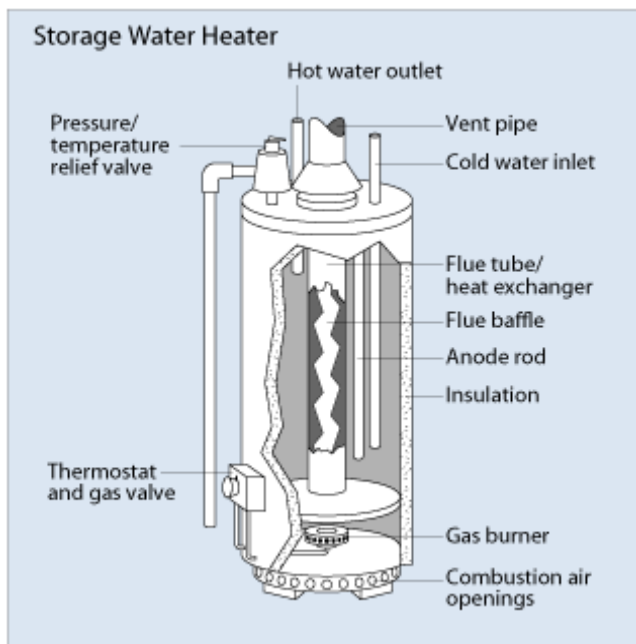


An E-Book from Remodelingonthemoney.com

The demand for “demand” water heaters....

Demand -- tankless or instantaneous -- water heaters provide hot water only when needed. That is a major advantage over “storage” water heaters, which waste lots of energy, and money. In this “e-book,” you'll find basic information about how demand heaters work and how to choose the best model for your home.

Information was provided by the manufacturers listed, and government sources.



Source: U.S. Department of Energy

The old way....

The reservoir for the traditional storage tank heater ranges from 20 to 80 gallons of hot water. When you turn on the hot-water faucet, hot water is released from the top of the tank. To replace that water, cold water enters the bottom of the tank, so that the tank is always full.

These heaters use natural gas, propane, fuel oil and electricity as fuel. A gas burner under the tank heats the water. A thermostat opens the gas valve as the water temperature falls. When the temperature rises to the thermostat's set-point, the valve closes.

50-gallon



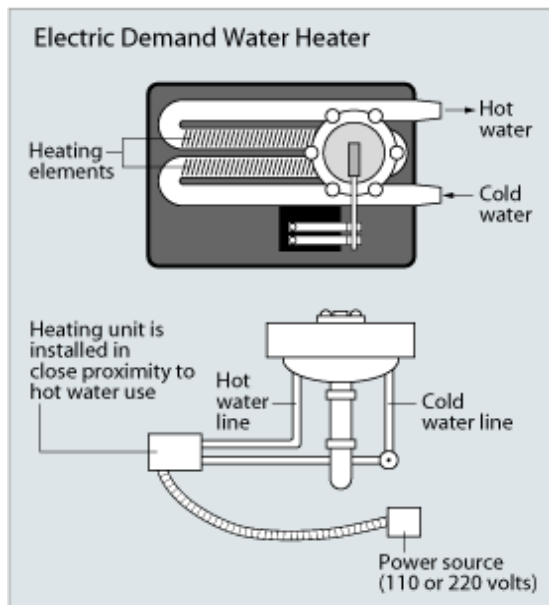
Gas-fired

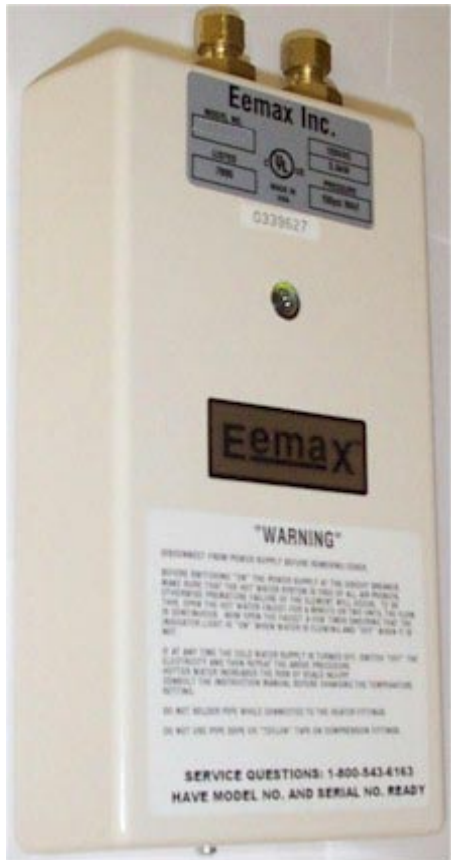
Oil-fired water heaters have power burners that mix oil and air in a vaporizing mist, ignited by an electric spark. Electric water heaters have one or two electric elements, each with its own thermostat. With two electric elements, a standby element at the bottom of the tank maintains the minimum thermostat setting while the upper demand element provides hot water recovery when demand heightens.

