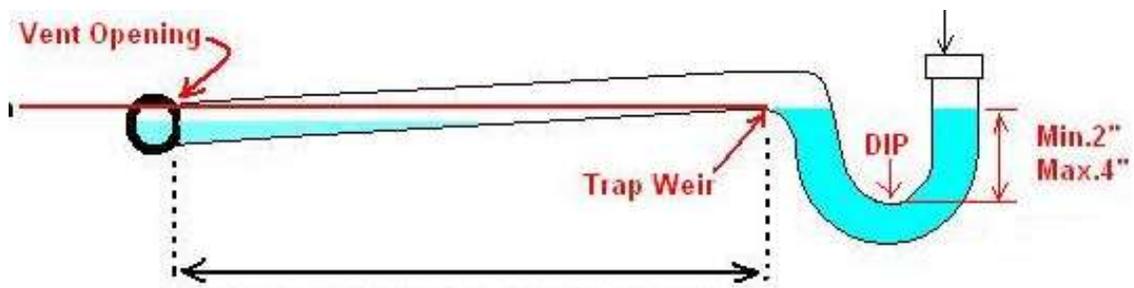
If the building has more than ten branch intervals then a relief vent must be installed on the drainage stack at each tenth interval, beginning with the top floor. If there is a horizontal offset in the drainage stack then a relief vent must be installed if five or more branch intervals are above the offset.

Section 906

If the distance between a trap and vent is too great, the fixture drain will totally fill with water and siphoning of the trap seal may occur during discharge. Table 906.1 dictates the maximum distance allowed between a trap weir (see illustration below) and vent. If the trap size is unknown refer to Table 709.1 in Chapter 7. The drain size is determined by fixture units, using Table 710.1(2).

Example: The maximum distance of a drain, sloped $\frac{1}{4}$ -inch, measured from the trap weir to the vent fitting connection for a 1 $\frac{1}{2}$ -inch trap, shall be six feet.

Note: Although it is not indicated in the table or written in the IPC, if the slope is greater than $\frac{1}{4}$ -inch, the distance has to be reduced. Otherwise, the trap will be siphoned.

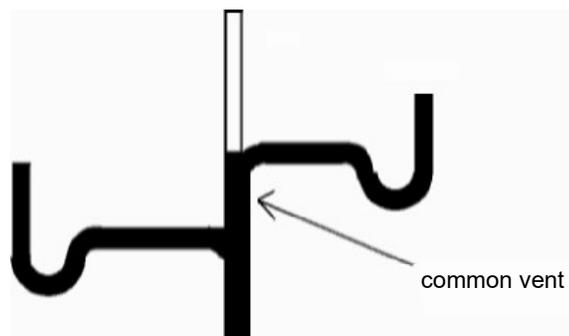


Note: Even though a sink with a disposal has a 1-1/2-inch trap, some states require a 2-inch vertical drain. Read the footnotes.

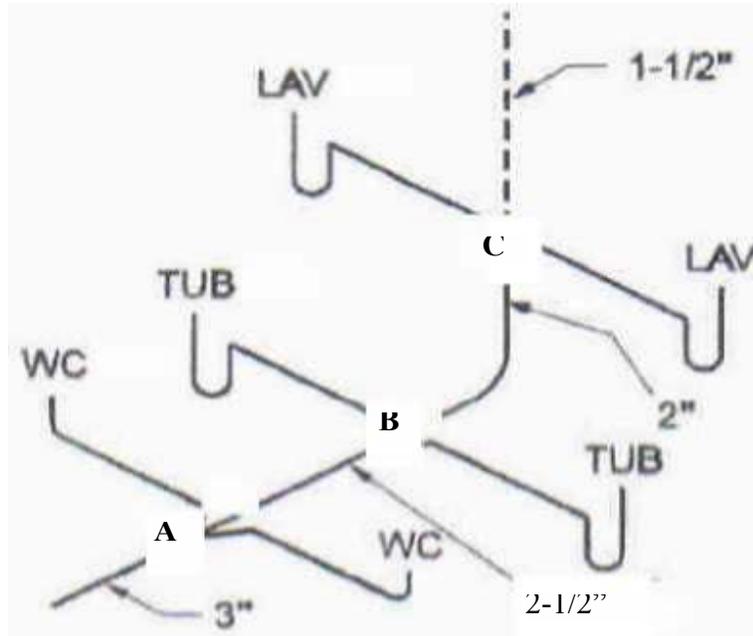
Section 908 Common vents

The illustration below shows two fixtures at different levels sharing an individual vent. Use Table 911.3 to size the vertical section between the fixtures.

