PLUMBING & MECHANICAL

The Do's And Don'ts Of Three-Way Thermostatic Valves

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Tips for properly installing these mixing valves in radiant heating systems.

One of the best known temperature control devices in hydronic radiant heating systems is the three-way thermostatic mixing valve. It's available from several manufacturers with either an internal thermostatic element or an external actuator. The latter uses capillary tube sensing bulbs for temperature measurement.

Because these valves have been around for decades, many installers feel they fully understand how such valves work and how to install them in a radiant heating system. Unfortunately, the number of problem jobs that I see or hear about suggests otherwise.

Let's look at both the right and wrong way to apply these valves.

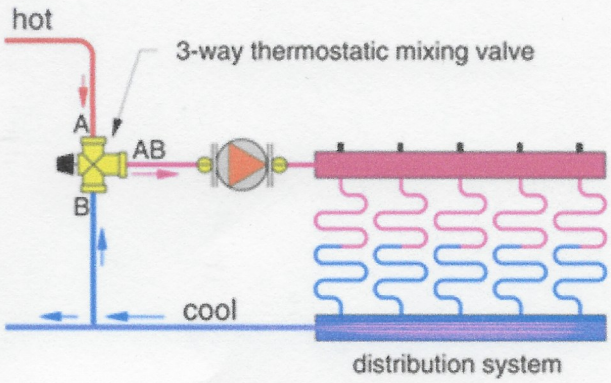

Figure 1

Where The Circulator Goes

The proper piping of a three-way thermostat valve is shown in Figure 1. Hot water enters port A and mixes with cool return water entering through port B. The resulting mix flows out through port AB and heads for the radiant floor manifold(s).

Note that the distribution circulator is located between the mixing valve and the manifold station. With the pump in this position, the proper flow rates can be generated through the distribution system. Unfortunately, the old habit of installing circulators so they pump into the return side of the boiler has resulted in systems such as the one shown in Figure 2.

In such installations, almost all the hot water from the boiler outlet is routed through the internal porting of the mixing valve and back to the boiler inlet. This happens because flow leaving the discharge port of a circulator only "cares about" getting back to the inlet of the circulator. The path of least resistance is through the porting of the mixing valve rather than through the floor circuits. Only a trickle of hot water flows through the latter. The high supply temperature and extremely low flow rate lead to very large temperature drops along the circuit and severely hinders heat output. Any heat that makes it out to the floor circuits is more of a coincidence rather than planned occurrence.

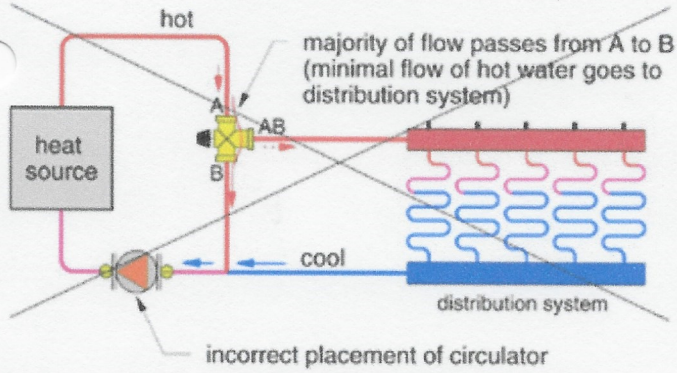

Figure 2