# Features to look for in an effective Radiator PICV Valve

Pressure Independent Control Valves have massively grown in popularity and market share according to a BSRIA study due to their energy efficiency. The first dynamic radiator valves (PICV valve for radiators) were launched around 2013 and have no doubt contributed to the PICV valve market growth.

Dynamic radiator valves are suited for buildings with a 2-pipe radiator heating system, e.g. district heating and central plant rooms. The valve automatically adjusts the flow of water to each radiator according to temperature levels and system loads. The installation of a radiator PICV valve on each radiator eliminates the need for any other balancing and differential pressure control valves in the system. The dynamic radiator valve combines temperature control with automatic hydronic balancing. The Pressure Independent Control Valve has a built-in differential pressure controller that prevents pressure fluctuations, the main cause for noise and over or underheating, and a built-in pre-setting for maximum flow to supply each radiator with the correct amount of water. When all valves in a system are installed and set, the system is commissioned at the radiator and optimised for minimum energy consumption.

The effectiveness of the dynamic radiator valve can easily be measured at the index valve (the radiator furthest away from the pump) by measuring the differential pressure across that valve with an appropriate measurement device. When the pump pressure is reduced the reading will show that the differential pressure is maintained, confirming that the system is perfectly balanced. Field tests of dynamic radiator valves conducted in the early stages have resulted in temperature differential increases of c. 5°C as well as energy consumption reductions of over 11%.



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# With radiator PICV valves available from different manufacturers it can be challenging to select the best radiator PICV valve for an installation. So, what are the important valve features that drive flawless operation and maximise energy savings?

1. Accuracy
2. Repeatability
3. Wide range of flow rates
4. Debris tolerance
5. Compact design
6. Availability of a full range of valve configurations
7. Availability of a full range of TRV heads

Accuracy

- Ensure that the valve can be set accurately, i.e. a large dial with sufficient distance between settings so that the radiator gets exactly the calculated flow.
- According to pressure independent control valve manufacturer FlowCon a "1% increase in PICV accuracy can be converted to a reduction of approximately 0,5% in the buildings overall hydronic energy consumption".

Repeatability

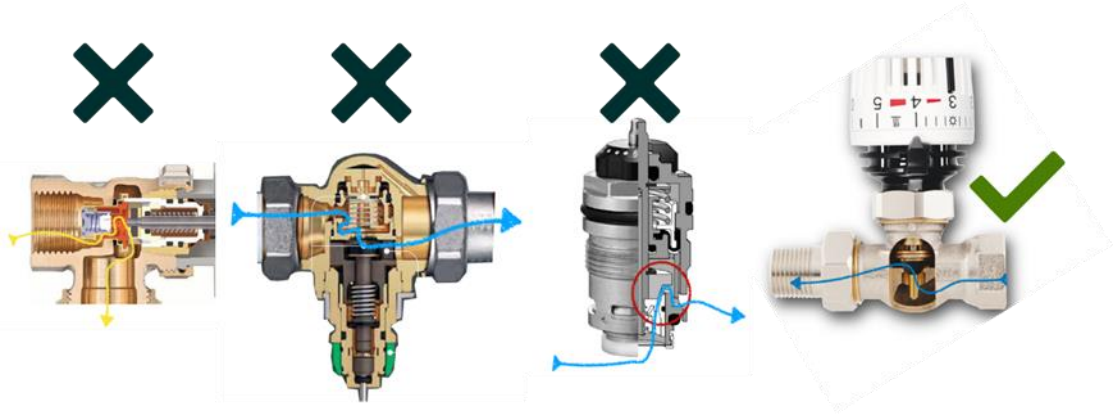
- Select a valve with the best repeatability (lowest hysteresis) close to the ideal flow curve for a dynamic valve with a constant flow between the minimum and maximum differential pressure (the operating range) for a comfortable ambient temperature and optimised energy consumption.
- For example, the Gampper radiator PICV has a patented pressure compensating capsule, which ensures the lowest hysteresis whereas other designs are based on springs and diaphragms.

Wide range of flow rates

- The range should be such to suit the largest radiators in a system. For example, if a radiator output of c. 8 KW is required, the radiator PICV must have a maximum settable flowrate of 0.09 l/s.
- There are many pressure independent control valves for radiators that do not exceed 0.04 l/s.

Debris tolerance

- Dependent on the geometry of the valve, some valves have a greater dirt tolerance than others.
- Some of the below cross sections show a convoluted flow path with restrictions and high blockage potential whereas for example the Gampper pressure independent control valve has a clear flow path that, in a fully open position, is ideal to flush out any potential debris.
- The valve design should be robust enough to allow flushing through it without having damage caused.



Availability of a full range of configurations

- Choose a manufacturer who can supply the full range of variants for greater flexibility: angle, angle reverse, straight & double angle right and left.

Availability of a full range of TRV heads:

- The range should include local and remote control as well as lockable, tamper-proof TRV heads and thermic actuated heads.

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