

Residential Water Heater Safety

Residential water heaters are typically not part of our members' jurisdictional responsibilities.

As a fired pressure vessel, however, the residential water heater represents a marriage of select components that make up both a pressure vessel and a boiler.

In promoting boiler and pressure vessel safety, it makes sense to use the water heater as a familiar example.

Even though residential water heaters usually do not fall under our jurisdictional regulations, National Board members continue to serve as advocates for home water heater safety. As part of this ongoing effort, we present below a list of tips to keep your home's water heater operating efficiently and safely:

Do-It-Yourself Maintenance of Electric AND Gas-Fired Water Heaters:

When water is heated, calcium carbonate settles to the bottom of the tank. This sediment reduces the efficiency of your water heater, as well as its storage capacity and eventually its lifespan. To combat the effects of this natural process, **drain water** from your tank two to four times a year (more often if you live in a hard-water area). To do this, first turn the water heater off. Then simply attach a length of garden hose to the drain valve near the bottom of the tank and empty several gallons into a floor drain or bucket. Typically the water will look rusty or brown.

Occasionally sediment sticks inside the valve after you drain it, preventing it from resealing tightly. Opening and closing the valve a few times will usually flush the sediment out of the valve. Finally, remember to turn the water heater back on as the last step of the process.

On most water heater models, there is a safety device known as the **temperature-pressure relief ("T & P") valve** located at or near the top. If an excessively high temperature or pressure were to build up in your water heater, this T & P valve is designed to open, relieving the effects of the high temperature and/or pressure and so preventing an explosion. Once a year, test it by pulling up on the handle. If water flows out of the pipe attached to it, then it is functioning properly.

As with the drain valve, sediment may lodge under the valve seat after you test it, preventing it from re-sealing. If this happens, pull on the T & P handle a few times to flush the sediment away. If it still does not seal, call a qualified plumber

immediately to have the T & P valve replaced. **NEVER** cap the discharge pipe of the T & P valve to prevent leakage.

For energy savings and in homes with small children, many consumer safety organizations recommend setting your water-heater thermostat to **120 degrees**. A special word of caution, however: water temperatures below 120°F can enable unhealthy bacteria to grow inside your water heater.

Many homeowners insulate their water heaters, especially if located in the garage. **Insulation kits** designed specifically for this purpose are available. Be careful not to cover up the T & P valve, control panel, or drain. Do not cover the top of a gas-fired unit at all; also keep the pilot light access, air intake and draft diverter free and clear.

A normal 50-gallon capacity water heater can hold approximately 400 pounds of water. If you live in an earthquake zone, **water heater strap kits** are available and in some areas even required, to help stabilize the unit and prevent it from tipping over in the event of a tremor.

Below: A new anode compared to one in use for seven years



Specific to Gas-Fired Water Heaters: Keep the area around your hot-water tank clean and clear of combustibles. This includes accumulations of dust and dirt, paper of any type, and especially any flammable liquids. Paint thinner, cleaning agents, and gasoline are all examples of dangerous liquids which should be poured and stored well away from the water heater. Never set off aerosol bug bombs nearby without first properly shutting off the gas supply and extinguishing the pilot light.

If the water heater is located **in the garage**, raise it so that the pilot light is 18 inches above the floor. This increased height will help prevent the ignition of any gasoline fumes which accumulate near the floor.

If you have any gas-fueled appliance (water heater, furnace, oven, clothes dryer, etc.) in your home, a **carbon monoxide detector** is imperative. The Consumer Product Safety Commission warns that carbon monoxide poisoning kills 200 people each year and causes another 10,000 to need hospital treatment. This odorless, colorless gas is a potential danger with all combustion appliances.

And if you smell gas, get out of the house immediately. Use a neighbor's telephone to call the fire department and the gas company. The slightest spark could cause an explosion. Natural gas is lighter than air and will usually diffuse. Propane is heavier than air and will collect in low areas, such as basements.

Professional Maintenance:

The aforementioned chores are fairly simple to accomplish. Other important tasks, however, require the expertise of a **service professional** (a qualified plumber, heating contractor, or gas company technician).

For gas- and oil-fired water heaters, the **burners** should be cleaned once a year. Have the service professional also inspect the **flues and vents** for cracks or loose connections which could leak deadly exhaust gases.

Perhaps the single most neglected component of your home's water heater is its sacrificial **anode**. The anode is a magnesium or aluminum rod which is suspended inside your steel storage tank. Over time, an electrochemical reaction causes the anode rod to corrode while the steel tank remains intact. If the anode has sacrificed itself completely and there is no metal left, then the electrochemical process attacks the water heater tank itself – it rusts out, and you find yourself in the market for a new water heater!

Instead, have a **qualified plumber** (some localities will require plumbers to be licensed) **replace your anode rod** once every two to five years.

The service life of a T & P valve is usually three years. Even if a T & P valve looks fine from the outside, manufacturers recommend they be removed and visually inspected for accumulations of corrosion deposits. Again, the T & P valve should be replaced only by a qualified plumber.

Finally, a qualified plumber is recommended if your water heater tank is leaking. The average **lifespan** of both electric and gas water heaters is **eight to thirteen years**.

In closing, if your water heater does overheat and your T & P valve is discharging water or steam, the **ONLY** safe intervention is to remove the heat source by cutting off its fuel, if you can. For an electric heater, trip the circuit breaker; for a gas heater, shut off the gas. **NEVER** go near the water heater to try to relieve the pressure yourself. **NEVER** add cool water to the tank. And **NEVER** try to cool it by spraying it with a hose. Call a qualified plumber and allow the water and water heater to cool naturally.

Sources:

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