March 20, 2018

On-Demand Water Heating – Is it the best solution for your home?

In the last 10 years, there has been increased use of on-demand water heaters. Widely used in Europe and Asia, these appliances have penetrated the American market, largely due to the efforts of “green building” advocates, and building code officials looking for energy efficiency. Although on-demand water heating can be a perfect fit in certain applications, it may not be the best solution in every project. We have written this guide to help the end-user determine if it is right for them.

There are (3) significant advantages to on-demand water heaters.

1. Energy savings due to the lack of “stand-by losses”.
2. Space saving.
3. Outdoor installation.

1. Energy Savings:

On-demand water heaters have no “stand-by losses”, which occur in traditional storage water heaters in (2) ways. First, there is a pilot light that stays lit all the time. The cost of energy to run this pilot light is minimal. When operated with natural gas, it is as little as $3.00 per month. The second, and more significant, source of “stand-by losses” is the hot air rising through the internal flue of the water heater, escaping through the chimney. Since storage water heaters cannot be insulated at the central chimney, these losses are significant. We estimate the cost of these “stand-by losses” through the flue at approximately $15.00 per month for a (40) gallon water heater. Typically, storage water heaters operate at (60)% efficiency, meaning that (60)% of the energy is transmitted into hot water used by the consumer and (40)% of the energy is dissipated through the chimney. On-demand water heaters operate at an efficiency ranging from 84% to 95%. Therefore, the energy savings of an on-demand water heater using natural gas ranges from $10.00 to $15.00 per month. If one is using LP gas or electricity to heat water, this dollar amount would rise by a factor of (3) or (4).

2. Space Saving:

The second advantage of using on-demand water heating is the small size of the units themselves. On-demand water heaters are typically wall mounted, leaving the floor space free for other uses.

3. Outdoor Installation

Most on-demand water heaters can be installed outside, exposed to any weather. Traditional storage water heaters need to be enclosed in weatherproof sheds if installed outdoors. Relocating your water heater outdoors means more usable space indoors.

Disadvantages of On-Demand Water Heaters:

1. Initial cost
2. Higher demand for gas
3. Different combustion venting
4. Limited flow capacity

1) Initial Cost:

The initial cost for an on-demand water heater that will deliver (6) gallons per minute, enough to serve (2) bathrooms, ranges from $1200. to $1700. with all the appurtenances. This compares to $500. - $600. for a storage water heater (30 – 50 gallon). When one adds in the extra rough piping cost (we explain these costs in the next 2 sections), the price ranges from $2500. to $4000. to replace an existing storage water heater with a new on-demand water heater. At $15.00 a month in savings using natural gas, one's monthly savings in energy cost may never by repaid, given the depreciation of any water heating equipment.

2) Higher Demand for Gas

On-demand water heaters have a typical gas usage load of 199,000 BTU's. Storage waters heaters have a typical gas load of 40,000 BTU's. The reason for this discrepancy is that storage water heaters can reheat water slowly over an extended period of time, while on-demand water heaters heat all the water being used instantly. The problem in retrofitting is that storage water heaters typically are served by a (1/2)" gas line, whereas on-demand water heaters usually need at least a (1)" gas line. Although this is not a problem in new construction, it may be expensive to retrofit gas piping in an existing location.

3) Different Combustion Venting

Storage water heaters use what are called "B-vents". This material is designed to with - stand high heat, but not the corrosive acids that are typically generated by the exhaust in high efficiency appliances. On-demand water heaters require stainless steel or PVC venting designed less to withstand high temperatures than to resist the acids generated in an efficient combustion process. As a result, any retrofit involves changing the vent that extends from the water heater up through the roof. This can be an expensive process, typically costing between $300 and $1000. This is also a big incentive to install on-demand water heaters on the outside of the building, where no vent piping in required and it can vent directly to the exterior.

4) Limited Flow Capacity

A typical on-demand water heater has maximum flow-rate of 6.5 gallons per minute. This means that one is limited in how many fixtures can be operated at the same time. As a rule of thumb, this limits on-demand water heaters to homes with 2 bathrooms. .One can "piggy back" two or more heaters to increase this capacity, but that involves additional expense in gas piping and venting. Again, this is less of an issue in new construction than it is with existing conditions.

Our conclusion regarding on-demand water heaters is as follows:

The significant energy and space savings are great incentives for on-demand water heating. Still, they are best used in homes with 2 or fewer bathrooms, and are best installed on the exterior of the building where they don't need to be vented through the roof. Finally, they are most easily installed in new construction where one does not need to retrofit gas, water and vent piping.