Straight Talk About "On-Demand" Tankless Water Heaters

With the introduction of the Aurora™ On-Demand Tankless Gas Water Heater, State provides its customers with a product that has genuine merit for certain applications. We believe, however, that tankless water heaters are a "niche" product, not a practical alternative to storage-type water heaters to serve the whole-house needs of most modern homes.

Aurora's initial offering consists of the model GAX19400 (Natural and Propane). This is a wall-hung, indoor or outdoor small-size tankless unit, with modulating inputs from 25,000 to 194,000 BTU, and hot water delivery as follows…

- 6.3 Gallons per Minute at 45ºF Rise
- 4.0 Gallons per Minute at 77ºF Rise
- 3.1 Gallons per Minute at 100ºF Rise

Our major tank-type competitors (Rheem and Bradford-White) are also marketing small-size tankless units with comparable inputs and deliveries. At this point, only "tankless-only" manufacturers (including Bosch, Noritz, Rinnai and Takagi) are manufacturing larger units with maximum inputs as high as 380,000 BTU.

The tankless-only manufacturers have gone to great lengths to promote the positive attributes of this technology. However, in many cases, they make "tankless versus tank-type" performance comparisons based on obsolete tank-type units that are significantly less efficient than today's "NAECA 2004" models.

Because it is an unfamiliar technology to most people, your customers will surely have many questions about tankless water heaters. We've prepared the following "Q&A" to help you answer most of the questions associated with On-Demand Tankless Water Heaters.

Q. What is a tankless water heater?

A. "Tankless" is the most commonly used term, but it's really more accurate to think of Aurora and other water heaters in this class as "On-Demand Water Heaters". They only operate and use energy when hot water is "demanded" anywhere in the system.

Q. How do on-demand tankless water heaters work?

A. On-demand water heaters can be installed so they deliver hot water to just one fixture (such as a shower valve) or to multiple fixtures. When hot water is demanded, cold water flows into the on-demand water heater's copper heat exchanger where it is "instantly" heated by a built-in burner.

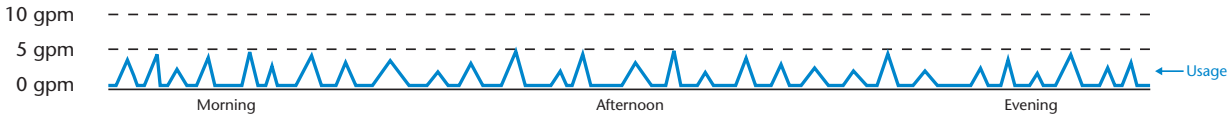
Unlike tank-type gas water heaters, which operate at a constant input rate, most tankless gas water heaters operate with "modulating input". Gas input to the burner fluctuates depending on the "on-demand" water heating need. As mentioned, Aurora model GAX19400 gas input "modulates" from a minimum of 25,000 BTU to a maximum of 194,000 BTU.

Q. How does an on-demand tankless water heater differ from a tank-type water heater?

A. As the name implies, an on-demand tankless water heater has no tank to store hot water. It can deliver a steady, continuous stream of hot water "on demand" up to its maximum rated output. But, if demand suddenly spikes and exceeds maximum output (such as by multiple hot water fixtures operating simultaneously), a tankless heater will be unable to meet the need.

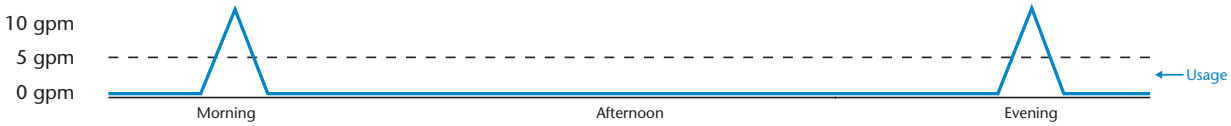
A tank-type water heater, on the other hand, is designed to handle large "peak-demand" spikes from multiple-fixture demand, which is the usage pattern of most American families. Here are three ways to visualize usage patterns and how they relate to tank-type and tankless water heaters.