Note: A water closet is not allowed to be the upper fixture when common venting.



The illustration below is an illustration of wet venting back-to-back bathrooms.



The fixture units are obtained from Table 709.1:

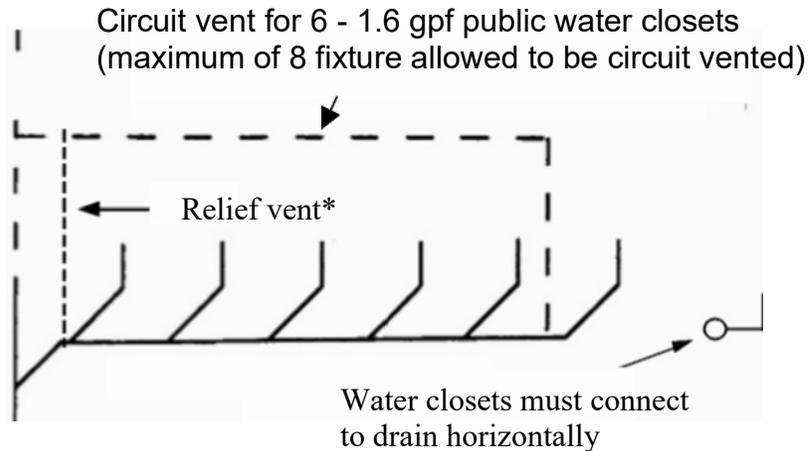
- Drain size is from table 710.1(2) column 2 (total 12 DFU).
- Section A-C is a wet vent.
- Section A-B must handle 6 DFU. Table 912.3 indicates a 2-1/2" pipe is needed as a wet vent.
- Section B-C must handle 2 DFU. Table 912.3 indicates a 2" pipe is needed as a wet vent.
- The dry vent beyond point C must be 1-1/2 inches as section 906.2 says vents, other than stack vents or vent stacks, must be at least one half the diameter of the drain served (3 inches).

Section 911 Circuit vents

Determine vent size - 4 dfu x 6 w.c. =24 dfu (Table709.1).

Table 710.1(2) states that a 4 inch drain is required (this is a horizontal branch).

Section 906.2 states that vents other than stack vents or vent stacks must be 1/2 diameter of drain. Therefore, the circuit vent size is 2 inches.



*A relief vent must be installed when four or more w.c. are connected to a drain **and** the soil stack receives discharge from upper branches.

Section 906 Vent pipe sizing

There are only four rules for sizing vents. Remember these rules and you will have no trouble with vent sizing.

- 1) Table 906.1 is used only to size **stack vents**, **vent stacks** and **combination vent** systems.
- 2) **All other vents** shall be sized as 1/2 the diameter of the drain served but never smaller than 1-1/4 inch.
- 3) For vents, *other than stack vents or vent stacks*, if the developed length of the vent is greater than **40 feet**, you must increase the size by one pipe size.
- 4) If the vent is a **common vent** or **wet vent** use Tables 911.3 or Table 912.3.

Using Table 916.1

The base of a vent stack is connected to a waste stack handling 450 DFU and extends 50 feet upward where it connects to a stack vent. The stack vent continues another 15 feet to the outside air. What is the minimum vent stack size if the waste stack is handling 3 branch intervals?

The first thing we need to know is the size of the building drain stack. Table 710.1(2) indicates a 5-inch drain is needed to handle 450 DFU (540 DFU maximum).

Next, we'll turn to Table 906.1 and find a row corresponding to a 5-inch waste stack and 450 DFU (about half way down the chart is 5-inch waste stack @ 490 DFU). The total developed length of our stack is 65 feet (50 feet + 15 feet). Therefore, slide your finger to the right until you find a column containing at least 65 feet (250 is correct, 63 is too short). At the top of the chart it indicates a 4" vent stack is required.

Sump vents (Using Table 906.5.1)

A 40-gallon per minute sewage pump is feeding a sump. A pipe with a developed length of 55 feet must vent it. What is the minimum allowed size for the vent pipe?

Footnote (a) says to add 50% to the developed length for entrance and friction losses. Therefore, the maximum developed length would be 55 ft. plus 27.5 ft. ($.5 \times 55$) for a total of 82.5 feet. Table 916.5.1 indicates a 1- 1/2 inch vent is needed.