Because water is constantly heated in the tank, energy can be wasted even when a hot water tap isn't running. This is called *standby heat loss*. There are some models with heavily insulated tanks, which significantly reduce standby heat losses, lowering annual operating costs. Look for models with tanks that have a thermal resistance (R-Value) of R-12 to R-25.

Gas and oil water heaters also have venting-related energy losses, according to the U.S. Department of Energy. Two kinds of standby heaters—a fan-assisted gas water heater and an atmospheric sealed-combustion water heater—reduce these losses.

The fan-assisted gas water heater uses a draft-induced fan that regulates the air that passes through the burner, which minimizes the amount of excess air during combustion, increasing efficiency. The atmospheric sealed-combustion water heater uses a combustion and venting system that is totally sealed from the house.





Tankless heaters from Eemax and Tempra

The newer way...

Demand heaters are rated by the maximum temperature rise possible at a given flow rate. To size a demand water heater, determine the flow rate and the temperature rise you'll need for its application, whether it is the entire house or just a sink in a second-floor bathroom.

Start by listing the number of hot-water devices that you expect to use; then add up their flow rates, which are measured in gallons per minute, for the desired flow rate you'll want for the demand water heater.

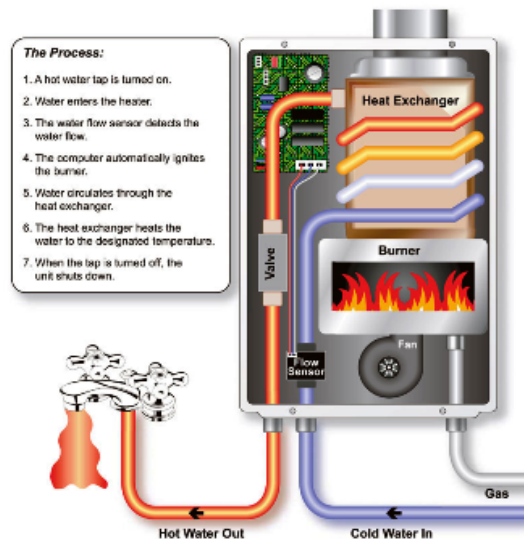
For example, you expect to simultaneously run a hot water faucet with a flow rate of 0.75 gallons (2.84 liters) per minute and a shower head with a flow rate of 2.5 gallons (9.46 liters) per minute. The flow rate through the demand water heater would need to be at least 3.25 gallons (12.3 liters) per minute. To reduce flow rates, install low-flow water fixtures.

To determine temperature rise, subtract the incoming water temperature from the desired output temperature. Unless you know otherwise, assume that the incoming water

temperature is 50°F (10°C). For most uses, you'll want your water heated to 120°F (49°C). In this example, you'd need a demand water heater that produces a temperature rise of 70°F (21°C) for most uses. For dishwashers without internal heaters and other such applications, you might want your water heated at 140°F (60°C). In that case, you'll need a temperature rise of 90°F (32°C).

Most demand water heaters are rated for a variety of inlet temperatures. Typically, a 70°F (21°C) water temperature rise is possible at a flow rate of 5 gallons per minute through gas-fired demand water heaters and 2 gallons per minute through electric ones. Faster flow rates or cooler inlet temperatures can sometimes reduce the water temperature at the most distant faucet. Some types of tankless water heaters are thermostatically controlled; they can vary their output temperature according to the water flow rate and

How Does a Tankless Water Heater Work?



inlet temperature.

When a hot water tap is turned on, cold water travels through a pipe into the unit. Either a gas burner or an electric element heats the water. As a result, demand water heaters deliver a constant supply of hot water.

Typical Flow Rates in Gallons per Minute (gpm)							
Fixture Type	Lavatory	Bathtub	Shower	Kitchen Sink	Pastry Sink	Laundry Sink	Dish-washer
Flow Rates	0.5	2.0 – 4.0	1.5 – 3.0	1.0 – 1.5	1.5 – 2.5	2.5 – 3.0	1.0 – 3.0

Typically, demand water heaters provide hot water at a rate of 2 to 5 gallons (7.6 to 15.2 liters) per minute. Gas-fired demand water heaters produce higher flow rates than electric ones. Sometimes, however, even the largest, gas-fired model cannot supply

enough hot water for simultaneous, multiple uses in large households. For example, taking a shower and running the dishwasher at the same time can stretch a demand water heater to its limit. To overcome this problem, you can install two or more demand water heaters, connected in parallel for simultaneous demands of hot water. You can also install separate demand water heaters for appliances—such as a clothes washer or dishwasher—that use a lot of hot water in your home.

