

Water Heater Choices

Types of Water Heaters and Maintenance Strategies



Touchstone Energy[®]
Cooperatives

SKILL SET

Be sure you have the experience needed for these maintenance tasks. If you are in doubt, hire a contractor.

SAFETY

These maintenance tasks may require working in tight clearances and under task lighting. Disconnect power sources when working on electrical appliances. Turn off gas at cut-off valves before working on gas lines. Be sure to relight pilot lights.

TOOLS

Utility knife, garden hose for draining tank

MATERIALS

Insulation kit for water heater – follow directions for gas-fired or electric appliance

Pipe insulation and zip ties or tape

COST BENEFIT

Older water heaters will benefit from additional insulation since new tank water heaters are better-insulated. Pipe insulation, especially at and around the heater can greatly minimize heat loss. Flushing the tank can extend the life of the unit by minimizing corrosion.

PRIORITY LEVEL

LOW MED HIGH

SKILL LEVEL

DIY PRO

The Water Heating Appliance

A residential water heater provides domestic hot water for a home and is commonly powered by either a **fuel-fired** (natural gas, propane) or **electric resistance** appliance. Other water heating appliances include:

- Solar thermal collectors which use free sunshine to heat water
- Electric heat pump water heaters that provide hot water and help cool a home
- Heat recovery devices such as desuperheaters which heat water with waste heat from a heat pump

There are a number of variables that affect the efficiency and cost to provide hot water. Always look for the *Energy Guide* label and consult the recipe card on *Water Heater Efficiency*.

Tank vs. Tankless Water Heaters

Whether electric or fuel-powered, the water heating appliance is usually either a traditional tank type or a tankless unit.

Tank water heaters heat water to a set temperature and store it. Typical sizes are 40-50 gallons for a standard home, feature a cold water inlet and hot water outlet, a temperature and pressure safety relief valve that should be piped to a drain or outdoors, a sacrificial anode rod (which is designed to corrode before the tank itself), a thermostat to set the desired water temperature and an insulated tank. Other installation features may include:

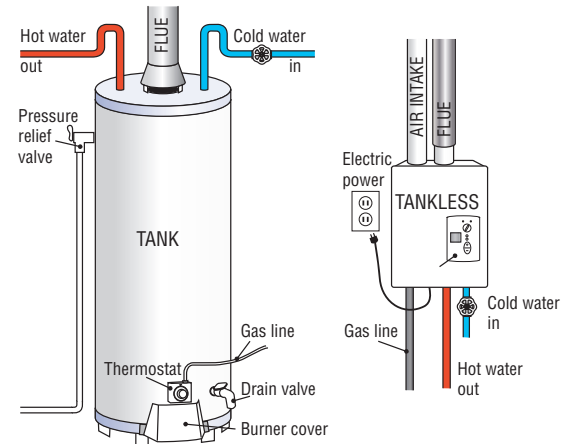
- Pipe insulation and heat traps - to reduce heat losses during non-occupancy periods
- Expansion tank - to reduce pressure spikes (required by code in many areas)
- A drain pan - plumbed to a drain or outdoors in case the tank leaks

Advantages of a tank water heater:

- Usually cheaper to buy and install
- Utilizes a smaller heat input rate (usually either electric resistance element or gas burner) than a tankless unit
- Can provide a certain amount of hot water regardless of how many fixtures are pulling from it.

Disadvantages of a tank water heater:

- Generally has greater standby losses due to the surface area of the insulated tank
- Provides only a finite amount of hot water



The tank or tankless decision (fuel-fired units shown) should take into account initial cost, fuel demands and/or flue considerations.

- Recovery takes time
- Takes up more space than the tankless variety

Tankless water heaters do not store hot water but rather heat a small volume of water continuously. A tankless unit can usually only meet the hot water demand of one or two uses at a time, such as washing dishes or taking a shower.

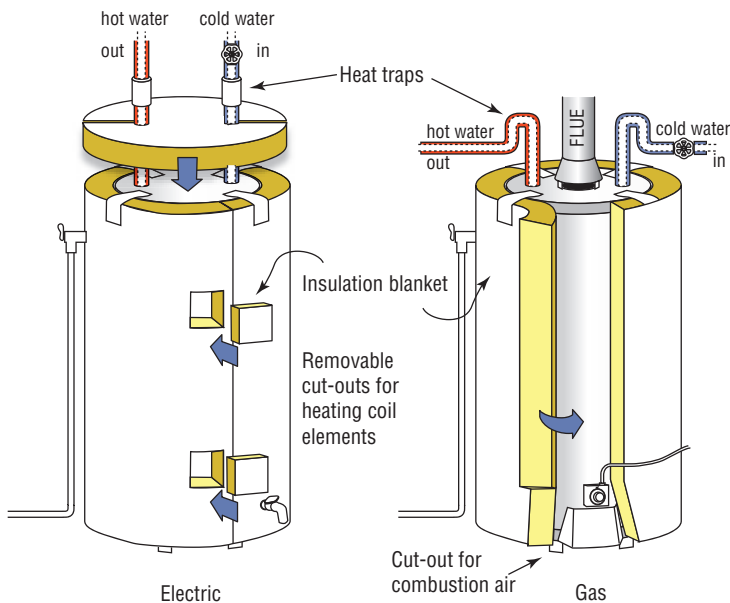
Electric resistance tankless water heaters are best suited for small, remote and rarely used locations (e.g., guest bathrooms) and are not recommended for whole house water heating. Typically, small tank point-of-use electric water heaters would be a better choice.

