



Steps in the Home Energy Series

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Water heaters

A water heater is like a workhorse. It is steady, reliable and practically maintenance-free. Giving your water heater a little attention can extend its life and significantly reduce energy costs. Water heating can account for up to 20 percent of your home's energy use, second only to space heating.

How water heaters work

When you turn on the hot-water tap, heated water is drawn into your home's pipes from the top of your water heater. To replace the water being used, fresh cold water flows into the bottom of the tank, which activates the heating element. Gas and electric storage water heaters basically operate the same way. However, gas heaters have a pilot light at the bottom to ignite the burner. They also have a flue running through the center of the tank to exhaust combustion gases. Although gas models have only a single burner, electric heaters generally have lower and upper heating elements inside the tank.

Both gas and electric heaters must have a temperature and pressure release valve near the top of the tank that allows steam or hot water to escape safely should a thermostat malfunction occur. Check this valve annually to ensure that it is working properly.

Energy-saving options

There are several strategies for saving water, energy and money. By following these five steps, you can ensure that your water heater will operate efficiently.

Adjust the thermostat

Your tank is probably keeping your water hotter than necessary. Most electric heaters are set at 140 degrees F, but this setting is only needed if you have a dishwasher without a booster heater. Turn the temperature down to 120 degrees F (midway between low and medium on gas heater dial), and you will cut your water-heating costs by 6 to 10 percent. Because gas water heaters do not have a temperature thermostat, use a cooking thermometer to test the temperature of the water at the tap. Lowering the temperature will also slow tank and pipe mineral buildup and corrosion. Mark the current settings with a permanent marker so you can easily readjust the temperature later if need be.

Electric heaters might have both an upper and a lower thermostat. However, before removing the thermostat access panels, turn the electricity off at the circuit breaker or fuse box.

When you are going to be away from home for several weeks, turn the thermostat down to the lowest setting or turn the heater off completely. Electric heaters can be shut off at the electrical circuit breaker box. If you turn off a gas heater, you will need to know how to relight the pilot light (see page 3). It only takes about an hour to reheat the water once the heater is turned back on.

Insulate the tank

Unless the owner's manual specifically states not to, wrap your water heater with an insulating blanket, especially if it is located in an unheated space (garage, crawl space, etc.). If possible, put the heater in a heated space. Wrapping the tank in a blanket of fiberglass insulation will reduce standby heat loss by 25 to 45 percent. Standby heat



Gas thermostat

loss results from keeping water heated at all times so it is ready when needed — it's on "standby." Some of the heat is transferred through the tank and pipes out into the surrounding air. Insulation can result in a savings of 4 to 9 percent on your water heating bill. Water heater insulation kits are available for about \$20 at hardware stores. They are easy to install and will pay for themselves in less than a year. Take care to avoid covering exhaust vents and air intakes on gas models, and cut insulation so you can access the thermostat panels on electric heaters. Never cover the pressure temperature relief valve. Wrap a strap around the top and near the bottom to secure the insulation.

Insulate hot-water pipes

To save even more, reduce heat loss by insulating the first 5 feet of your hot and cold water pipes from the water heater. You can insulate your hot lines beyond 5 feet, if they are accessible, using preformed foam insulation available in different diameters and lengths. Use the size with the tightest fit.

Keep tank and pipe insulation at least 3 inches away from the gas burner, the hot exhaust vent or pipe, and draft hood on gas water heaters.

Flush the tank

Sediment and scale — dirt and mineral deposits from the water — build up over time inside your water tank. They reduce both heating element efficiency and the overall capacity of the water heater. You can reduce this buildup by periodically flushing water from the tank.

The drain valve is located near the bottom of the tank. Open the valve and let the murky water drain into a bucket until it runs clear, usually after 1 to 2 gallons. If the valve hasn't been opened in years, you may want to have a garden hose cap handy the first time you drain, in case it is difficult to shut off and avoid drips. In some areas, depending on the hardness of the water, monthly flushing is recommended, and in others the tank need only be flushed once a year.

Install heat traps

Heat traps are one-way valves placed inside both the hot- and cold-water lines running into your water heater. They keep the hot water from riding out and the cold water from dropping in to your water heater when you're not drawing water from a tap or for an appliance. If your existing water heater does not have heat traps or you are not sure, contact a plumber to check your system and install them if necessary. New water heaters should have them already installed or available as an option.