Other applications for demand water heaters include remote bathrooms or hot tubs; booster for appliances, such as dishwashers or clothes washers; or a booster for solar hot water heating system.

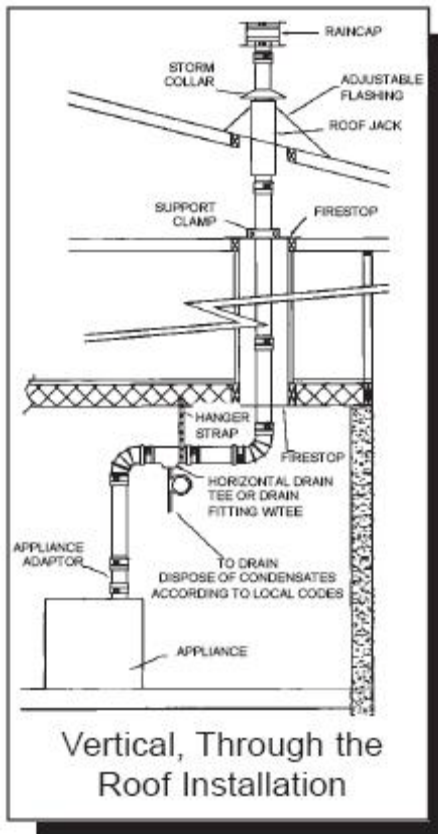
Although gas-fired demand water heaters tend to have higher flow rates than electric ones, they can waste energy if they have a constantly burning pilot light. This can sometimes offset the elimination of standby energy losses when compared to a storage water heater.

For homes that use 41 gallons or less of hot water daily, demand water heaters can be 24 percent to 34 percent more energy efficient than conventional storage tank water heaters. They can be 8 percent to 14 percent more energy efficient for homes that use a lot of hot water -- around 86 gallons per day. You can achieve even greater energy savings of 27 percent to 50 percent if you install a demand water heater at each hot water outlet.

In a gas-fired storage water heater, the pilot light heats the water in the tank so the energy isn't wasted. The cost of operating a pilot light in a demand water heater varies from model to model. Ask the manufacturer how much gas the pilot light uses for the model you're considering. If you purchase a model that uses a standing pilot light, you can always turn it off when it's not in use to save energy. Also consider models that have an intermittent ignition device (IID) instead of a standing pilot light. This device resembles the spark ignition on some gas kitchen ranges and ovens.



How gas-fired demand heaters look and operate.....



Demand water heaters cost more than conventional storage water heaters. However, you may find that a demand water heater may have lower operating and energy costs, which could offset its higher purchase price.

Before buying a demand water heater, you also need to consider size, fuel type and availability, energy efficiency and estimated costs.

Fuel

The choice is between the electric heater models include Eemax or Stiebel Eltron or gas-fired such as like Rheem.

If you plan to purchase an electric heater, you must consider the electrical requirements, including voltage, amperage and circuit breaker.

Voltage: Many retailers sell units that will accommodate 110V, 120V, 208V, 220V, 240V, and 277V.

Amperage: Different heaters will have various requirements in amp draw. You will want to ensure that you can support the electrical demands of your heater.

Circuit breaker: You must ensure that you have a circuit or circuits that will support your heater. It may be necessary to put your heater on its own circuit or circuits. You should consult with a qualified, licensed electrician for more information.

If you plan to purchase a **Gas-Fired heater**, consider the gas-type and venting requirements:

You'll need to identify whether your gas type is natural or propane. It is imperative that you examine your current gas line to ensure that it will meet the requirements of your new gas-fired heater. The requirements may exceed that of your existing tank-style water heater.

Next, you will need to consider venting. There are a few important things to keep in mind when purchasing the venting accessories for your heater.

Be sure that you purchase Category III stainless steel (UL1738 certified) venting for your heater. Check local building code to ensure that your specific needs will be met.

Many manufacturers offer gas venting kits, but it is recommended that customers evaluate the needs of their specific installation to ensure that they will be getting all of the necessary gas venting accessories. Depending on where you will be installing the heater, a pre-made kit will probably not meet your needs. Ensure that you measure out the vent route and consider where the discharge will go through the wall or ceiling, consider the

