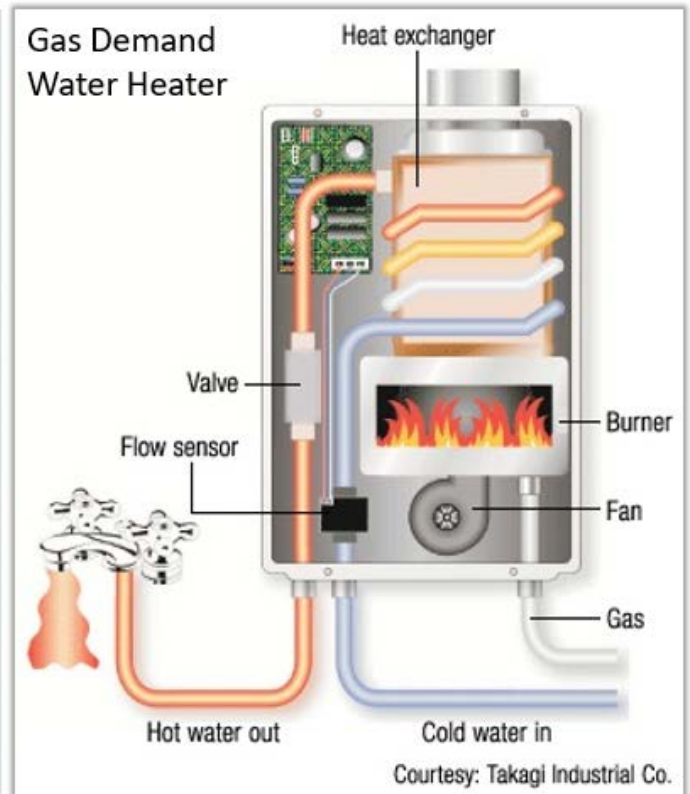
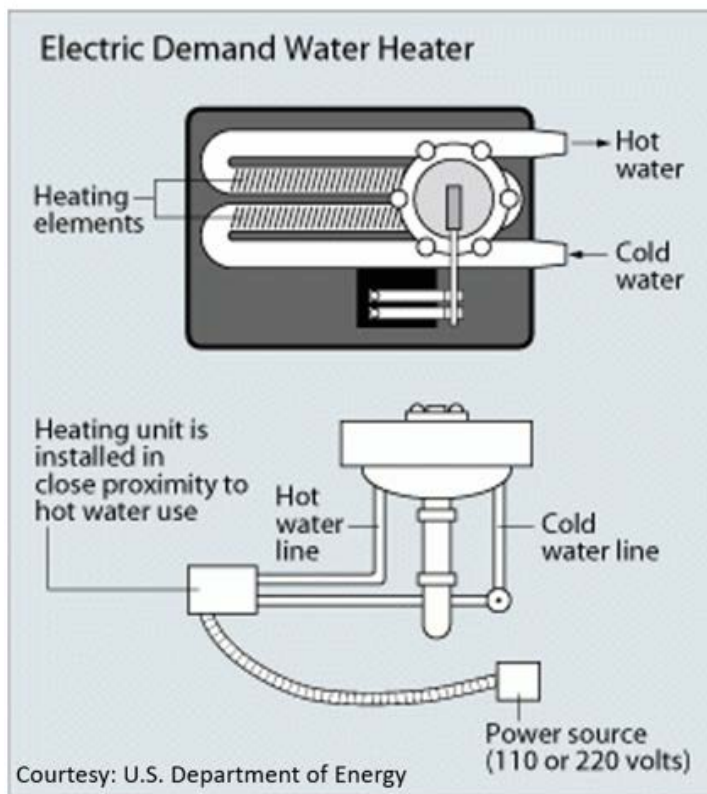




Technical Bulletin: Demand Water Heaters

Demand water heaters—also known as tankless, instantaneous, continuous flow, inline, flash, or instant-on water heaters—are growing in popularity. These water heaters offer numerous advantages over traditional storage water heaters, and are available for all major fuel types: electric, natural gas, and propane. Not only can demand water heaters improve convenience and comfort for the homeowner, they can also make it easier to achieve the HERS Index Target for ENERGY STAR certification. For those reasons and more, now is a great time to consider utilizing this technology in your homes. Here is some guidance that may help you find the right approach.

Sample Configurations for Electric and Gas



About Demand Water Heaters

A demand water heater eliminates the need for a hot water storage tank by heating water 'on-demand.' When

water starts moving within the pipe (i.e., when a user activates a faucet or dishwasher), a heating element or igniter is activated. Cool, ground temperature water flows into the unit and through a heat exchanger, which raises the temperature before exiting toward the fixture or appliance. While demand water heaters vary by fuel type, size, maximum flowrate, and capacity, the fundamental technology is the same for each.

Demand water heaters are more efficient because, unlike storage water heaters, there is no energy wasted on storing large amounts of hot water between uses. This standby time can account for 96% of a storage water heater's operating time each day, which uses a lot of energy.

