367 Rosebank Road | Avondale | Auckland 1026 | T: 0800 500 484 | Int +64 9 828 3123

Training Update November 2020

Tempering valve

I thought it would be informative to take a look inside some of our products and explain how they work and why some of the components are there. This month we will make a start by examining a tempering valve.

Regulations

The plumbing code in New Zealand (G12) has some specific requirements that are safety related:

B*y the way you can find the G12 standard here free of charge – well worth a read!*
https://www.building.govt.nz/building-code-compliance/g-services-and-facilities/g12-water-supplies/#jumpto-standards

Clause 6.14.3 requires that storage water heaters are set to temperatures above 60° C to reduce the risk of legionella bacteria growth.

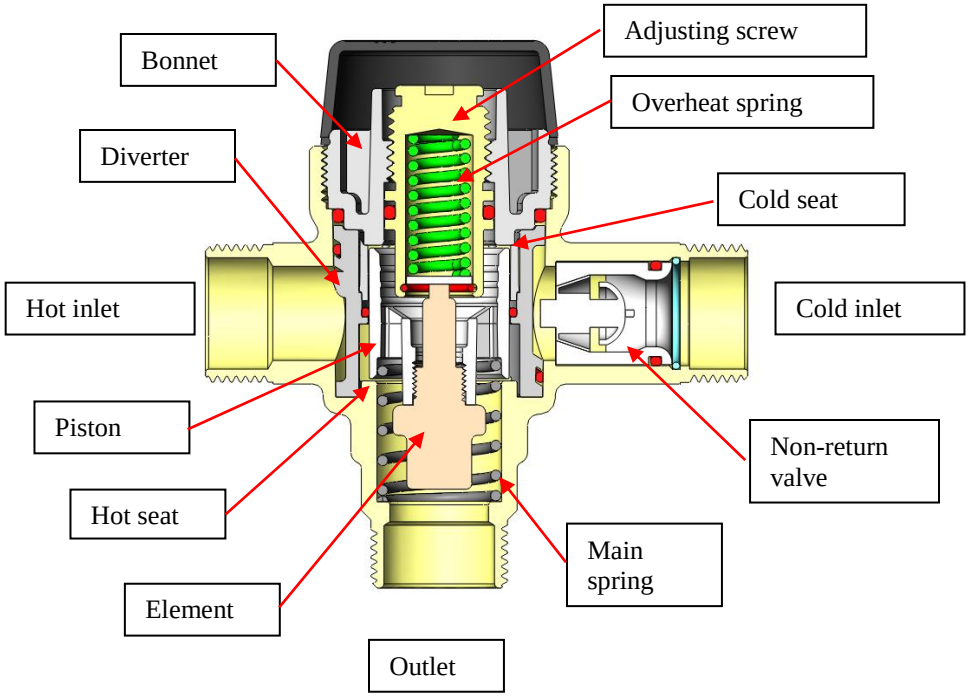
Clause 6.14 requires that hot water delivered to a sanitary fixture used for personal hygiene shall not exceed 45° C for early childhood centres……. And 55° C for all other buildings.

The best solution to meet these 2 requirements is to store the water hot and temper it down to below 55° C for use at basins, showers etc.

Function of the tempering valve

As the name implies, the tempering valve function is to temper the hot water down to a safe level for use at basins, baths, showers etc.

Tempering valve anatomy



The element contains a blend of copper dust & paraffin wax. As it gets hotter, the wax expands pushing out a piston that is in contact with the adjusting screw assembly

How it works

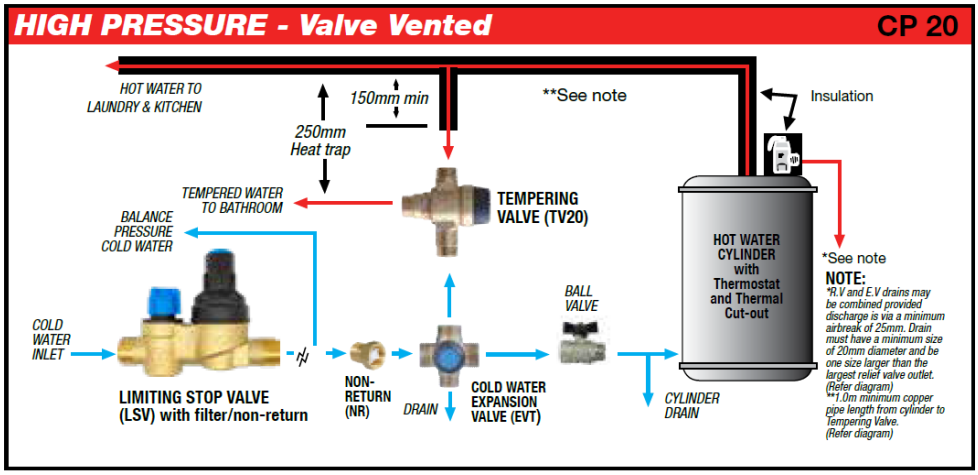
Hot water enters from the left, cold water from the right. The diverter prevents these two flows from mixing.

A piston is located between the cold valve seat (the bonnet face) and a hot valve seat (machined into the brass body). The temperature of the outlet water is determined by the position of the piston. As the piston moves down, the hot water is throttled and the cold water flow is opened up. The reverse happens if the piston moves upwards.

The main spring is constantly forcing the piston against the cold valve seat. If the element senses the outlet temperature getting hotter, the element expands slightly, pushing against the adjusting spindle assembly, moving the piston towards the hot valve seat, reducing the hot water flow and increasing the cold water flow to maintain the set temperature. If the element senses the outlet temperature falling, the reverse happens. The valve setting is determined by turning the adjusting screw. (clockwise to reduce the set point)

The overheat spring is there to accommodate excess expansion of the element. The element is a precision device, every single one is calibrated in production. If the piston is against the hot valve seat and is still being heated, the calibration would be lost if the overheat spring was not there to absorb the extra expansion.

You will note that the TV20 has a single non-return valve, the function of this device is to prevent thermal syphoning in a normal hot water cylinder installation. Looking at the image below, if there was no non-return valve, water would circulate by convection upwards from the hot water cylinder, anticlockwise down through the tempering valve and back to the cylinder. This is both wasteful in heat and would mean that the valve would remain hot all the time, reducing its life.



Some of our tempering valves have non-return valves on the hot and the cold side

- TV15
- TV15P
- TV20C
- TV20D
- TV20S
- TV25
- TV25S

This is because the normal installation position for these valves is on a ring main where the hot and cold pressures will be different. In this case, the non-return valve prevents water flowing from the hot to the cold side or vice versa when there is no draw off.