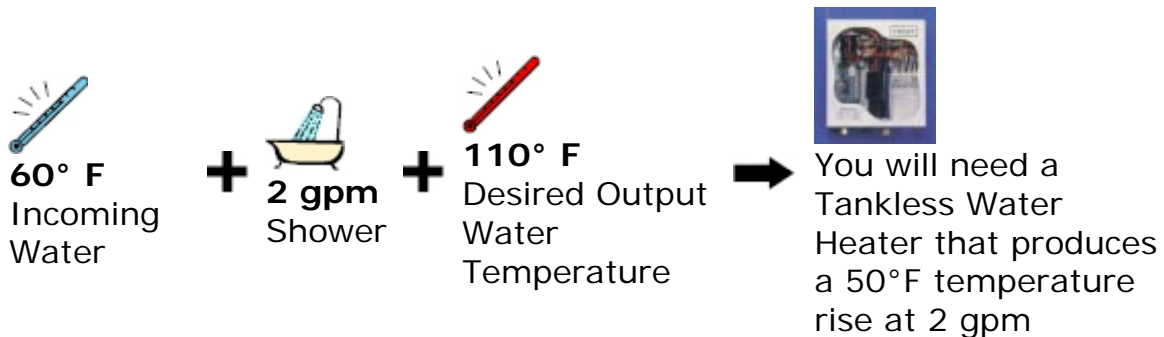
necessary clearances, and consider ample access to air for combustion, then buy the appropriate gas venting pieces.

Gas-fired heaters may still require a minimal electrical connection. Be sure to review installation requirements for the units you are considering for purchase.

You should look at your ambient incoming water temperature.

If you live in a cold climate, like New York, your incoming water temperature will likely be much lower than if you live in a warm climate, like Florida. Your best bet is to find out how much temperature rise you will need in order for your hot water to reach the desired heat. If the ambient incoming water temperature for your shower is 65°F, you are using a 2.0 gallons per minute shower, and you want to raise that temperature to 115°F, you will want to look for a heater that will provide at least a 50°F temperature rise at 2.0 gallons per minute ($115^{\circ}\text{F} - 65^{\circ}\text{F} = 50^{\circ}\text{F}$).

However, if you anticipate additional simultaneous demand, such as the hot water from a sink being used while someone is showering, you will need to add the sink's gpm to the shower's gallons per minute to determine your overall gpm demand and then find the temperature rise necessary to meet your overall needs.

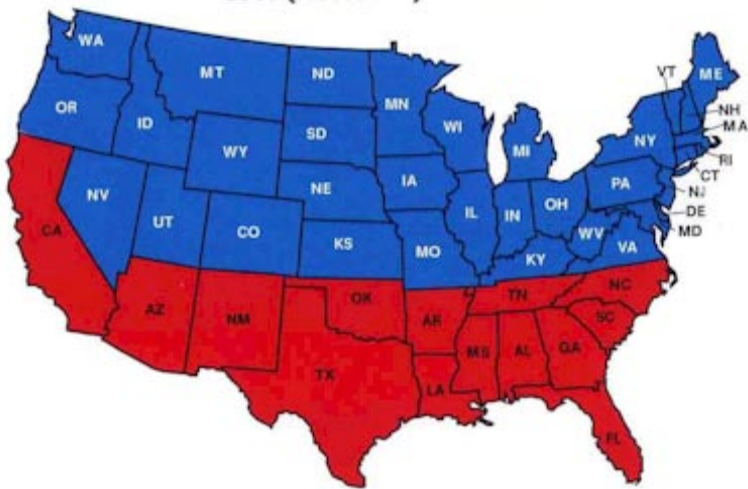


Proper installation and maintenance of your demand water heater can optimize its energy efficiency. Proper installation depends on many factors. These factors include fuel type, climate, local building code requirements, and safety issues, especially concerning the combustion of gas-fired water heaters. Therefore, it's best to have a qualified plumbing and heating contractor install your demand water heater.

If you're determined to install your water heater yourself, first consult the manufacturer. Manufacturers usually have the necessary installation and instruction manuals. Also, contact your city or town for information about obtaining a permit, if necessary, and about local water heater installation codes.

Most tankless water heaters have a life expectancy of more than 20 years. They also have easily replaceable parts that extend their life by many more years. In contrast, storage water heaters last 10 to 15 years. Periodic water heater maintenance can significantly extend your water heater's life and minimize loss of efficiency. Read your owner's manual for specific maintenance recommendations.

Cool (Northern) Climate



Warm (Southern) Climate

After your demand water heater is properly installed and maintained, try some additional energy-saving strategies to help lower your water heating bills. Some energy-saving devices and systems are more cost-effective to install with the water heater.

Be sure your contractor first consults the manufacturer's installation and instruction materials. Manufacturers

usually provide the necessary installation and instruction manuals with the product. Your contractor should also contact your municipality for information about obtaining a permit, if necessary, and about local water heater installation codes.

Check out these brands by going to their Web sites

Top Tankless Water Heater Brands

1 Bosch



2 Rinnai



3 Noritz



4 Paloma



5 Rheem



6 Titan



7 Takagi



8	Powerstar	
9	Eemax	
10	Seisco	

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