Designing with the Uniform Plumbing Code

Proven Reliability That Stands the Test of Time

Plumbing Vent System in Multistory Building
Conventional UPC Vertical Wet Venting and IPC Air Admittance Valves

Project: This project is a 12-story high-rise residential building. Each unit has one and one-half baths, one kitchen sink, one clothes washer, and one laundry. In a high-rise design, the plumbing for the drainage and vent system is installed vertically to minimize the piping to fixtures on each floor. The drainage and vent stacks are designed to parallel each other.

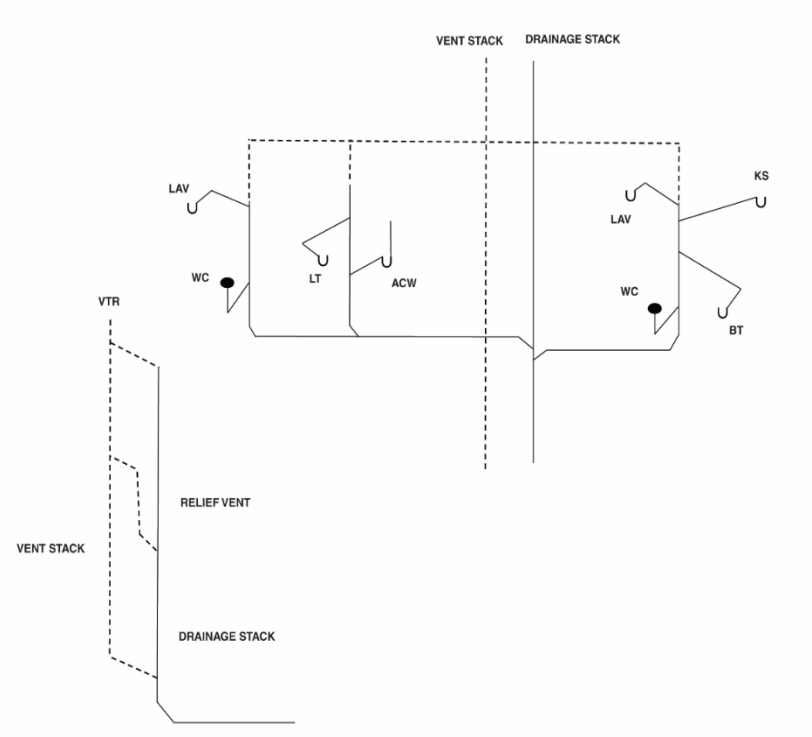
The drainage and vent system in Figure 1 is designed in accordance with the Uniform Plumbing Code. The Uniform Plumbing Code permits many types of venting systems for protecting the trap seal from siphonage (negative pressure) and backpressure (positive pressure). The plumbing fixtures are vented using vertical wet vents, the most economical venting design. Vertical wet venting is used for all fixtures and connect to a branch vent. The branch vent connects to the vent stack on each floor. At the base of the drainage stack, a vent stack is required (10 or more branch intervals) to relieve pressures that develop in the drainage stack and terminates to the outdoors. A relief vent is installed at various intervals to assist fixture venting and the venting of the drainage stack. The top of the drainage stack connects to the vent stack and terminates to the outdoors. The type of venting system illustrated in Figure 1 is vertical wet venting.

The drainage and vent system in Figure 2 is designed in accordance with the International Plumbing Code. The plumbing fixtures located in the bathroom group are vented by a vertical wet vent. The clothes washer and laundry tray are vented by a common vent. The kitchen sink is individually vented as it is not permitted to be vented by a vertical wet vent (only fixtures located with a bathroom group). Each wet vent, common vent, and individual vent terminate to air admittance valves. At the base of the drainage stack, a vent stack is required (five or more branch intervals) to relieve pressures that develop in the drainage stack and terminates to the outdoors. Stack type air admittance valves are not permitted to serve as a vent terminal for vent stacks or stack vents that serve drainage stacks having more than six branch intervals. A relief vent is installed at various intervals to assist fixture venting and the venting of the drainage stack. The top of the drainage stack connects to the vent stack and terminates to the outdoors.

