

Risk Control Bulletin: Water Heater Maintenance and Service



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Electric and gas hot water heaters are often taken for granted and ignored – until the hot water faucet runs cold. And while an absence of hot water may not be a life-or-death risk, heater explosions can be catastrophic. If gas leaks in or around your water heater, the small ignition flame can ignite the gas. Additionally, as the water is heated, pressure builds inside the tank. Normally, water heaters shut off or release this built-up through a safety valve, assuming your heater is in good condition.

Let's look at the few items that, given the attention they deserve, will decrease the cost of ownership by increasing the life of the heater, and doing so in a safe and reliable manner. A good start is to become familiar with the manufacturer's service recommendations either posted on the heater or in the printed instructions that came with the heater.

The problem:

When water is heated within a hot water storage heater, the dissolved solids in water can combine to form deposits and sludge which can adhere to the internal surfaces and settle to the bottom of the tank.

As a result, several factors come into play:

- Decrease in thermal efficiency; increase in energy required
- Reduction of volumetric capacity
- Overheating of the bottom head of the vessel due to the insulating properties of the sediment (for gas fired heaters)
- Corrosion from sediment and deposits trapping oxygen against the tank's steel shell

The solution:

These factors impact the overall life expectancy of the vessel; however, by periodically flushing the tank, the lifespan can be extended considerably.

In an effort to minimize the effects of deposit and sludge formation, qualified personnel following industry accepted procedure should flush the water heater at least once a year. This frequency may need adjusting either way depending on the mineral content of the water supply and thru put.

The problem:

All water heaters are equipped with a safety device known as the temperature-pressure relief valve ("T&P valve"), located on the side near the top or on the top of the heater. Unless this critical safety device is manually tested and exercised at least once a year, there is a very good chance the valve will not open when needed, thus setting the stage for a tank rupture and possible explosion.

The solution:

The valve's over-temperature relief is set to discharge at 210°F with over-pressure relief set at or less than the maximum allowable working pressure (MAWP) of the vessel. If excessive temperature or pressure were to build up in the water heater, the T&P valve is designed to open and discharge until the over-temperature or over-pressure event ceases. This margin of safety minimizes the possibility of a tank rupture.

To avoid the T&P valve from sticking shut, qualified personnel following industry accepted procedures should verify its proper functioning at least once a year.

To prevent accidental scalding from the valve discharge, a full sized discharge pipe must be attached to the outlet of the T&P valve. The discharge pipe should terminate at a safe point. The end of the discharge pipe must never be capped!

Photo source:

T&P valve (top left) – <https://www.waterheaterhub.com/how-to-replace-a-water-heater-pressure-relief-valve/>

Heating Element (top right) – <https://www.youtube.com/watch?v=-IXV-ZSdLYQ>

The service life of a T&P valve is usually around three to five years, depending on the water quality and degree of maintenance. In some cases, a T&P valve will visually appear normal; however, manufacturers recommend they be removed and visually inspected for accumulation of deposits and possible temperature probe damage. Again, the T&P valve should be replaced only by a qualified plumber or as required by your municipality.

The problem:

In locations where water heaters are susceptible to excessive vibration and movement, such as an area where earthquakes are more prevalent, the water heater may require securement to a permanent structure.

The solution:

Water heater strap kits are available. In active locales, straps may be a Building Code requirement. A 50-gallon capacity water heater can hold approximately 400 pounds of water; thus the need to keep the heater stable and upright.

Gas-Fired Water Heaters (Specific Requirements):

Housekeeping around gas-fired water heaters is critical. Combustibles must be kept clear of the burner as accumulations of trash and debris can greatly increase the possibility of a fire. Flammable liquids such as paint thinner, cleaning agents, and fuel must be stored in properly marked and closed containers located well away from the water heater.

Carbon monoxide (CO) is a deadly, colorless, odorless gas produced by the incomplete burning of carbon-based fuels including coal, wood, charcoal, oil, kerosene, propane and natural gas. Around any gas-fired objects (water heaters, hot air furnaces, boilers, etc.), a carbon monoxide detector is vital in detecting and giving early warning of a potential life threatening situation. The Consumer Product Safety Commission warns carbon monoxide poisoning kills 200 people each year and sends another 10,000 to the hospital.

When appropriate, always use professional maintenance or service contractors – a qualified plumber, heating contractor or gas company technician.

For gas-fired appliances such as water heaters, boilers and furnaces, the burners should be cleaned by a qualified service professional at least annually. The service professional should also inspect flues and vents for cracks or loose connections which could allow flue gas to leak into the building creating a potential life threatening situation.

The single most neglected component of a water heater is the sacrificial anode. The anode is a magnesium or aluminum rod which is suspended inside your steel storage tank. Over time, an electrochemical reaction between dissimilar metals submerged in water causes the sacrificial rod to corrode away while the steel tank remains clean and intact. If the anode has sacrificed itself completely and there is no remaining metal, the reaction will attack the steel tank causing corrosion and pinhole leaks.

A qualified plumber (some localities will require plumbers to be licensed) should replace the anode rod once every two to five years.

The anticipated life expectancy of a hot water heater ranges from eight to thirteen years depending on water quality and extent of maintenance. Completing the simple maintenance tasks described above will extend the life of the heater, lowering cost of ownership while maintaining reliability and safety. When the time comes and the heater leaks or does not function as designed, a qualified plumber should be engaged.

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