New water heaters

If you're in the market for a new water heater or are doing homework to know what is available once the old one quits working, you will have a variety of choices to consider and discuss with your heating contractor or plumber.

High-efficiency gas storage water heaters

This is an upgraded version of the conventional gas water heater. It has better insulation and heat traps and more efficient burners. Look for storage tanks with an R-value of around R-25 to reduce standby heat losses.

Gas-condensing water heaters

Regular gas water heaters vent combustion gases to the outdoors at a high temperature. A gas-condensing water heater is more efficient because it captures more of the combustion gas' high temperature to heat the water.

Heat pump water heaters

Instead of generating heat, a heat pump uses heat from the surrounding air to heat water; like how a refrigerator works, only in reverse. They might not work as efficiently in Missouri during winter if a living space's heated air is pulled to heat the water.

Tankless (on-demand) water heaters

Most water heaters keep water heated at all times, whether needed or not. Powered either by gas or electricity, tankless water heaters save energy by heating water only when it is needed. A flow sensor detects when the hot water faucet is turned on or the hot water selection is made on an appliance. For a gas-



Tankless hot water heater

powered heater, the gas valve opens and the burner fires up. The system measures the incoming water temperature and calculates how quickly the water should flow past the burner through to the faucet or appliance. The burner's heat is transferred to the water. Although these systems can supply a limitless amount of heated water, they must be sized for your hot water needs.



Solar water heating system

You can also heat your water using the sun's energy. There are several types of solar hot water systems that work well. The sun's energy is absorbed by a south-facing collector that heats a fluid (water or antifreeze). The fluid transfers its heat to potable water stored in a tank. These systems typically require a backup system for high demand or cloudy days. The backup can be a tankless water heater.

Seismic bracing

The southeast areas of Missouri are in a seismic zone where plumbing code requires water heaters be anchored to resist movement during earthquake motion. Bracing code requires that a strap be anchored to the wall on the top and bottom thirds of the vertical dimensions of the tank. Straps are to be 4 inches above the controls.

Lighting a gas water heater pilot light

Instructions for lighting a pilot light should be on a plate mounted to the water heater. The instructions, which apply to most gas water heaters, are repeated here:

1. Turn the thermostat indicator knob to OFF.

This shuts off gas supply to the heater. Wait five minutes for any gas that might be in the combustion chamber to clear the heater. If closed, open the gas valve in the gas supply pipe. Turn the indicator knob to PILOT.

2. Depress the indicator knob and light the pilot.

Continue holding the indicator knob for one minute after the pilot is lit. The pilot flame should remain on when the knob is released.

3. Turn the indicator knob to ON. The main burner should ignite.

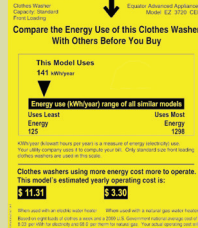
4. Set the water temperature dial to the desired temperature.

5. Repeat these instructions if it is necessary to relight the heater.

If the pilot light goes off when you release the reset button, try holding the button down again for an additional 10 to 15 seconds. If it still fails to stay on, either the thermocouple is defective or it is not positioned properly in the flame of the pilot. The flame from the pilot should bathe the top ½ inch of the thermocouple rod. If it does not, loosen the bracket nuts and reposition the rod. The thermocouple acts as a safety cutoff for the gas valve. When the pilot is lighted, the heat generates a slight electric current in the thermocouple, which then allows gas to come from the gas valve. When the pilot goes out, the thermocouple stops sending the current, and the gas supply stops. You should replace the thermocouple if is faulty.

If you still cannot get the pilot lighted, there is probably something obstructing the flow of gas. Clean the pilot and check for clogs, or call a plumber or heating contractor for maintenance.

ENERGYGUIDE



Before you buy, consider both purchase and operating costs. Heaters with the lowest price tags are often the most expensive to operate. Look for the Energy Star label for energy-efficient water heaters that will save you money. Also compare the bright yellow EnergyGuide labels. These labels provide information on energy efficiency and estimated annual operating costs.

