Hot Water Heating System Problems

Hot water heating systems, also called hydronic systems, use water heated in a water heater or boiler as the heating medium, which is then circulated through pipes to baseboard convectors or radiators.

Overview

There are two types of systems, forced and gravity. According to the “Residential Rehabilitation Guide” by the Department of Housing and Urban Development (HUD) gravity systems, which is found in older single-family homes, have no water pump, require larger pumps, and heat unevenly. For this reason, these units are usually replaced during a renovation.

Forced water systems are usually heated by gas- or oil-fired boilers like their forced air counterparts, but use immersion-type electric resistance heating coils instead of burners in the boiling unit. Like electrically heated systems, gas- and oil-fired hydronic systems use hot water pumps and distribution piping, with either one- or two-pipe or series-loop systems.

Problems can arise in several areas of the hydronic system, including the boiler, water heater or hydronic furnace; expansion tank; the boiler controls; distribution piping and radiators.

Repairs should only be made by a certified technician.

Boilers and Water Heaters

Cast-iron or steel boilers used in hydronic systems, according to “HVAC Fundamentals Volume 1,” by James E. Brumbaugh. Corrosion from water is a problem with boilers and can minimize their useful life. For this reason, cast-iron types, which have a greater resistance to corrosion, are used. Chemically treating the water will minimize this problem and extend the boiler's service life.

Other boiler problems can include no heat from low water levels or thermostat or burner malfunctions.

Common problems with water heaters range from no hot water to insufficient hot water to slow hot water recovery.

The Expansion Tank

Expansion tanks are installed near the boiler to allow expansion and contraction of the water as it changes temperature, according to Brumbaugh. Problems arise when the tank loses air and the unit becomes waterlogged, prohibiting expansion. Water is then discharged from the boiler's pressure relief valve, as evidenced by high pressure readings. In this case, a professional needs to be called in to drain and re-pressurize the expansion tank.

Boiler Controls

According to HUD, “all boilers should be equipped with a pressure gauge, a pressure relief valve, and a pressure-reducing valve.” Other boiler controls include a high-temperature limit control as well as circulating pump and controls.

Both low and high pressure can cause problems. If pressure readings are lower than 12 psi, this indicates a faulty valve that needs to be adjusted or replaced. In addition to causing waterlogged boilers, high-pressure may be caused by cracks in the coil of the water heater, according to HUD. Check for water near or below the valve.

If a boiler gets too hot, an aquastat, a high-temperature limit control, should be installed, checked or replaced, as the case warrants.

The circulating pump and controls sends hot water through the system at a constant flow rate. HUD recommends listening for loud operation in a pump which can indicate a faulty motor. Other problems include leaks in the seal between the motor and pump and faulty wiring if the pump is not operating correctly.

Distribution Piping

The hot water in a hydronic system is transported by pipes, radiators and control valves. In distribution piping, valves and connections should be checked for leaks, and pipes should be insulated in crawl spaces, attics, and unheated basements, according to HUD.

If radiators are not warm during operation, there may be a problem with the system's zone control. Check the valves associated with the unit for leaks, faulty wiring or incomplete connections. Radiators should also be checked for leaks as well as an inspection of the unit's fins for dirt or damage, according to HUD. If the radiators do not warm up evenly, the air trapped inside needs to be discharged.

Disadvantages of Hydronic Heating Systems

Brumbaugh lists several disadvantages to hydronic heating systems including high first cost, a lack of ventilation, slow heat response and the sometimes inconvenient placement of baseboard heaters. Home owners should take these issues under advisement when considering installing a hydronic heating system. Again, repairs to equipment should only be performed by a certified technician.