

Intro to Tankless Boilers Training Flyer

One of the products we offer that can be used to heat a home or commercial building is a tankless condensing boiler. Working in our industry it's important we have at least a basic understanding of what condensing boilers are and how they work. This flyer will serve to cover just that. There are tank-type boilers and tankless. This flyer is only concerned with tankless.



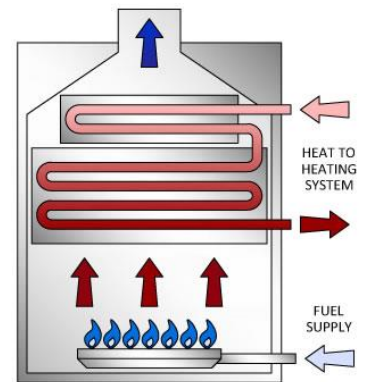
What is a Boiler?

There are many different methods that can be used to heat a home or commercial building. The most common is through the use of a furnace. In this case, the air is heated and blown throughout the structure. Another method of heating is accomplished by running heated water through a building using the heat in the water to heat the air. Boilers are devices used to heat the water used in these applications.

Non-Condensing Boilers v Condensing Boilers:

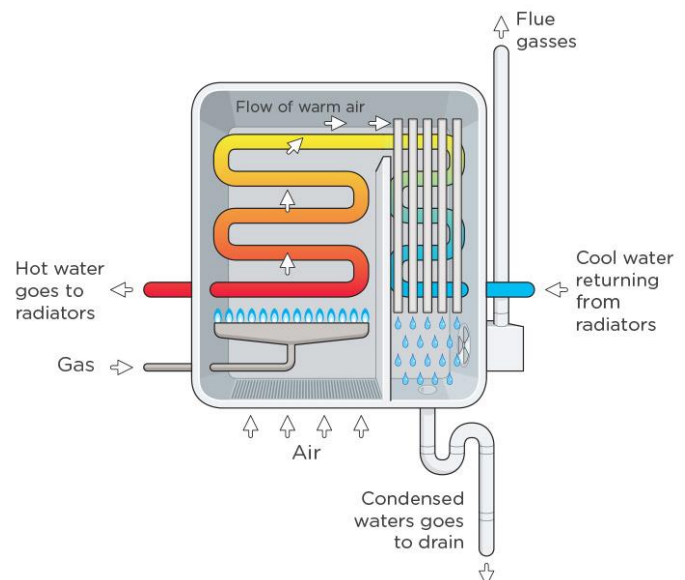
Non-Condensing boilers work by burning gas and running the hot gasses over a cast iron or copper water section, which is basically a coil with water running through it. This process heats the water so it can be used to heat the home. The heated gas is then exhausted through a flue into the outdoors.

Immediately venting the hot gas through the flue causes inefficiencies that are corrected by the condensing boilers.



Condensing boilers work very similarly but rather than immediately exhausting the heated gas through the flue it is ran back over another section of coil to extract more heat. As the water absorbs this additional heat, the gas is further cooled. The cooling causes water to condense out of the air and into a drain pan and the gas is then exhausted through a flue. In the non-condensing, there is no condensation and therefore no drain pan is required.

Boiler performance is based on the efficiency of heat transfer and usually stated as a percentage. Condensing boilers are a much more efficient system than non-condensing boilers. Non-Condensing boilers typically range from 70%-80% where Condensing boilers can range from around 90% up to 98%. Because of their efficiency, condensing boilers are quickly becoming the boiler of choice.



Applications of Boilers:

There are many applications the hot water from a boiler can be used to heat a home. Below is a brief overview of a few of the most popular.

- **Radiant In-Floor Heat:** In this application, the hot water is ran through tubing beneath the floor of a structure. The heat from the tubing is absorbed into the floor and the living space of the home.
- **Baseboard Radiators:** In this case the hot water is ran into the radiator where the air is allowed to pass over it and absorb heat.
- **Hot water coils:** Used in place of a typical furnace. In this application the hot water is ran through a coil in the ductwork. Air is blown over it and absorbs heat from the water and is blown through the ductwork throughout the house.

Turn Down Ratio:

In the [thermostat](#) training flyer we talked about multi-stage vs “on/off” HVAC systems and the efficiency gained by using multi-staging. Today’s condensing boilers have incorporated the same concept. Rather than being either On at 100% capacity or off, some systems can adjust the level of output they working at based on what is needed. They can operate at a low level most of the time and only use higher levels when larger amounts of heat are needed.

The condensing boilers that have incorporated this do so by having multiple levels of output designated, only stepping up to the next level when needed. The number of levels of output a boiler can “step up” to until reaching 100% is called the Turn Down Ratio. An example of a 3:1 turn down system is below. 3:1 means there are three levels of output the system can operate at. The number of BTU’s the system is using is also noted.



180K BTU Boiler			
Off	33% Capacity	66% Capacity	100% Capacity
0 BTU	60K BTUs	120K BTUs	180K BTUs

Basically, the higher the Turn Down Ratio, the more levels the system can operate at and the more efficient the boiler is. Navien NHB Boilers have an industry leading 15:1 Turn Down Ratio making them **95% efficient**.

Combi-Boilers:

Because a boiler is basically a water heater used to heat the home, it follows that the same unit could heat the water used in the home for showers and cooking. There are combination boilers that do just this. These act as both a water heater and a boiler.

What do we stock and how to look it up:

The condensing boilers we stock are the Navien NHB series. You can find them by doing an NHB f4 search.

The combi-boilers we stock are the Navien NCB series. These can be found by doing an NCB f4 search.

Next Steps and a Couple Questions:

The first next step is to learn more. Below is a link to a video detailing the installation of an NHB condensing boiler.

https://www.youtube.com/watch?v=2iChwA_ctn4

TRUE or FALSE: The lower the Turn Down Ratio the better the boiler.

TRUE or FALSE: Both Condensing and Non-Condensing boilers need a flue and a drain pan.

*** One benefit of using a boiler to heat your home over a traditional forced air furnace is humidity. A furnace draws moisture from the air as it is heating it where radiant heat and baseboard heating do not.