

## **The Truth about Tankless Water Heaters**

*Courtesy of the Cooperative Research Network*

Many homeowners have seen advertisements for tankless water heaters. The ads promise big savings. But are they accurate?

Unlike a traditional water heater, a tankless model does not store hot water. It heats water only as it is used. One or a series of heating elements within the water heater is activated when a hot water faucet or valve is opened. The unit heats the water as long as the faucet or valve is open. When it is closed, the tankless unit stops heating the water.

Companies that make tankless water heaters generally cite four advantages the design has over a tank-type water heater:

- Unlimited (continuous) supply of hot water
- Instantaneous hot water if installed at point of use
- Reduced water-heating costs
- Small amount of space required for installation (usually wall-hung)

It is true that tankless water heaters do not require a lot of space. A large unit requires an area no larger than 24 inches square, and extends from the wall about 8 to 10 inches. But what about the other three claims?

### **Is It Realistic To Expect ‘Unlimited’ Hot Water?**

An unlimited supply of hot water may sound appealing, but it is not compatible with responsible water use, particularly in those areas of the country suffering from drought or chronic water shortages. Moreover, even the largest whole-house unit may not

supply enough hot water for simultaneous, multiple uses. Such a unit may be able to supply only two showers simultaneously or perhaps one shower, a dishwasher, and a sink. If the users demand too much water, the temperature will drop. A tankless system probably won't meet the needs of a large family.

Water temperature rise will be determined by the kilowatt capacity of the heating unit, the water flow, and the temperature of the incoming water.

As the incoming water temperature drops, or as the volume of water moving through the heater increases, the temperature of the heated water will correspondingly decrease. The water temperature depends on the volume coming out of the faucet. If you turn on the faucet only enough for a trickle of water, it will be cold. If you open the faucet further, you will trigger hot water—the hottest you'll ever get. If you open the faucet to maximum, the temperature will drop back a bit. If you open more than one faucet the water temperature should drop even more.

### **Home's Electric Service May Need to be Upgraded**

Tankless electric water heaters usually require an upgrade in electrical service, something the home improvement stores often do not mention.

A tank water heater with 4,500-watt elements operates on #10 wire and a 30-amp circuit breaker. One whole-house tankless water heater has four 7,000-watt elements for a total electrical load of 28,000 watts. This load requires wire and a circuit breaker that will handle at least 120 amps, at a cost many times that of electrical service to a conventional tank water heater. The load will also necessitate a larger and more expensive meter loop and main panel for the house. In some cases, the customer also must pay for wiring

between the distribution transformer in the neighborhood and the electric meter. You may need to check with a licensed electrician or your electric service provider to determine if your home needs to be upgraded.

Consumers who want to replace an existing conventional water heater with a tankless unit or add a tankless unit in a home-remodeling project will incur initial installation costs much greater than for installations in a new home.

When a high amperage load comes on, voltage levels can be significantly affected. If a tankless water heater is installed in an existing home without upgrading the electrical service, low voltage or sudden voltage drops are likely to result in dimming lights, blinking lights, and other problems. Some co-op customers are complaining about blinking lights after reportedly connecting 28-kW tankless units in homes with 150-amp services on 10-kW transformers.

### **Gas Tankless vs. Electric Tankless**

Gas tankless water heaters generally do not require upgrades to a home's basic services as an electric tankless water heater does. However, the same considerations must be made when determining how many hot water faucets will be turned on at any given time and how far away the tankless heater is from sinks and showers that will be using the water.

It should be noted that gas tankless water heaters are Energy Star qualified and may qualify for a federal tax credit in 2009. However, being Energy Star labeled does not mean that traditional electric water heaters are not efficient. In order to determine if a product meets Energy Star guidelines the program looks at the products potential to be

improved. High efficiency electric storage water heaters are close to being 100 percent efficient and cannot be substantially improved going forward.

### **Picking the Right Water Heater**

Consumers looking for an efficient water heater should consider a traditional storage electric water heater that is heavily insulated. These water heaters are often the most cost effective option over the life of the water heater.

If consumers want to reduce their water heater energy costs, there are several ways to do so. According to a report by Oak Ridge National Laboratory, measures such as tank insulation, temperature setback, timers, heat traps, and low-flow shower heads are more practical, much less expensive, and have a greater return on investment than installing a tankless water heater in an existing home with a conventional water heater.

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*The Cooperative Research Network monitors, evaluates, and applies technologies that help electric cooperatives control costs, increase productivity, and enhance service to their consumers.*