

June 2010 Glitch & Fix

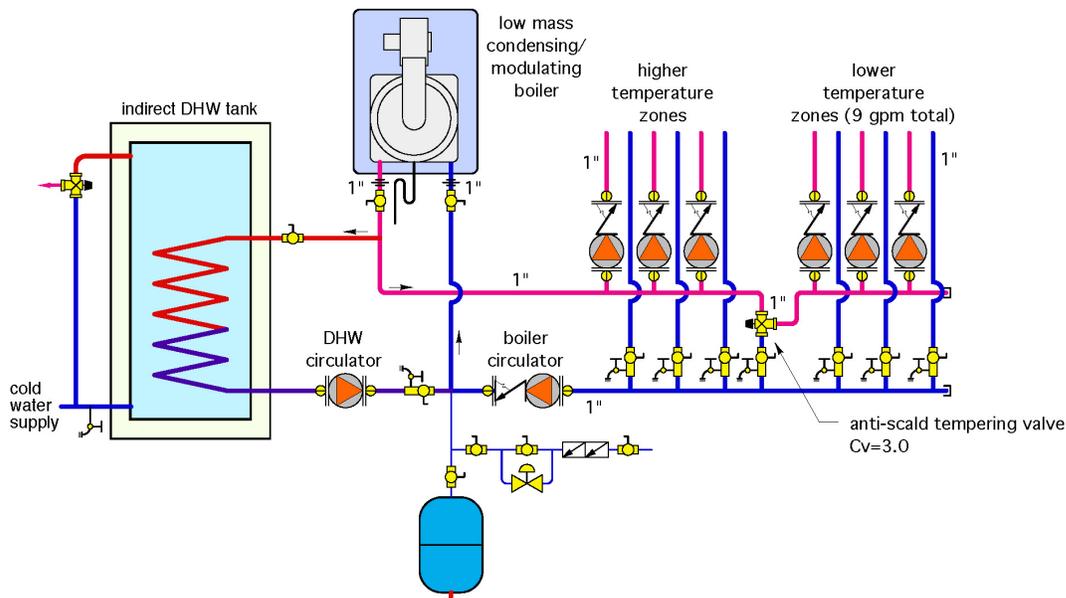
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Radiant Floor Heat And Mod/Con Boilers

The Glitch

A project requires both medium- and low-temperature radiant floor panels. The installer proposes the following system design. Since the mod/con boiler already has an internal outdoor reset controller, he decides to use a standard 1-inch tempering valve to lower the water supply temperature to the lower temperature zones. He also decides that since the boiler supply and return connections are 1 inch, he can pipe the entire system with 1-inch tubing.

Can you spot at least six design or installation details that are going to create problems?



The Fix

The header piping in the original design is the same size (1-inch) as the piping to individual zone circulators. This will likely create a high pressure drop when all zone circulators are operating. The pipe size of the distribution headers in the fix drawing has been increased to minimize head loss and, thus, minimize hydraulic interference between zones.

The boiler circulator needs to be hydraulically separated from the circulators in the distribution system. This has been corrected using the closely spaced tees.

The 1-inch tempering valve with $C_v = 3.0$ has been replaced with a properly sized three-way rotary mixing valve with much higher C_v ($C_v = 10$) and hence lower pressure drop. Although a motorized actuator is shown on the mixing valve, it may not be required.

A manually set (nonthermostatic/nonmotorized) three-way valve can provide proportional reset control to the lower temperature zones when the hot water supplied to the valve is reset by the boiler. The motorized actuator is recommended in situations where the lower temperature zones will have frequent setback or temperature adjustment. A check valve is installed in the hot water pipe to the three-way valve to prevent flow reversal when other zones are operating.

The remaining glitches and their corrections are as follows:

- A microbubble air separator has been added such that flow from the boiler passes through it during both space heating and DHW operating modes.
- In the original drawing, the purging valves on the return side of the zone circuits were installed backwards.
- In the original drawing, all zone circulators are shown with very little distance between their inlet port and the header. This distance should be a minimum of 12 pipe diameters to reduce the level of turbulence entering the circulator.
- The DHW circulator in the original drawing lacks a check valve. Without it, there will be some reverse flow through the coil of the indirect water heater when the space-heating portion of the system is operating.
- Finally, the point of no pressure change in the original system is incorrectly located on the discharge side of the circulators.