1. "OCCASIONAL" HOT WATER USAGE



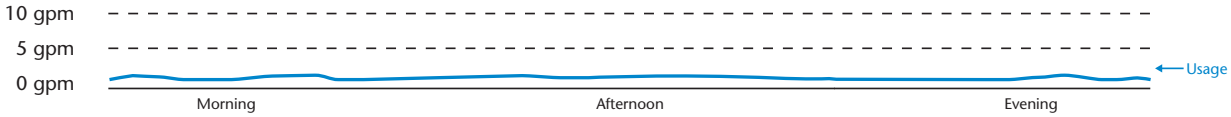
Occasional usage is somewhat unusual. It represents short to medium-length periods of no demand, with small demand spikes at intervals throughout the day. As an example, in an "occasional" household, one person would take a shower at 7:00 am, the next person at 9:00 am, followed by washing clothes at 11:00, and so on throughout the day. Either a tank-type or most tankless water heaters can manage this usage pattern.

2. "HEAVY PEAK DEMAND" USAGE



Most American homes follow this usage pattern, with a high demand for multiple showers or baths during a 60-90 minute period in the morning, followed by another heavy-demand period in the evening for washing dishes and evening showers and baths. A tank-type water heater is ideally suited for this usage pattern, because of its ability to deliver a large volume of stored water and then recover to heat additional water to provide a high first-hour rating.

3. "STEADY STREAM" USAGE



This is another unusual scenario, where hot water demand is fairly constant and the volume of hot water required, gallons per minute (GPM), is consistent. Here, a tankless water heater seems the ideal solution, as long as its GPM capacity is equal to or greater than the demand. In reality, a typical tank-type water heater can also handle a moderate level of "steady stream" hot water demand throughout the day.

Q. Are on-demand tankless water heaters more energy-efficient than tank-type water heaters? Does it cost less to heat water with tankless than with tank-type?

A. Yes, on-demand tankless water heaters use less energy than tank-type units. The State Aurora has an energy factor of .78, compared to energy factors ranging from .53 to .63 on State tank-type gas units.

We've seen some very dramatic claims by "tankless only" manufacturers, including "save up to 67% on hot water". In reality, however, translating a higher energy factor into actual savings on fuel bills for the consumer depends on many factors, including the size and hot water output of the tankless and tank type heaters being compared, and local utility rates.

Consumers considering replacing a tank-type water heater with an on-demand tankless unit for "whole house" water heating should very carefully balance the long-term energy-saving/money-saving potential of tankless against two important concerns...

- How much does a tankless water heater cost?
- Can an on-demand tankless water heater meet the entire hot water demand of a home?

Q. How much do tankless water heaters cost?

A. This requires a two-part answer, taking into account the purchase price of the water heater and the installation costs.

First, the "initial cost" of buying an on-demand tankless water heater is almost always higher than a tank-type and significantly higher in the case of larger, higher-output units. As an extreme example, the largest and most powerful tankless heater we've seen on the market carries a MSRP of nearly $4,000.

Installation costs for tankless water heaters are also higher than tank-type units, particularly in retrofit situations, when a tankless unit is being installed to replace an existing tank-type unit. Because of their high inputs, larger tankless heaters require 4" to 7" diameter power venting, which requires electrical power. Since most tank-type gas heaters have a 3" flue and require no power, there are usually conversion costs associated with installation of a larger flue and the necessary electric power. The materials and labor costs for venting will also usually be higher with a tankless unit. In addition, because of their high maximum gas inputs, tankless installation often requires retrofit installation of a larger gas line.

Q. Can an on-demand tankless water heater meet the entire hot water demand of a home?

A. Theoretically yes. There are, however, many variables to consider, including:

- The flow rate of water through the unit, in gallons per minute, or GPM
- The minimum and maximum BTU input of the unit
- The incoming water temperature, and temperature rise required to heat water to the desired outlet temperature
- The total daily hot water demand and usage pattern of the home (as discussed above)

Bottom-line, there are tankless water heaters on the market, with maximum inputs as high as 380,000 BTU and flow rates as high as 13.2 GPM at 45ºF temperature rise. And, depending on the make and model, two or more tankless heaters can be installed together in a manifold arrangement, which multiplies output dramatically.

So individual heaters at the upper end of the tankless output scale or multiple tankless heaters installed together could indeed provide hot water to satisfy large hot water demands, but such installations are impractical for most residential applications.