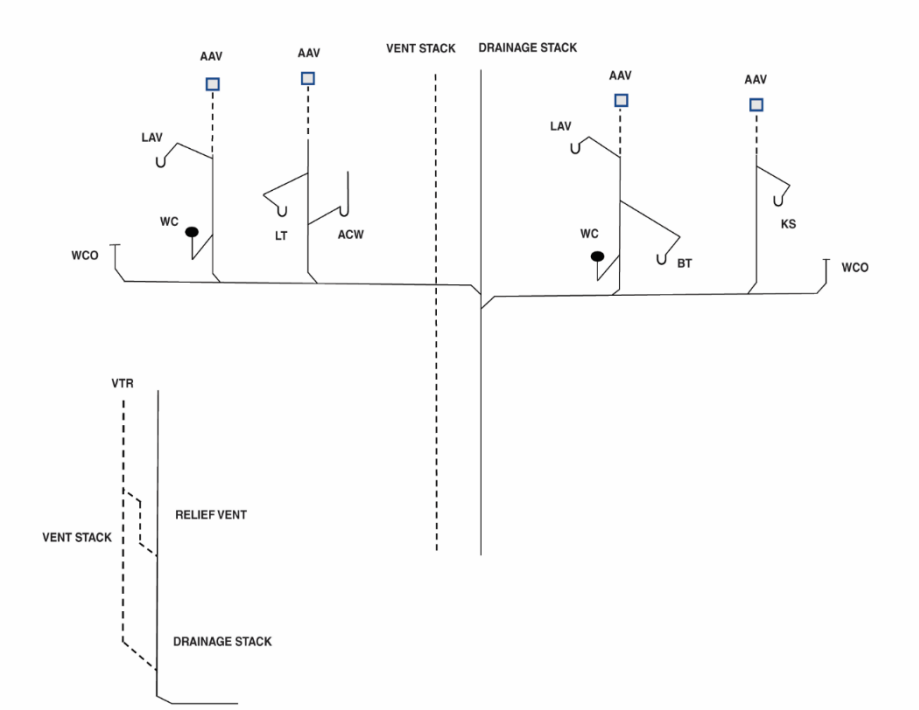
Table 1 provides the support that the conventional wet venting method in Figure 1 is a superior, cost-effective design method without the use of air admittance valves. Because air admittance valves have moving parts, access and maintenance are required for replacement. Negative and positive pressure, extreme temperature variations, and corrosive vapors affect the operation of an air admittance valve, thereby introducing sewer gases into the building. An open piping system regulates the pressure with air from outside the building while air admittance valves regulate the pressure inside the venting system with air from inside the building.

TABLE 1 Considerations/Factors Using UPC Vertical Wet Venting versus IPC Air Admittance Valves	UPC Wet Venting	IPC Air Admittance Valves
Venting method has over 100 years of proven reliability.	✓	✗
Relieves positive and negative pressures.	✓	✗
Provides equalization of atmospheric pressure on both sides of the trap.	✓	✗
Capable of withstanding the discharge of high-speed pump (i.e., washing machine) into a standpipe without fouling the vent system.	✓	✗
Venting method regulates the pressure with air from outside the building. Therefore, no sewer gas leaking into the building.	✓	✗
Access and ventilation are not required for the venting system.	✓	✗
No additional rated membrane penetration required for AAV and AAV access box.	✓	✗
A vertical wet vent may serve as a vent for a kitchen sink and bathroom fixtures.	✓	✗
Designed to withstand extreme temperature fluctuations.	✓	✗
May serve fixtures on more than one floor level.	✓	✗
No moving parts subject to malfunction or failure.	✓	✗
Horizontal branch drains may be located anywhere in the drainage stack.	✓	✗

May be installed in supply and return plenum.	✔	✘
Venting system lasts for the duration and life of the building.	✔	✘



UPC FIGURE 1
WET VENTING



IPC FIGURE 2
VENTING WITH AIR ADMITTANCE VALVES

The venting design method using the Uniform Plumbing Code undoubtedly is a superior, cost-effective design over the International Plumbing Code venting design method using air admittance valves. As shown in Figure 1 and Figure 2 both systems require vent stacks and relief vents. The installation of the kitchen sink vented by a vertical wet vent method in the Uniform Plumbing Code is cost effective thereby minimizing the cost of additional drainage and vent piping. As noted above, the drainage and vent stack is run vertically to minimize the piping to the fixtures on each floor. The branch vent as shown in Figure 1 is near the vent stack thereby minimizing the length of pipe. The additional costs of the International Plumbing Code venting design method include the air admittance valves for fixtures, accessible valve boxes, firestopping penetrations for each valve box and drainage and vent piping for the kitchen sink far exceed the cost of a branch vent.

It is cost-effective, affordable, and economically feasible to design a venting system per the Uniform Plumbing Code without the use of air admittance valves.