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Tankless Water Heaters

Tankless water heaters are compact heating units that provide hot water as it is needed, and do not store hot water like traditional tank-type water heaters. When a hot water tap is turned on, water enters the tankless water heater. A sensor detects the water flow, and activates a gas heating device, which quickly raises the water temperature to a preset level. When water flow stops, the heating element shuts off. Thermostatically-controlled tankless water heaters vary their output temperature according to water flow rate and inlet water temperature.

Unlike traditional storage tank water heaters, tankless water heaters do not store a reservoir of hot water. As a result, standby losses are eliminated, which makes them an energy-efficient alternative (EF~0.82 for gas units) to traditional water heating (EF~0.60 for gas units). Tankless units can reduce water heating bills by 10 to 20% – a significant savings for homeowners, considering the average household spends 14% of its energy budget on water heating. Even more efficient condensing models (EF~0.95+) are available now.

Gas tankless water heaters are available in a variety of capacities by numerous manufacturers. In some cases they can be used for supplementary heat, such as a booster to a solar hot water system, but they are primarily meant as the primary source to meet all of a home's hot water needs. The maximum flow rate and temperature rise are determined by the capacity of the heater. In general, gas tankless heaters have larger capacities than their electric counterparts. Residential gas models are available that can heat more than five gallons per minute by 60°F, generally more than enough for two showers to be run simultaneously.

Because tankless heaters do not store water, they are less subject to corrosion than tank-type heaters. As a result, their expected equipment life is longer – more than 20 years, compared with 10 to 15 years for traditional heaters. Also, because they are not under pressure, tankless water heaters are less susceptible to leakage than tank-type water heaters.

Gas tankless water heaters are more expensive than typical tank systems but similar in cost to high efficiency tank systems. Standard tank systems may cost around $300, whereas gas tankless systems may cost closer to $1,000. Electric tankless systems are available, but due to low heating capacity and the higher capacity electrical panel required (high amp draw), these are not recommended. Tankless units are typically installed on the interior, but in climates that are warm year round, exterior installation is possible to minimize the required interior mechanical space.

It would seem that there is no reason not to get a tankless gas water heater. It is true that they can be beneficial, but here are some points to be aware of:

- Tankless water heaters eliminate the standby loss of tank water heaters, but they do not provide hot water any quicker to the faucet. In fact they may take a 5-15 seconds longer

as the unit senses the call for hot water and turns on the burner. But for the most part, the wait time for hot water at a faucet depends on the plumbing design:

  - distance from water heater to faucet
  - insulation level of hot water pipes
  - plumbing configuration (looped, branched, structured, manifold)

- Tankless water heaters require a minimum flowrate of typical 0.5 gpm before they will fire. This is to prevent continual operation in the case of a leak or a faucet not full shut off. With low-flow fixtures/aerators being a commonly implemented water-saving feature, this flow rate may not be met. This can be a concern for 2 knob bathroom sinks if the hot water is turned fully open and for single-lever faucets.

Typical End-Use Flow Rates [gpm]					
End-Use	Bath Sink	Bathtub	Showerhead	Kitchen Sink	Dishwasher
Flow Rate	0.5 – 1.5	2.0 – 4.0	1.5 – 2.5	1.0 – 2.5	1.0 – 3.0

- When operated at the higher temperature settings and the water has a high mineral content, scaling of the low-mass heat exchanger is likely. The heating coils should be flushed with a descaling solution. Refer to the owner's manual for specific maintenance requirements.
- An additional electric connection is typically needed for tankless gas water heaters, so it will not function during power outages like a typical tank gas water heater. There is at least one model that has a hydro-generated ignition (a tiny paddle wheel that generates a spark to ignite the fuel gas and heat the water).
- Venting can be expensive (Category 3 stainless steel) so locate the water heater in as central a location to your faucets as possible, but on an exterior wall to minimize length of the vent pipe.

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