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Abigail Daken  
Energy Star Water Heater Program Manager  
U.S. Environmental Protection Agency

Dear Ms. Daken,

Comments on the EPA Product Specification Framework for Energy Star Water Heaters

Follow-up to Webinar

1. Do after market devices include retrofit, end-of-the-line hot water pumping devices or standard recirculation systems? As discussed in the webinar, the short answer was that they were not included in the draft framework. However, point-of-use water heaters are included in the framework, the idea, at least in part, being to locate the water heater closer to the hot water fixtures in order to reduce the amount of water, energy and time wasted while waiting for hot water to arrive.

Waiting for hot water to arrive is one of the most common complaints that consumers want to resolve. When gas tankless water heaters first came onto the market consumers were told that they were instantaneous, which legally, they were, and that they would get hot water instantly if they installed one. However, the legal category of instantaneous water heaters did not contain a single water heater that in fact released hot water the moment the tap was turned on. Instead, all of the water heaters needed to ramp up to temperature, a process that takes from 10 to more than 60 seconds depending flow rate and temperature rise. Rather than getting hot water more quickly, it now took longer to get the hot water. The market was confused and frustrated.

It is only possible for tankless water heaters, regardless of fuel type, to waste less water delivering hot water than a storage water heater if the tankless water heater is installed closer to the fixtures than the amount of water that runs through it while it ramps up to temperature. Assuming a flow rate of 2 gpm and 15 seconds to ramp up, this means that it must be located at least 0.5 gallons

closer to all fixtures it is going serve. This is equivalent to roughly 20 feet of 3.4 inch piping.

There are other devices that can solve the water and associated wastes. The most common of these is a circulation pump. In new construction, one or more circulation loops are installed in a home and the supply portion of the loop is located so that the volume from the loop to all fixtures is small, ideally less than 2 cups or roughly 10 feet. The standard loop has a small pump which is often set to run 24/7 in order to provide the convenience of hot water arriving quickly at any time. This is costly in terms of energy, not so much for the pump, but due to the heat loss in the loop. Timers and aquastats or combinations of the two can be used to reduce the hours of operation to better match the hours of hot water use and reduce the energy consequences. A much more efficient option than any of these is to install a demand-controlled pump that is activated shortly before hot water is desired.

There are end-of-line pumps and controls that can be installed in retrofit applications where it is prohibitively expensive to install a dedicated return line in the plumbing. All of these devices use the cold water line as a temporary return back to the water heater. They have similar control strategies to those used in new construction, with similar energy impacts. As above, demand-controlled retrofit pumps are by far the most energy efficient.

Still another option is to install electric heat trace on the piping. It is generally only an option in new construction or major renovation, as it requires access to the piping. Energy impacts for just maintaining temperature in the supply portion of the trunk line are similar to running a circulation loop less 3 hours a day, while providing the convenience of hot water all day long. In addition it is possible to trace the pipe all the way to the fixture, in which case the energy impact is similar to a circulation system operating 6 hours a day, reducing the waste of water and time still further.

A document is attached that goes into more detail about the options discussed above.

2. We need to be very careful with our naming of the categories. Water heaters of any size or type can be used for a whole home or point of use. Please do not skew the market's understanding by selecting potentially misleading names. Point-of-Use is about location of the water heater relative to the fixtures, not about the size of the water heater. Point-of-use should be based on the volume between the water heater and all of the fixtures it serves. In my opinion, POU should mean that the volume in the pipe is less than 0.25 gallons.
3. There are very few contractors who are truly familiar with any high efficiency product, tankless or condensing. Most of them have not done enough jobs to have fully climbed the learning curve related to the installation and maintenance

of the new products.

4. What we really want is for consumers to climb the efficiency curve, regardless of volume in the water heater. What Energy Star should be promoting are water heaters with high thermal efficiency when in use; low standby losses (thermal and controls) when off; and low cycling losses when transitioning between the two states.

In addition, the water heaters should be connected to hot water distribution systems that are energy, water and time efficient. This means locating water heaters closer to fixtures and planning the plumbing to provide hot water within a very short time, say less than 5 seconds whenever it is desired.

It seems like it is necessary to coordinate the Energy Star Water Heater (product) program with the Water Sense Faucets and Showerheads (product) program with the Energy Star for Homes and Water Sense for Homes (system) programs. Right now they have provisions that give consumers conflicting messages and this needs to be fixed.

5. To industry and water heater manufacturers' comments on applicability of the program. Water heaters are only one part of the hot water system. Water heater manufacturers only want to give Energy Star value to their products, but water heaters are not the only way to improve the hot water system. Only providing Energy Star designation to the water heater skews the market and does not give consumers the correct signals on higher efficiency options.
6. The discussion of liability with respect to manufacturers providing information to EPA on Energy Factor for products outside the legal classification was very enlightening. I agree with the industry perspective on liability. An alternative is for EPA to take the thermal efficiency and standby loss numbers and estimate an EF. Manufacturers should not be liable in this case, as they are not providing the information or making the claim in their literature.
7. We need to be careful of how we distinguish the water heaters in the Energy Star program. Both residential and commercial applications can use water heaters of a wide variety of sizes and types. However, it is not likely that water heaters with a storage volume larger than 119 gallons will rarely be used in residential applications. Heat rates of more than 200,000 Btu/hour or 58 kW are also unlikely to be used in most residential applications.

Sincerely,

  
Gary Klein  
Managing Partner