



Sustainable building solutions.

HIGH-EFFICIENCY WATER HEATERS 2011

There continues to be conflicting information out there about high-efficiency (HE) water heaters. The following is based upon much research, discussion with experts and actual installations.

Conclusion:

HE heaters are almost always a better option than the old (tank) storage-type system. The type of HE system may vary depending on the type of space heater you have: furnace vs. boiler. Folks with a forced air furnace should consider the new generation of “hybrid-tankless” systems that give advantages of both a tankless combined with those of the old tank-type heater. One such hybrid is “Eternal”. Folks with a boiler instead of a furnace might consider a condensing “Combi” system that provides both space heating combined with a hybrid-tankless type of water heater in one unit. Payback timeframes have generally dropped to 5-10 years for many homes and functionality benefits generally out-weigh issues if buying the best models of tankless systems. You have to pick the right one AND you still need to have different expectations versus what you had with your tank-type water heater. Note Federal Tax Credits appear to still apply for 2011 but at a much lower rate and only if you have not used them up to the \$500 limit..check with your tax advisor. Plus, many utilities offer rebates for these units.

If you Have a Boiler Instead of a Furnace:

If your space heating is from a hot-water boiler, our recommended strategy is to eventually install a high efficiency condensing combi-boiler (95%+ EF). This boiler can then do double duty and provide both space heating and water heating very efficiently. Some of these models now contain both functions in the same unit thus providing added fuel efficiency, lower initial costs and taking up less floor space. It will take an installation expert to determine whether these new generation combi units (like the Triangle Tube Excellence) have sufficient capacity for your home. Also, if you need a new water heater well before you need a new boiler, then you have to determine whether it makes financial sense to get a combi or whether to leave your old boiler and add a hybrid-tankless water heater.

Water Heaters - Background:

The old technology (tank) storage-type systems are generally very inefficient at less than .62 Efficiency Factor (EF)... while tankless tend to have a .82 - .84 EF... condensing models as high at 98%. Most tank-type systems are also more dangerous to operate since combustion fumes are generally not sealed within the exhaust system. In addition, they use lots of indoor air to create combustion which in Winter results in cold air needing to re-enter house and this cold air then makes your furnace/boiler work harder thus costing you even more. Finally, useful life tends to average 12-14 years and when they unexpectedly fail... you might have water flowing all over your basement. The largest advantage of a tank system and generally the reason they are still installed is that their **initial** cost is lower even though their **total** costs (initial + operating) are higher and they tend to run out of hot water.

You may have heard about “tankless” water heaters and that there have been concerns with them. Note that older and less expensive tankless models have insufficient technology and

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therefore have some significant functional issues. Functions and quality have improved dramatically in the last few years with a significant leap very recently. Caution if you try buying the cheapest HE water heater (maybe at a big-box retailer) and talk a plumber into installing it... you will likely be terribly disappointed at the performance. Also, some plumbers will not install HE water heaters as they are still unaware of the advances in the technology which makes them less costly to install and maintain. BAC can refer you to the appropriate plumber.

NEW EXPECTATIONS: Old tank-type heaters do have the ability to provide a massive amount of hot water at once time (ie. 3 showers at once) but will quickly run out of hot water and it will then take dozens of minutes to “recharge”. Most hot-water use is not massive-volume, short-burst since shower/baths tend to use moderate amounts of hot water over long periods of time (think teen-agers in a shower). The short-burst of hot water needed by (for example) a front-load clothes washer does not allow some tankless systems sufficient time to heat and deliver the hot water before the washer is done filling that is why the new generation of hybrid-tankless makes more sense. But then just about any system can fail here since the long water supply lines start out with cold water which might fill the washer before hot can ever reach the washer. Generally, HE systems cost much less to operate (25%-50% less) but by definition must have a more complicated design in order to get instant flows of very hot water without a big energy wasting tank. They will not run out of hot water even if 4+ people take showers in a row. Given reduced operating costs and nearly double the life-expectancy, a HE unit should be seriously considered. If you have hard water (Mpls & StP generally have soft water), then expect to need a water softener...which has many benefits beyond ability to use a HE system.

HE Water Heater Features:

- Endless hot water (all brands)
- Providing hot water with low flow or in short bursts (some brands)
- Quiet operation (some brands)
- Freeze Protection (some brands)
- Recirc pump to get instant hot water to a far-away fixture (one brand)
- Remote control (some brands)
- Advanced diagnostics info to make servicing faster/easier (some brands)
- Super Efficient Condensing technology (95%+ efficient!) ... this needs to discharge small amount of condensate water to a floor or sink drain
- Long-life span ... 20-25 years expected (most brands)
- Ultra low CO₂ and NO_x emissions
- Stainless steel heat exchanger for nearly zero risk of mineral build-up (issue with tank-types and tankless models without stainless steel exchangers)

Things to watch/ask for:

- If you have an OLD house, you might only have 1/4 pound gas service and this may need to be upgraded to 2 pound service (extra cost)
- Have “isolation valves” installed at the heater so it can easily be removed for service

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- Ask whether a “concentric vent kit” makes sense to allow just a single vent pipe penetration in the side of your house.
- What is upcharge to install the new heater closer to the faucets/appliances in order to save more energy... ie... directly beneath the kitchen and/or baths. The old tank-types were teathered to the chimney which was often a long way from where the hot water is being used and therefore adds to your “wait time” and uses more energy.
- Ensure at least 3.5 gpm flowrate at a 70+ degree rise (for 2 people); careful... many advertise their flowrates at a temp rise of less than 70... find out their flowrate at 70+
- Best to have 5-6 gpm flowrate if 3+ people and more than one bath Ensure the unit is SEALED COMBUSTION ... meaning it uses outdoor air for combustion and NOT indoor air.... very important
- Does the unit give you a “cold sandwich”? This is more common in older tankless units when you use hot water then turn off faucet for a few minutes, then when it is turned on again, you get hot water (stored in pipes) right away but then get a brief 1-4 second stretch of cooler water due to the tankless needing time to get back up to full temp.
- Make sure a full 3/4” gas line (or one that meets the manufacturer’s specs) is delivered to the heater.
- What is the minimum flow rate for the heater to turn on? You might have a low flow shower head or faucet aerator that prevents the unit from turning on. There is one brand (at least) that uses a mini-buffer tank to eliminate this issue.
- If you have a Hi-efficiency clothes washer (short/frequent calls for water), will the tankless be able to provide hot water? Frankly, some tank-types cannot provide hot water to these units either if the call for hot-water is less than amount needed to replace the standing (cold) water in the pipes with hot from the heater.
- Does your shower have a pressure balancing valve? If not, will the water heater be able to provide controllable hot water to the shower? The plumber will be able to answer this for you.