

HEATBASE Ltd FACTSHEET 25

PRV Termination or Open Safety Vent position

Version 1 February 2018

Hot water circuits and Central Heating systems must incorporate safety aspects within their design that will protect the appliance, pipework and system in the event of a failure within the temperature control of the appliance. Depending upon the type of system this is achieved in different ways. Failure to fit these items or fitting them in the wrong manner can be a **Potential Safety Risk** as well as causing problems with the system and components.

Sealed/Pressurised system

A sealed system incorporates a manual **filling loop** to top up the system with water and to set the system at the pressure it was designed for, it also incorporates an **expansion vessel** which should be sized correctly for the volume of water in the system; its purpose is to allow the water to expand into the vessel when it is heated and acts like a shock absorber absorbing some of the rising pressure, without it the system pressure would continue to rise which could then cause damage to the appliance, pipework and components. A sealed system also incorporates a **PRV** (Pressure Relief Valve) which in the event of the system pressure becoming too high, it opens and relieves the pressure from the system. Great care should be taken on how the PRV discharge pipe terminates. Common practice is to fit a 90-degree bend and then turn the end of the discharge pipe towards the wall, but in many cases the PRV discharge pipe terminates from the wall and is left discharging in a horizontal position; this manner could have disastrous consequences. In the event of an appliance thermostat and limit stat failure the water within the boiler will start to boil and steam can be produced, at the same time the pressure in the system will start to rise. Once the system pressure is at 3 Bar (most PRV's have a 3 Bar relief pressure) the PRV will open and shoot a jet of boiler water and steam through the discharge pipe which leaves at a pressure of 3 Bar (approx. 42PSI). This jet of scalding water can easily spray 3 or 4 meters or more and anyone nearby stands a chance of severe scalding or burns. If a PRV discharge terminates horizontally it should be altered to minimize any risk of scalding in the event of failure of the appliance safety controls.

Open Vented system

Open vented systems are the traditional type of system but are still used today as some appliances cannot be fitted to a Sealed/pressurised system. They still have safety aspects and components which are not the same as those used for a sealed system but act in a similar manner; but are specific to the requirements of an Open Vented system. **The Feed and Expansion Cistern** (often referred to as a header tank) is located at the highest part of the system to maintain system pressure and to supply make-up water to replace any lost due to evaporation or leakage. **The Feed and Expansion pipe** (often referred to as the cold feed) connects the Feed & Expansion cistern to the system pipework and it provides a route for water to enter the system but also a route for water to expand from the system into the Feed & Expansion cistern as the temperature of the water increases. An important function of the Feed & Expansion pipe is to quickly replenish water in the system to protect the appliance in the event of Boiler and Limit thermostat failure. **The Open Safety Vent Pipe** provides the means for air to escape the system and a path for the relief of pressure and the escape of boiling water and steam in the event of Boiler and Limit thermostat failure. The Open Safety Vent pipe should not be constructed of plastic pipe and must have a minimum diameter of 22mm and it should rise continually from its point of connection, should contain no restrictions such as valves and should discharge below the level of the cover of the Feed & Expansion cistern. Appliance Manufacturers instructions dictate the positioning of the Open Safety Vent in relation to the appliance. Most manufactures state the Open Safety Vent must rise continually (this is the Industry Standard) from the boiler, whereas others may not providing there is a 1 Bar Pressure Relief Valve positioned at the boiler.

In addition to the required positioning of the Open Safety Vent pipe in relation to the boiler, it must also be correctly located in the system with regards to the Feed and Expansion pipe and circulator (circulating pump). If the Open Safety Vent pipe is connected after the circulator it will lead to "pumping over" of the system which will aerate the system water and lead to corrosion problems. If the Open Safety pipe is connected prior to the circulator (but not connected with the correct pipework configuration) then the suction of the circulator can be so great that the water level in the Open Safety Vent pipe and Feed & Expansion cistern will drop, which could allow air to enter the system. When the circulator stops the lack of suction can then allow a surge of water back into the Feed & Expansion cistern which aerates the system water and lead to corrosion problems.

Full explanation and diagrams regarding differing methods of compliance can be found in "The Domestic Heating Design Guide" of which most Trade Associations and Competent Person Scheme providers state must be held by their registered Technicians as part of the Rules of Registration.