

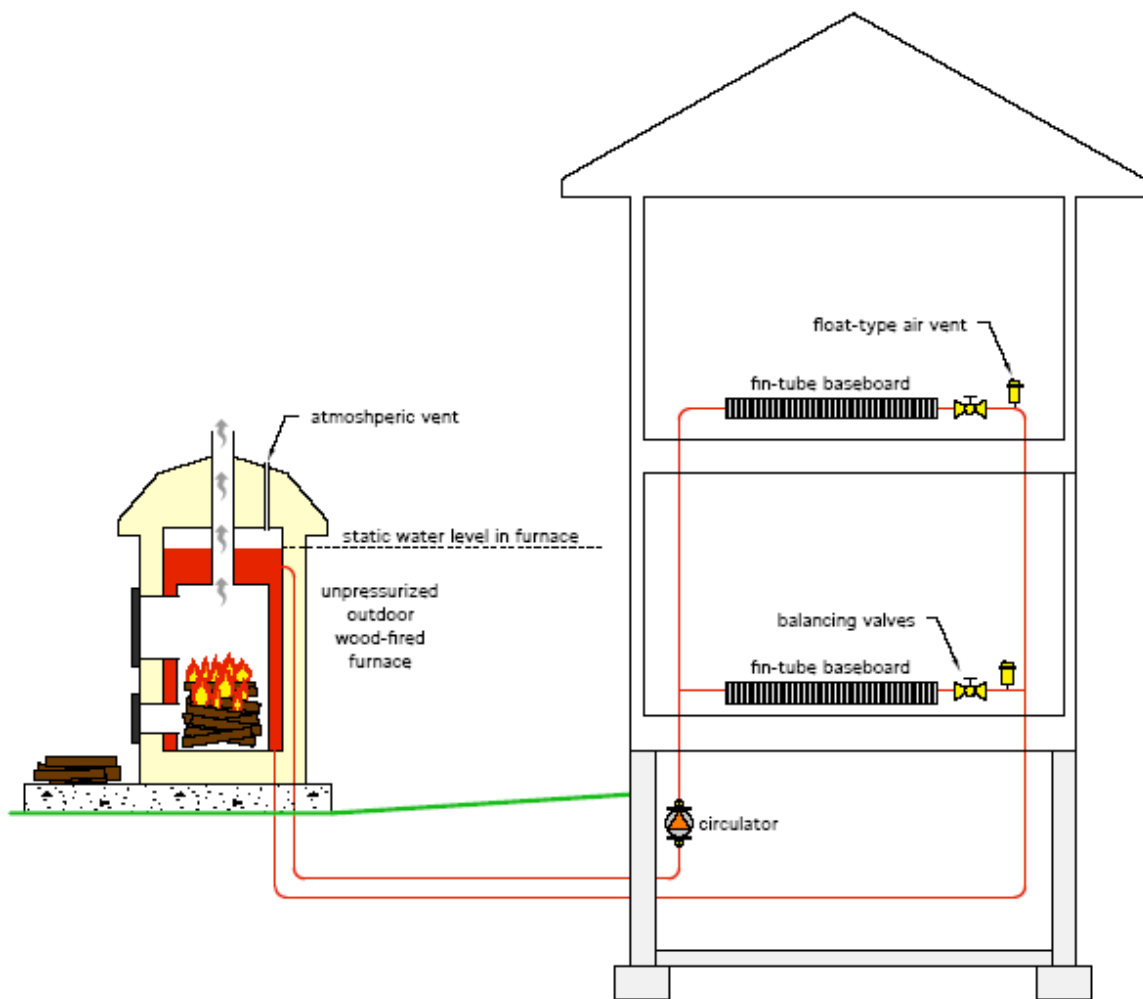
Noisy Pipes

The Glitch

Overview: An unpressurized outdoor furnace supplies heat to a fin-tube baseboard system in a house. The circulator is located well below the water level in the furnace to ensure it's always primed.

The system heats the house well (and keeps the path between the house and furnace clear of snow). However, every time the circulator shuts off, the owner hears banging and gurgling sounds in the pipes. When the circulator starts up again, he hears “water fall” sounds in some of the pipes.

Exercise: So what's going on here?



The Fix

The static water level (atmospheric pressure level) in the outdoor furnace is lower than the top of the distribution system. This causes the pressure in the piping to go below atmospheric pressure whenever the circulator is off.

High temperature water in the piping might even flash to steam when the circulator pressure is suddenly removed. This is responsible for the banging sounds.

Air will attempt to enter the sub-atmospheric portion of the piping system any way it can, including air vents, valve packings and even slightly imperfect threaded joints. As air enters, the water level lowers toward the level in the boiler. The next time the circulator starts, it shoves water through the piping and drives the air back down in the distribution system. If the owner is lucky, it might even drive this air back out to the furnace.

Corrections actions include:

1. Not installing any vent, valves, threaded connections or other fittings that could possibly weep air into the piping when under sub-atmospheric pressure.
2. Installing a heat exchanger to isolate the unpressurized portion of the system from the building distribution system (absolutely essential in my opinion). If this is done, there should be no problems with vents, valves or threaded fittings at the top of the distribution system (see revised schematic).
3. Reducing water temperature to prevent steam flash under lowered pressure.

