WASTE PIPE SYSTEMS: VALVES THAT 'BREATHE'

Ever since plumbing came indoors, plumbers have been piping water to and from buildings. People have had to be safeguarded from illness or infection and protected from odours that could be unpleasant within the building.

Many waste piping systems have been used: the two-pipe system of separating the soil and waste pipes; the one pipe or single stack system which was then fully vented, providing an open pipe from every sanitary fixture.

In more recent times a fully vented modified system has been developed where each branch pipe that is connected to a stack is vented. Individual trap vents to sanitary fixtures on that branch are omitted. Group venting, where two or more fixtures on the same pipe are vented by one group vent, is also an option.

"Not an exact science"

"Provision of plumbing waste systems isn't an exact science," says Nelson Palmer, a master plumber of Wanganui, "however, experience over the years has led to a system that works.

"The basic criterion is that air must be allowed into the waste piping system in sufficient quantity to allow each sanitary fixture trap to act as a water seal at all times. The fully vented modified system has been proven where air is required within the waste piping system.

"An open pipe has traditionally been used to provide air from outside the building for the purpose, but an approved alternative, using air admittance valves that draw air from inside the building, is now available."

Many attempts have been made to provide a mechanical valve from brass to provide an alternative air ventilation system to waste piping but, says Nelson, they were unsatisfactory.

Swedish alternative

In 1971 Sture Ericson invented the Studor Air Admittance valve in Sweden. "With the development of plastic injection moulding, using high grade materials, air admittance valves that are guaranteed air and water tight have since been developed, bringing radical changes to the plumbing waste piping system," Nelson says.

Different sizes of air admittance valves are produced to provide up to 35 litres of air per second at a pressure difference of 0.25 kPa (25mm w.g.).

"One open vent pipe to each sanitary drainage system must be maintained, though, to relieve any build-up of over pressure within the sewerage system, or over pressure within the public system," says Nelson.

Different countries, different rules

"Experience in Britain using air admittance valves for drainage vents has indicated that one open vent is required for each of six dwellings but that other valves may be air admittance valves. In Australia and New Zealand, regulations say that each connection to the public sewer must have one open vent which could be installed on the lower part of the drains to relieve any over pressure before putting pressure on the trap seals. Within the plumbing codes of Europe, a branch drain may be extended to an unlimited length with the use of an air admittance valve. With one open vent there is no health risk, nor a safety risk from the possible build-up of gases within the drainage piping."

Using an air admittance valve on waste piping systems will provide air into the piping system, as it's a one-way valve. Allowing air into the system prevents siphonage, which is 99 per cent of the action of water movement within the piping system. The other one per cent of water action is positive pressure that can only apply in a building over eight floors in height, and if sufficient water is allowed into the stack. In Europe the codes call for an increase in stack diameter to compensate for the possible over pressure. In Australia and New Zealand, the codes call for a relief vent if the stack is three floors high.

High response

"Air admittance valves are extremely responsive," says Nelson. "The slightest vacuum pressure will open the valve to break the siphonage action. It could be said they breathe with the water movement." They must seal at very low pressure, and three mm water gauge is the standard European test pressure.

The volume of air that an air admittance valve can pass must be sufficient for the duty required and a branch waste must be provided with air equal to twice the volume of water from each group of sanitary fixtures. In the stack situation, air volume must equal eight times the volume of water from the sanitary fixtures connected to the stack.

Studor mini valves may be installed under the flood level of the fixture they are attached to as an increase in pressure onto the valve will seal the valve more firmly.

Air admittance valves are recognised in plumbing regulations *AS/NZ 3500.2.2:1996*. In New Zealand, this allows air admittance valves to be used for venting: the only exception is that the main vent must be an open vent. In Australia, air admittance valves may be used for trap venting 'but shall not be substituted for main or branch venting.' The Australian/New Zealand WS 14 Committee is reviewing this restriction on branch venting in Australia.

Studor carries both the Australian 'Watermark' label and the New Zealand Building Authority 'Codemark' accreditation: this is your guarantee of quality air admittance valves.

Source: *The above information is provided by Nelson Palmer of Studor New Zealand, who may be contacted at phone: 06 3455891; fax: 06 3453941.*