**Trouble Shooting Guide for Hydronic Heating**

Modern boiler systems for home heating are *hydronic* systems, meaning the boiler heats water to circulate through the house. Although they are closely related to older steam boiler systems, hydronic systems are made of pipes that carry hot water that radiates heat through either steel radiators or baseboard convectors, sometimes called "fin-tubes." In these systems, once the radiator or baseboard convector absorbs heat from the hot water, the cooled water returns back to the boiler to be reheated, and the water circulation loop continues. Steam boiler systems operate in a similar fashion, but rather than hot water flowing through the pipes, it is superheated steam vapor that circulates.

# Components of a Hot Water Boiler

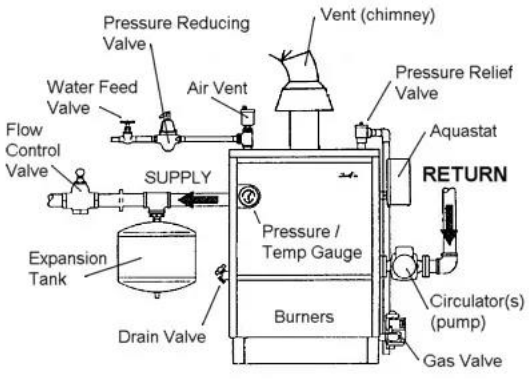
Understanding the components of a hot water boiler can help with basic troubleshooting. A boiler is a bit more complex than a forced air furnace in that it has more parts, valves, and controls. However, gas-fired boilers are fairly reliable and when problems do occur, they are usually related to the expansion tank or water circulation pump(s). The major components of the boiler for a hot water (hydronic) system include:

## Hot Water Supply Side

- **Aquastat**: A thermostat that regulates the water temperature in the boiler
- **Gas valve and burners**: The combustion assembly that heats the water chamber
- **Combination pressure/temperature gauge (tridicator)**: Monitors water temperature and pressure
- **Water feed valve**: Controls water flow to the boiler
- **Pressure-reducing valve**: Automatically maintains correct water level and pressure at about 12 to 15 pounds per square inch (psi)
- **Air vent**: Automatically purges unwanted air from the hydronic system
- **Pressure-relief valve**: Safety valve that automatically opens if the pressure gets too high inside the boiler
- **Expansion tank**: Allows expansion of water as it heats; there are two types of expansion tanks: horizontal-style (older, larger) and diaphragm-style (newer, smaller)
- **Flow control valve**: Regulates the flow of hot water to the system

## Hot Water Return Side

- **Circulation pump**: The electric pump that circulates water through the system
- **Drain valve**: A valve that opens to allow for draining the boiler




GAS FIRED HOT WATER BOILER

# The Boiler Doesn't Produce Heat

If your boiler isn't producing any heat at all, check for these common causes:

- **The boiler doesn't have power**: The circuit breaker or fuse controlling the furnace may have tripped or blown. Reset the tripped circuit breaker or replace a blown fuse.
- **The water level is low**: Maintain the water level in the boiler at half-full. The boiler's automatic filling system, controlled by the pressure-reducing valve, should maintain the proper water level at 12 to 15 psi of pressure. If there isn't a pressure-reducing valve, manually feed the boiler by opening up the water feed valve until the boiler pressure reaches 12 psi.
- **The natural gas or propane control valve for the burner is closed**: Make sure the valve is open.
- **The pilot is light out or malfunctioning**: Relight the standing pilot.
- **Electronic burner ignition is malfunctioning**: On boilers without a standing pilot, troubleshoot the electronic ignition system.
- **The thermostat is malfunctioning**: Check that thermostat is in heat mode and is set to the appropriate temperature. Try moving the thermostat setting for the temperature up or down a few degrees. If this does not work, troubleshoot the thermostat.

# The Boiler Heats Poorly

Common problems that would cause a boiler not to heat properly include:

- **The water level is incorrect**: This is the most likely cause if the change in heating capacity was sudden. Check the reading of the tridicator (combination pressure/ temperature gauge). If the water pressure is below 12 psi, water needs to be added to the system. The boiler's automatic filling system controlled by the pressure-reducing valve should maintain the proper water level at 12 to 15 psi. If there is no pressure-reducing valve, manually feed the boiler by opening up the water feed valve until boiler pressure reaches 12 psi.
- **Mineral deposits are accumulating in the boiler and heat exchanger**: This is the likely cause if the change has been gradual. Flush the boiler or call a repair professional.

# Water Leaks Around the Boiler

If you find a leak around your boiler, then you may have one of the following:

- Running a boiler without enough water is not safe.  Call 800-246-3516 for service.
- **Faulty circulator (pump)**: Most repairs to the circulator require a service technician.
- **Leaking circulator**: It may be possible to replace the pump seal.
- **Leaking pressure-relief valve**: This can be caused by the expansion tank being filled with water. Otherwise, the valve may have sediment preventing it from closing. To check this, turn the boiler off and let it cool. Lift the manual pressure-relief lever, discharge water for three seconds, and then allow it to snap back into the closed position. The water should discharge strongly and be relatively clean. If the valve leaks slightly afterward, this could be due to sediment trapped in the seat. Open the valve again and discharge a second time.
- **Faulty pressure-relief valve**: If no water at all discharges from the valve or if the valve will not close at all, shut off the boiler water feed valve and replace the pressure-relief valve.
- **Leaking water pipe connection**: If water is leaking or dripping from a pipe, follow the leak back to its source and repair the connection where the leak is originating. This requires turning off the water supply to the house and draining the boiler system.

# Some Radiators Don't Heat

Common reasons for your radiator not heating include:

- **Air is trapped in lines or in the radiator**: Bleed air from a cool radiator by opening the radiator bleed valve at top of the radiator. When water squirts from the radiator, close the valve.
- **The zone valve is faulty**: Check the zone valve for proper operation. The water pipe should be hot up to and beyond the zone valve. If the valve is faulty or stuck, lines will be hot up to the valve but will cool off slightly beyond the valve. Have a faulty valve replaced by a repair professional**.  800-246-3516**
- **The circulator is faulty**: Check the circulator for proper operation, making sure the motor runs. There may be dedicated circulators for different heating zones in the home. Have the circulator replaced if it is faulty.

# Pipes Are Noisy

Issues that may cause noisy pipes include:

- **A faulty circulator**: Check the circulator. There is a spring-loaded coupling that connects the pump to the motor, and when it breaks after the pump jams, the coupling will make a loud noise as the motor runs. A bad circulator pump will need to be replaced by a technician.
- **Water is trapped in return lines**: Check to make sure the pitch of the return lines slopes back toward the boiler. Adjust pitch with new pipe hangers, if necessary. You may also need to adjust the pitch of the radiator with a shim so that it slopes back toward the return pipe.