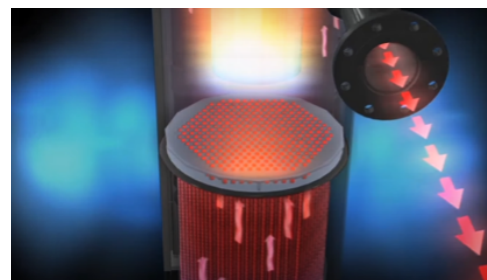


Monday, August 16th, 2021

Commercial Gas Fired Water Heater Types

Monday Morning Minutes | by Norm Hall, August 16th, 2021

In our world, a certain style of a water heater may be referred to with many different names. Over the next many months, the R. L. Deppmann Monday Morning Minutes will feature articles on hot water heaters in commercial and institutional buildings. Today we want to define a nomenclature for the various types of water heaters.



Instantaneous - What's in a Name? – ASPE and ASHRAE



The American Society of Plumbing Engineers (ASPE) Domestic Water Heating Design Manual defines an instantaneous-type (also called tankless) water heater as a "gas fired device with no storage".

The American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) is a bit more complicated. Chapter 51 of the Applications Manual splits the term Instantaneous water heaters into two types. "Tank-type instantaneous heaters have an input-to-storage capacity ratio of 4000 Btu/h per gallon or more and a thermostat to control energy input to the heater". Water-tube instantaneous heaters have minimal water storage capacity. ASHRAE continues with, "**Tankless water heaters** have almost no storage capacity, and heat water as it flows once through the water heater".

Let's address the word "instantaneous". You will not see that word in the name of most manufacturers. The average person may think of instantaneous as instant hot water at the fixture. This is more a function of the recirculating system than the heater. You may also think of instantaneous as the temperature leaving the heater. In that case, both a heater with storage and without could provide a temperature such as 130°F.

We will use the term “TANKLESS” to define a water heater with minimal or no storage capacity. It will have no less than “about” 4000 BTU/H per gallon.

Two examples: The [Aerco Innovation 1,060,000 BTUH tankless water heater](#), shown above, and the [PVI Brigade tankless water heater](#), shown to the right. The Innovation 1060 has 22 gallons of storage. It has some storage, but so small that it provides 48,000 BTU/H per gallon. It is a Tankless water heater.



The PVI Brigade is a small capacity water heater designed for the restaurant industry. It has a small footprint and can be fit in a corner and still be serviced. It will have applications in other building types. The capacity is 199,000 BTU/H which is just under 200,000 BTU/H for a reason. As with many water heater manufacturers of the same BTU/H, it avoids the ASME code. It has 25 gallons of storage. This makes it about 8000 BTUH per gallon. It has some storage but meets our definition of a Tankless water heater.

Tank Type and Volume Type Water Heaters

What about water heaters with storage? Once again, we have different monikers depending on who you talk to.

ASPE’s chapter 20 of the previously mentioned manual defines “Gas Water Heaters – Storage” or “Storage (Tank) type water heaters” as a device where a “single tank is used for both heating and storing the water”.

ASHRAE defines, “**Storage water heaters** incorporate the burner(s), storage tank, outer jacket, and controls such as a thermostat in a single unit and typically have an input-to-storage capacity ratio of less than 4000 Btu/h per gallon”.



This is the water heater that looks like the one you might see in your home. The similarity between your residential water heater and a commercial water heater ends there. One example, the water heater shown here has a 15-year warranty, premium efficiency, and BMS connectivity.

Here is a [PVI model Conquest 130](#). It is a 130-gallon **Tank Type** water heater with a capacity anywhere from 399,000 to 1,000,000 BTUH. At the low end, it has about 3,000 BTU/H per gallon. At the high end, it has about 76000 BTU/H per gallon.

OK, we call this a tank type water heater since the controls are in the tank and it has storage. One model drops below the 4,000 BTUH number above and that is why I put the word “about” in the description.

ASPE’s chapter 19 defines “Gas Water Heaters – Instantaneous with Separate Tank” as one where the tank is separate from the heater. ASHRAE calls this a “Circulating tank water heater”.

This water heater has a heater that looks like a hydronic boiler and a separate storage tank with a beefy inline pump circulating the water from the heater to the tank. The hot water delivered to the fixtures comes out of the top of the tank.

I grew up calling this a “Volume water heater” so that is what we will call this. My blog, my

naming! 😊

Shown below is an NTI Lx-WH volume type water heater shown with a separate tank.



The volume water heaters will require a pump between the heater and the tank. Of course, the pump should be a [Bell & Gossett](#) brand!

So, the three types of gas water heaters I will address will be Tankless, Tank Type, and Volume gas fired water heaters.

Of course, we also have electric, heat pump, indirect steam, and indirect water styles but that's another topic for another day.