Also, you should be aware that in promoting their product, most tankless manufacturers feature a GPM output figure based on the lowest possible temperature rise. For example, Rinnai claims that its "Continuum" tankless heater *"provides never-ending hot water to households 24 hours a day at the rate of up to 8.5 gallons per minute."* What Rinnai does not mention is that 8.5 gallon delivery rate is based on 45ºF temperature rise. At 77ºF rise Continuum delivery drops to 4.26 GPM and down to 3.2 GPM at 100ºF rise.

Q. Space-savings is another frequently made claim for on-demand tankless water heaters. Is this a legitimate benefit?

A. Yes, on-demand tankless water heaters are generally smaller than tank-type water heaters Our Aurora unit measures just 23.6" high x 13.8" wide x 9.4" deep. Additionally, they are designed for wall mounting, and many (including Aurora) can be installed outdoors. An optional Remote Control module is also available with Aurora, which can be easily installed in a location remote from the water heater, for easy monitoring of the thermostat setting and temperature adjustment.

It's important to note, however, that with gas inputs modulating up to 194,000 BTU on Aurora, and as high as 380,000 BTU on some other units, proper ventilation and combustion air are extremely important with tankless heaters. They should not, for example, be installed in a confined area such as a closet.

Combustion air requirements, clearances to combustibles, doors, windows and other important installation concerns are covered in the Aurora Owner's Guide and installation manual.

Q. What are the best applications for on-demand tankless water heaters? In other words, when is tankless the best choice?

A. This is another multi-part answer…

- **Residential new construction.** Installation of tankless heaters is less of a problem here, since the necessary venting, gas lines and other tankless requirements can be built into the plans for the home. However, because most builders want to keep the cost of their homes as low as possible, the initial price of tankless water heaters will be a significant obstacle. We don't see on-demand tankless as a saleable proposition for residential new construction, except for high-end custom homes, where the builder and/or homeowner can handle the expense of installing multiple tankless units.
- **Residential "Repair and Replacement".** We've already discussed the high cost of purchasing and installing an on-demand tankless water heater to replace an existing tank-type heater. In our view, most homeowners have been and will continue to be satisfied with the performance of a tank-type water heater. It is likely that the "downstream" claims of tankless manufacturers will persuade most consumers to pay extra for a technology that is not really in tune with American lifestyles.
- **Residential Remodeling.** This is the primary niche for on-demand tankless water heaters, and particularly for the State Aurora model GAX19400. Aurora should be positioned as a point-of-use water heater serving low to medium demand applications or individual fixtures such as a shower or whirlpool tub or as a supplemental hot water source to the home's primary tank-type water heater for room additions and other major kitchen or bath remodeling projects that significantly increase hot water demand. Aurora should only be considered as a "whole house" water heating option for very small homes or apartments with low hot water demand. Vacation homes or cottages are ideal for this product, as well.

Q. Does State plan to expand its line of tankless water heaters in the future?

A. As we've said, we believe on-demand tankless water heaters occupy a niche within the total universe of water heaters. It is true that tankless heaters have strong market penetration in Europe, Asia and other parts of the world. But so far, tankless still represents a very small portion of total U.S. water heater sales. Once again, our initial tankless offering, Aurora, is definitely not to be positioned as a "whole house" water heater. It is intended for point-of-use or "supplemental"applications, which is where we believe tankless technology is most viable.

We will, however, continue to assess the ever-changing water heating landscape, and we will not hesitate to expand our on-demand tankless offering if we determine customer demand and market conditions justify it.

Q. How is the State Aurora different from or better than competitive on-demand tankless water heaters.

A. The tankless water heater market is very crowded, with numerous brands competing for a relatively small unit sales volume. The fact is that the basic technology of tankless gas water heater design does not vary greatly from brand to brand.

The primary difference between Aurora and competitive brands and models is our reputation and superior support that customers depend on from State Water Heaters. We only market products that meet our high standards for quality, and Aurora is no exception.

State WATER HEATERS
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State Water Heaters

500 Lindahl Parkway
Ashland City, TN 37015
800-365-8170
www.statewaterheaters.com

Form No. SWHR-105762 0M-MSI-0904 Printed in U.S.A.