Advantages of a tankless water heater:

- Takes up less space
- Only heats water when it is needed
- Provides a constant volume of hot water continuously (but may lead to increased hot water consumption)
- Can reduce operating costs

Disadvantages of a tankless water heater:

- Usually higher purchase and installation cost
- May require a larger electric or fuel line than regular water heater
- Combustion air and venting requirements for fuel units may differ from tank models
- Potentially increased maintenance, especially in areas with hard water
- Doesn't overcome poor plumbing design



DIY Maintenance and Upgrades

Flush the Tank.

Tank water heaters benefit from a periodic (6 months to one year) flushing of the sediment from the bottom of the tank. First, turn off the heating source. Connect a hose from the drain valve at the bottom of the tank to a drain or outdoors, then to purge a few gallons of water. Also, depending on the corrosiveness of the local water, a routine checking of the anode rod is useful and replacement when substantially corroded can extend the tank life many years (an excellent resource is www.waterheaterrescue.com).

Low Cost Add-ons. To provide greater efficiency, consider adding:

- An insulating blanket around the water heater which is easy and inexpensive. Follow the directions with the insulating blanket, and:
 - Do not cover the top on gas water heaters or block air to the burner
 - Provide cutouts for access to controls
- Pipe insulation to as much of the hot water lines as possible. Be sure to:
 - Match the pipe insulation sleeve's inside diameter to the water pipe's outside diameter for a snug fit
 - On gas water heaters, pipe insulation should be kept at least 6 inches from the flue
 - Tape or cinch pipe insulation with cable ties every 1-2 feet in length

Heat Traps Should be Installed by a Plumber

Heat traps prevent warm water from rising upward and siphoning heat out of a tank during periods of non-use. Fortunately, this effect can be minimized since warm water will naturally rise up and travel, but will not flow down. As a result heat traps can be formed by plumbing in a loop or inverted "U" at the inlet/outlet water taps. Today many manufacturers include a check-valve type of heat trap which helps achieve the same result.

Water Heater Safety

Combustion water heaters should have separate combustion air that is isolated from the living area to minimize the danger of backdrafting and potentially introducing carbon monoxide and other combustion byproducts into the living space. One option is to locate the water heater outside of the living area (such as in a garage). Another option is to place the water heater inside a special *combustion closet* inside the home that pulls in outside air for combustion through high and low vents.

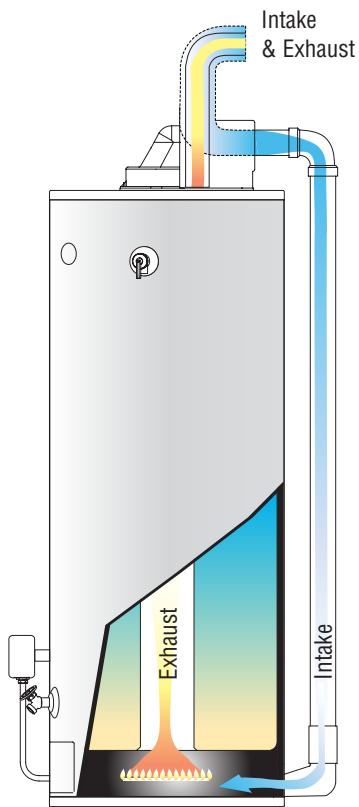
Direct vent gas water heaters bring in their own outside air for combustion and then safely vent the combustion exhaust gases through a concentric venting system. *Power vented gas water heaters* use the air around them for combustion but incorporate an electric exhaust fan and a safety pressure switch to ensure backdrafting will not occur.

Standard gas water heaters are typically exhausted with flue pipe that must always be sloped with at least $\frac{1}{4}$ " of rise per 12" of horizontal run. Flue pipes that sag or run too flat create a risk for poor drafting and can have problems with condensation which can lead to

corrosion and flue pipe failure. Visually inspect for signs of a corroded flue and contact a professional if detected. If unsure, consult a professional for a combustion appliance zone (CAZ) test.

Most standard gas water heaters incorporate a gas valve with a standing pilot that is used to ignite the water heater's main burner when the tank thermostat calls for heat. If the gas is shut off, the pilot will need to be relit. Consult the manufacturer's instructions for details. Building codes require that combustion water heaters in garages to be elevated above the ground in case of a gasoline spill (gasoline vapors are heavier than air).

For electric and gas water heaters, set the tank thermostat to approximately 120°F (medium setting). This will reduce standby losses, minimize risk of scalding and keep the tank temperature hot enough to prevent bacterial growth. Also, ensure that the temperature and pressure valve is piped down and preferably to the outside in case the tank pressure gets too high and scalding water is released.



Direct vent gas water heater