

The Glitch & The Fix, January 2015

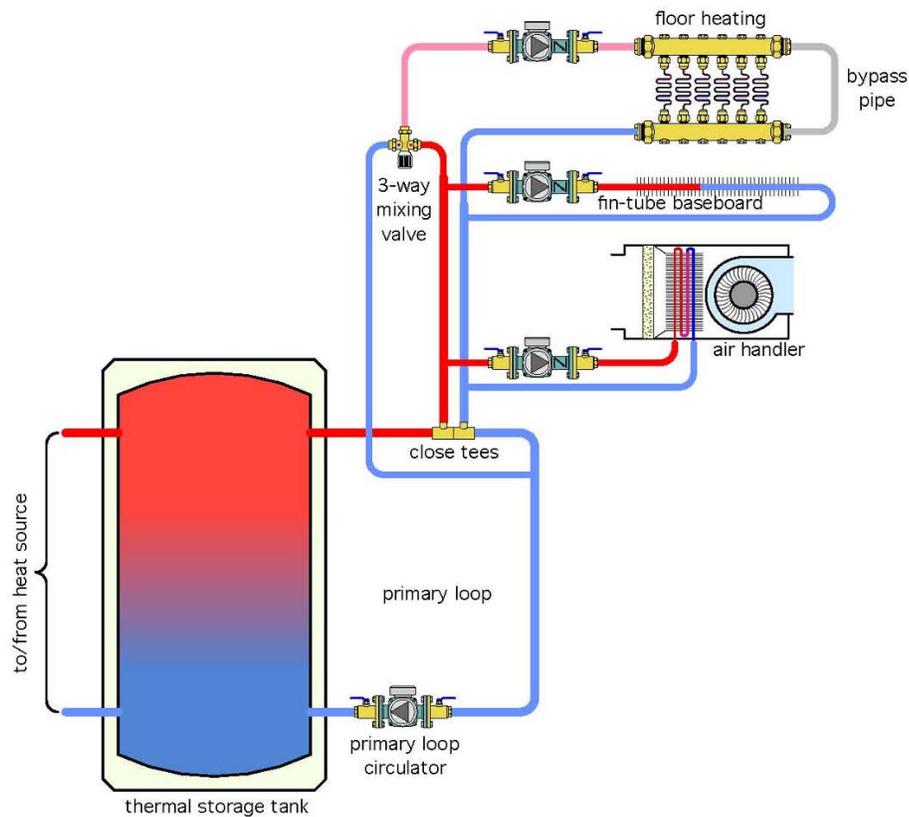
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Floor heating with pellet boiler

The Glitch

The drawing below is a close representation of a piping sketch that recently crossed my desk. The designer's intent was to supply a low-temperature floor-heating zone, as well as a higher-temperature baseboard zone and air handler, from a thermal storage tank heated by a pellet-fueled boiler.

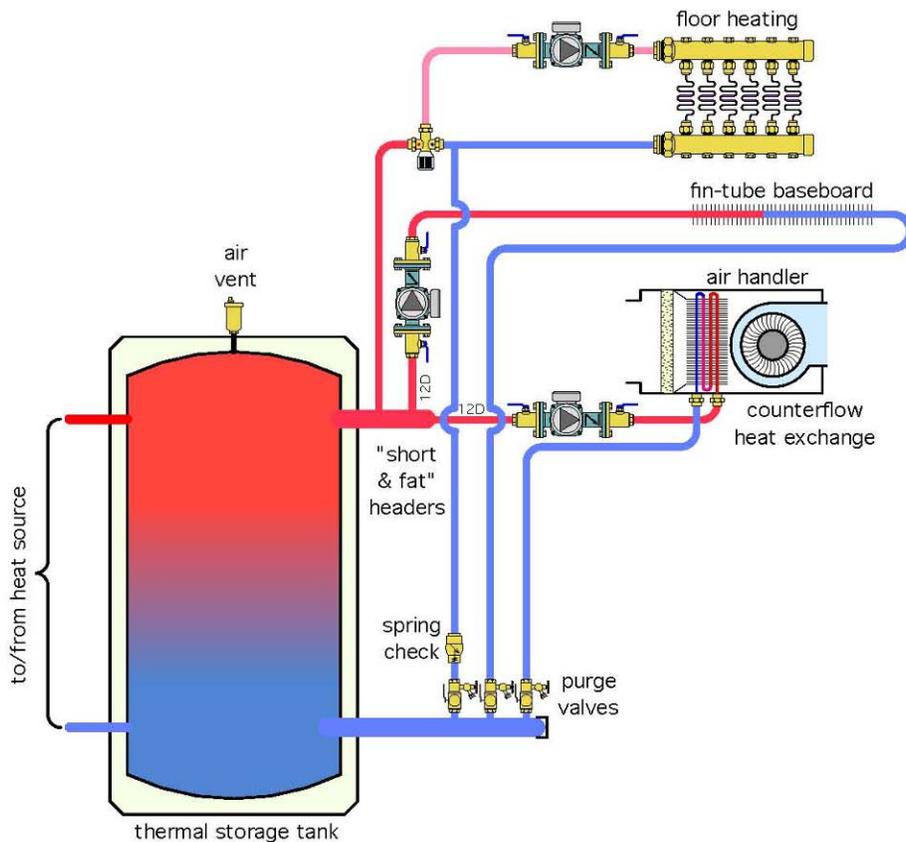
Can you spot at least five details that should be changed or components that should be added?



The Fix

A properly piped buffer tank can provide excellent hydraulic separation between multiple load circuits. The key is to create “short and fat” headers that connect to the tank and create very little pressure drop. These headers and the tank itself then represent a common piping path with very low flow resistance. The result: good hydraulic separation between the load circulators.

There is no need to create a separate primary loop on the right side of the tank as shown in the Glitch drawing. Thus, the piping and circulator in the primary loop can be eliminated. The operating cost of the primary circulator, over the life of the system, also disappears.



Other details that have been corrected in the Fix drawing include:

1. A float-type air vent added to top of the thermal storage tank. Without this, it will be difficult (impossible) to remove air trapped about the piping connections.
2. Reversing the piping connections to the coil of the air handler. This creates counterflow heat exchange, which increases the rate of heat transfer from the coil, all other conditions being equal.
3. Adding purging valves to the return side of each load circuit.
4. Adding a spring-loaded check valve to the return side of the floor-heating circuit to prevent the possibility of reverse flow through the three-way mixing valve.
5. Removing the "bypass" piping, shown in gray, on the right side of the floor heating manifold. This piping was definitely there on the sketch I received. There is absolutely no purpose in having this piping.

If present, most of the flow entering the supply manifold would short-circuit through the bypass piping, rather than pass through the floor-heating circuits, the latter having much higher flow resistance than the bypass.