

How much will I save with a Viessmann boiler?

The answer to that is not found in just the comparison of the rating of one boiler to another. (The AFUE number.) There is so much more to system efficiency. AFUE (Annual Fuel Utilization Efficiency) is a testing method developed by the American boiler manufacturers that does not measure such significant variables such as: operation above 140 degrees F; accrual control method; delta T other than 20 degrees; boiler insulation (and its effect on standby loss on the boiler); length of burner cycle; presence of a sludge settlement zone; the ability to burn clean or proper sizing.

AFUE Testing Numbers - This test is conducted in a laboratory where all tested boilers are run for 30 minutes to warm them up. Then only chimney losses are measured. The calculations which follow assume 8 minute firing cycles while running 140 degrees F out of the boiler and 120 degrees F back in. A "delta T" of 20 degrees. This is a condition that rarely, if ever, happens in the real world. Both the higher supply water temperatures and lower delta T values hurt efficiency. Both are common. Moreover, it is a fact that any combustion appliance takes several minutes to reach its steady state combustion efficiency. Few run that long in the field. Finally, the test ignores any and all losses of heat into the boiler room! If you pulled the insulation off the boiler, you would get a higher rating.

Control methods - Let's consider a comparison between a Viessmann boiler (VT) and a typical American boiler with traditional controlling (Brand X). The Vitola-biferral boiler for oil or power gas actually has a reset control built in from the factory. In fact, all the designs for Viessmann boilers are based on how best to handle lower temperatures during the spring and fall seasons.

Viessmann boilers reset the boiler water temperatures as the weather changes. This means they typically will have an average temperature over the entire heating season of 135 degrees F. A Brand X boiler will generally be controlled by thermostats and a high limit. It's traditional that these boilers will drive to their limit every time a thermostat calls. Most limits are set between 180 - 210 but we'll call the median 180 degrees F.

Now, as a rule of thumb, for every 3 degrees that a heating system's water temperature is dropped, fuel savings of approximately 1% result. Figure it out:

180 degrees minus 135 degrees equals 45 degrees divided by 3 equals 15% savings

If the boiler is a Vitola bi-ferral boiler with no low limit, and particularly if the system has large old radiators or larger flat panel radiators, the median water temperature goes down further and the savings increase. Often we see a median temperature of 120 degrees F in these systems and the numbers get better.

180 degrees minus 120 degrees equals 60 degrees divided by 3 equals 20% savings

But these temperature changes are just part of the savings.

Standby losses to the basement - A Brand X boiler has minimal jacket insulation (typically 3/4") and a standby loss of about 7%. A Viessmann boiler has more than 3" of insulation and a standby loss of less than .4% (four tenths of 1%) of its rating. In the real world, the amount of energy lost is always a function of boiler room and its temperature. If it has large combustion air openings, the temperature difference between boiler and boiler room increases as does standby loss. The irony is that the boiler with the least insulation is generally stored at the highest water temperature.

Stand By Loss Comparison

Assumptions: Two boilers with the same AFUE. Both with 100,000 Btu input. Both Boilers store 176 degree F boiler water in a 68 degree F boiler room. Gas at .60 per therm. One therm equals 100,000 Btu. Heating season of 277 days approximate.

Brand X boiler loses 7,000 Btu/hour or 168,000 Btu per day, which costs approximately \$ 1.08 per day, or \$300 per year

Viessmann boiler loses 400 Btu/hour or 9,600 Btu per day, which costs approximately \$.06 per day, or \$17 per year

Sizing

On top of this, the tradition in the North American heating industry has also been one of gross over-sizing. Since design conditions happen less than 1% of the heating season, the penalty for traditional on/off controlling with poorly insulated boilers is dramatic. The hotter and more oversized the boiler is, the quicker it wants to cool off and the less efficient it is.

Firing Time

The typical Brand X boiler contains 3 to 4 gallons of water. While the room thermostat calls for 9 minutes of heat, the unit cycles off its limit 3, 4 or 5 times. The Vitola-biferral has 17 to 47 gallons. It can, and does, burn for 9 minutes because it has enough water to store the heat. What does this mean? It means the ignition components of the Brand X boiler will wear out faster. It also means lower efficiency for Brand X than advertised because shorter burn times are less efficient than longer ones.

Clean boiler

As you might expect, the AFUE test is run on a clean, new boiler. Now in the real world, black iron oxide sludge can form on the inside of a boiler system and soot and scale can build up on the outside. Viessmann boilers provide sludge settlement zones; a place for the iron oxide to settle out -- a place that does not effect efficiency. Brand X lets it settle out at the base of the boiler where it can harm your efficiency and the boiler's life expectancy.

Moreover, the high combustion chamber of the Atola-Renox units and the stainless steel combustion chamber of the Vitola-biferral units keep Viessmann boilers running clean year after year.

SUMMARY - How much do you save? A lot more than you think if you only compared the AFUE numbers.

The Bottom Line

A properly sized, installed and controlled Viessmann boiler with weather responsive control will consistently outperform a Brand X boiler by 15 to 25%. It is not unusual for far greater savings than that. It also comes in a system that gets installed right the first time, can be troubleshot 20 years from now if need be and stays at its high efficiency throughout its life.

We also have many documented instances where Viessmann has outperformed high efficiency pulse and condensing boilers (90 plus AFUE) that had traditional on/off control methods.

Lowering the water temperature is the key to savings and comfort. Viessmann is the only manufacturer designed to take full advantage of lower boiler water without destroying the boiler. It is also the only manufacturer who prides their control system in a snap together system so that the system will get installed consistently and still run automatically in the future.