Considerations and Design

Impact on the HERS Index

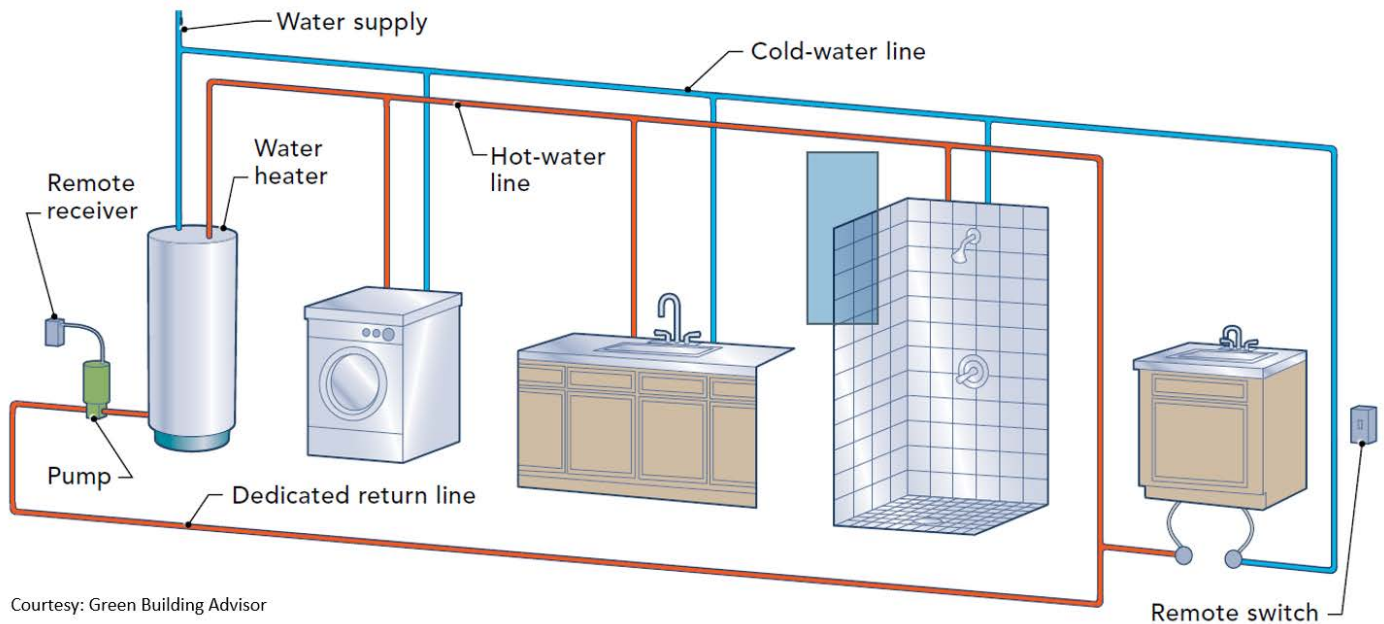
For ENERGY STAR or HERS Rated homes, high performance water heaters help lower a home's HERS Index to meet or exceed the ENERGY STAR HERS Target Index and qualify for utility rebates, where available. Depending on Climate Zone, fuel type, and capacity, a demand water heater can save approximately 3-7 HERS Index points.

Capacity and Peak Demand

Selecting the right capacity water heater is critical to performance and occupant comfort. A few best practices are to: 1) reduce demand on the water heater by installing low-flow fixtures and efficient appliances, and 2) calculate peak demand when all appliances and fixtures are firing to inform which size water heater to choose. While the capacity of storage water heaters is based on the number of gallons that fit in the tank (e.g., 40, 50, or 75-gallon), tankless models are rated by how many gallons of hot water they produce per minute (GPM). Note that output capacity is partly determined by the groundwater temperature, so colder climates generally require higher-capacity water heaters. It is best to consult with an experienced plumber to select an appropriately sized water heater.

Fixture Distance, Flow, and Temperature

Depending on the diameter and length of the hot water supply line to the farthest fixtures in the house, a large amount of hot water can get stuck between the water heater and the point of use, cool down, and eventually get wasted down the drain the next time a user runs the hot water (e.g., waiting for a shower to warm up). The longer the distance, the longer the wait time to reach the desired temperature, which is why it is better to run shorter plumbing lines when possible.



Courtesy: Green Building Advisor

For far-flung fixtures, a small, individual tankless water heating unit, called a [Point of Use System](#), can be installed near the fixture. Continuous circulating systems, which constantly pump hot water through a home's pipes to keep the lines warm at all times, should be avoided because they require continuous firing of the water heater. This practice negates the energy-saving benefits of a tankless unit and shortens a water heater's lifespan. Instead, use a push-button [Demand Circulating Pump](#) with a temperature-sensing shutoff.

ENERGY STAR Certified Demand Water Heaters (Gas only)

Compared to a standard gas storage model, ENERGY STAR certified demand water heaters can save a family of four an additional \$95 per year on gas bills, or \$1,800 over the unit's lifetime. Additionally, the life expectancy for demand water heaters is [20 years](#), which is much longer than that of conventional storage water heaters. Learn more about ENERGY STAR water heaters in the links below.

Learn More About Demand/Tankless Water Heaters

- [Whole-home tankless gas water heater guidance](#)
- [Rebate Finder tool](#)
- [Product Finder for brand and purchasing guidance \(gas only\)](#)
- [ENERGY STAR certified water heater key product criteria](#)
- [Point-of-use tips](#)
- [U.S. Department of Energy \(DOE\) guidance on selecting a new water heater](#)
- [DOE guidance on tankless water heaters](#)
- [DOE guidance on estimating water heater cost and efficiency](#)

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