TRV ORIENTATION – DOES IT MATTER?

Germany and the UK are the largest thermostatic radiator valve markets in Europe. A market predicted to grow significantly in the coming years. But did you know that German system design differs from our approach in the UK?

WHAT EXACTLY ARE THERMOSTATIC RADIATOR VALVES?

Thermostatic radiator valves (TRV) are devices that are used to control the temperature of individual radiators in a central heating system. They are designed to sense the air temperature in a room and adjust the flow of hot water to the radiator accordingly. This allows for more efficient control of the heating system, as each radiator can be set to the desired temperature and can be adjusted independently of the others. TRVs have become increasingly popular over the years as they can help to reduce energy consumption and save money on heating bills.

HOW DOES A TRV WORK?

The TRV consist of a valve that regulates the flow of hot water into the radiator and a temperature-sensitive element, usually a wax or liquid-filled bulb, located in the TRV head or sensor. When the temperature in the room falls below the desired level, the temperature-sensitive element in the TRV opens the valve to allow hot water into the radiator, which heats up the room. When the temperature reaches the desired level, the temperature-sensitive element closes the valve, reducing the flow of hot water into the radiator. This ensures that the room stays at a consistent temperature without overheating or wasting energy.

WHAT ARE THE BENEFITS OF USING TRVS?

- Energy efficiency
Using TRVs can be an efficient method to decrease energy consumption and reduce heating costs. TRVs enable the regulation of the temperature of each room separately, guaranteeing that energy is not squandered on rooms that are unoccupied.
- Comfort
TRVs are particularly beneficial for buildings with multiple rooms with multiple occupants as they allow for different temperatures in different rooms, depending on their needs.

- Zone control
TRVs can be used to create different temperature zones in a building. This is particularly important when zone requirements change, especially in larger buildings, whether this is driven by occupancy level, equipment/appliances or climate.
- Cost saving
Through room-by-room control, reduced energy consumption and low installation costs, TRVs will result in cost savings on heating bills over time.
- Easy to install
TRVs are easy to install and can be fitted to most radiators without the need for any special tools. They can also be retrofitted to existing systems without the need for costly upgrades.
- Low maintenance
TRVs are generally low maintenance and so are mainly hassle-free. Occasional cleaning is always recommended to avoid dust and debris accumulating on the temperature-sensitive element, as this can affect the accuracy.

TRV PLACEMENT - WHERE SHOULD THE TRV BE INSTALLED?

The placement of TRVs on radiators can depend on the specific installation requirements or as a matter of personal preference.

It is a commonly seen practice in the UK to install TRVs at the bottom of the radiator. This placement of the inlet and outlet piping is referred to as Bottom Bottom Opposite Ends (BBOE). Whereas across Mainland Europe a common approach is to install the TRV to the inlet at the top of the radiator and the outlet to the bottom of the radiator, this is called Top Bottom Opposite Ends (TBOE).

Circumstances can dictate which is the better installation. TRVs require a free flow of air to ensure the air temperature is accurately sensed. Any obstruction around the temperature sensitive element can lead to a false operation. Furniture and objects near to the radiator can cause the TRV to register a higher temperature than the actual temperature in the room, this is more likely to affect BBOE installation. When a radiator with a TRV is placed under a window, the cold air from the window can lower the temperature of the air around the TRV or vice versa if the TRV is in direct sunlight, this is more likely to cause issues with a TBOE installation.

When both the inlet and outlet connections are at the bottom, the concern is that the water can pass through the radiator without adequately heating the top. Whereas with the inlet at the top the entire radiator is heated more evenly, resulting in consistent temperatures. This is particularly effective in low-temperature heating systems, such as those used in heat pumps, as the lower temperature may not be sufficient to heat the entire radiator effectively from the bottom up.

Further factors influence the chosen installation, such as piping access points and aesthetics. TRVs placed out of sight at the bottom of a radiator with low level piping is common with UK installers as being more aesthetically pleasing and for the ease of installation.

TRV ORIENTATION – WHICH IS THE BEST OPTION?

Thermostatic radiator valves (TRVs) can be installed in either a horizontal or vertical orientation but there are seen advantages to a horizontal installation.
For a vertical TRV installation the temperature sensing element is directly above the hot water pipe and closer to the body of the radiator, likely creating a false temperature. A horizontal installation is more likely to sense the ambient temperature in the room.

PRESSURE INDEPENDENT RADIATOR VALVES

To further reduce the energy use and optimise occupant comfort in radiator-heated buildings, valve manufacturers have launched the Pressure Independent Radiator Valve [PIRV] about 5 years ago, which will be the key driver for the predicted market growth. Pressure Independent Radiator Valves essentially combine the functionality of the TRV and Differential Pressure Control Valves [DPCVs], traditionally used on branches in radiator-heated buildings to balance the system, in one valve. The Pressure Independent Radiator Valve provides the ambient temperature whilst automatically balancing the heating system irrespective of how many valves are exercised in the system. PIRVs comprise a dynamic element that automatically limits and maintains the flow rate of water, independent of pressure fluctuations in the heating system, thereby further improving the system performance and energy savings. A system design with PIRVs eliminates the need for DPCVs, reducing the capital investment and enabling an easy and fast commissioning process.

Want to know more? Check out our PRODUCT PAGE or read our PIRV ARTICLE.

Author: Daniel Frain M.Eng.

Sources:
- http://danfossheating.ourpressoffice.com/2019/trv-installation-time-change/#:~:text=On%20mainland%20Europe%20and%20in,the%20bottom%20of%20the%20radiato
- https://ipaper.ipapercms.dk/FlowconInternational/WW/Brochure/FlowConApplicationGuide/?page=44
- https://finance.yahoo.com/news/thermostatic-radiator-valve-market-size-083000533.html#:~:text=Germany%20and%20the%20UK%20are,radiator%20valve%20market%20in%20Europe.&text=By%20product%20type%2C%20the%20electronic,growth%20during%20the%20forecast%20period.