Domestic Hot Water 101

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The descriptions and pictures below are designed to foster a basic understanding of the parts of your ***domestic hot water*** system. When you call for service, we hope they will help you to identify those parts of your system that may need service. When you receive an invoice from us, we hope the information below will help clarify which parts and systems we worked on during our service visit.

The electric water heater is usually powered by a **double pole circuit breaker** in the breaker box. An extremely common cause of no domestic hot water if you have an electric water heater is a circuit breaker in the off position.

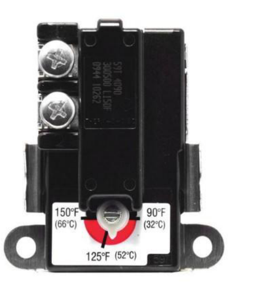
All tank type water heaters will have a **vacuum breaker** to prevent the collapse of the tank when it is drained.

The **pressure relief valve** is set to open at either 150 psi or 210 F, whichever occurs first.

This is a cutaway of an **electric tank water heater** showing the various parts. (image courtesy Merriam Webster)

The water is heated by **upper and lower water heater elements**. They are identical – most commonly 240 Volts and 4500 watts.

The **upper thermostat** heats the upper element first. Once the upper part of the tank is satisfied, this thermostat sends power to the lower element.

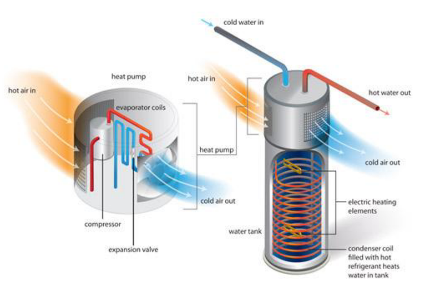


The **lower thermostat** receives power when the upper part of the tank is hot enough to turn off the upper thermostat. At this point, the lower thermostat sends power to the lower element.

The **lower water heater element** is identical to the upper element.

The **Heat pump water heater** uses a compressor and R134a refrigerant to use room heat to heat domestic hot water. This means that the room will usually get cooler and dryer as the heat and moisture are removed by this unit. In the upper part are the compressor, evaporator, and metering valve. Wrapped around the water tank is the condenser.

This diagram shows the inside components of the heat pump water heater including the **evaporator**, the **compressor**, the **expansion valve**, **fan**, **air filter**, and the **condenser**.



Tank type water heaters can also be heated with propane. The **propane tank water heater** has pressure relief valve and a vacuum breaker like the electric types. Some of these water heaters are naturally aspirated with a steel flue pipe. Most new water heaters are condensing with PVC plastic flue pipe.

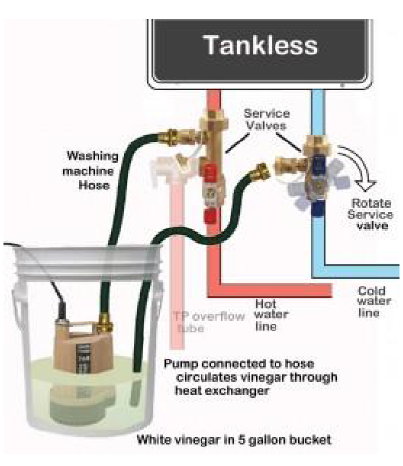
The **gas valve** is controlled by an electronic or thermal control to turn on and off propane gas to the burner.

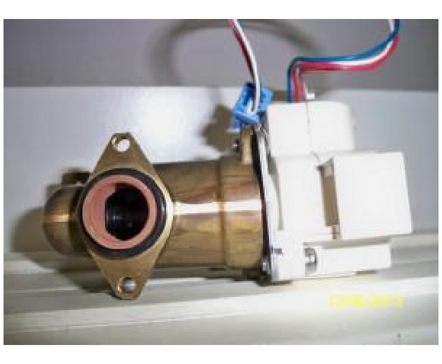
The **draft inducer** is used to pull the propane – air mixture through the water heater and out of the building. Because the flue temperature is so low, plastic parts can be used which perform better in the corrosive flue gas.

An **electric tankless water heater** is most commonly used for a single fixture that may be separated from the main source of domestic hot water. In these cases, a small electric tankless water heater makes sense in that there is no storage and the hot water demand is quite low. These water heaters have electric elements that need service once they burn out.

A **propane tankless water heater** is able to heat entering potable water in a single pass through heat exchanger from 50 F up to 130 F.

Because there is no tank to settle out impurities and sediment, an **inlet water filter** is used in the inlet pipe.



The hot and cold valves also have **flushing ports** designed to permit cleaning of the tankless water heater heat exchanger to ensure that is operates correctly. We use a descaler and circulate it through these valves and then thoroughly flush out the descaling chemical.

A **water flow sensor** (actually a small turbine) is used to measure water flow to determine how much propane to meter into the combustion chamber.