

AFUE ratings do more harm than good.

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When the government created AFUE (Annual Fuel Utilization Efficiency) ratings, they had a good plan.

However, AFUE ratings don't help consumers make educated decisions about a hot water heating system's efficiency because it only measures some chimney related losses. It's like saying highway driving is the miles per gallon you'll get all year when you know you'll be doing most of your driving around town.

AFUE doesn't take into account the running jacket losses (heat lost from a boiler with

heat-up energy is left in the boiler so it acts almost like the boiler with a tankless coil. Cooling down gradually from 180°, its losses are similar to the tankless coil boiler including significant off cycle losses. It rarely operates at a cold start. Actual efficiency for the demand fired boiler with a domestic storage tank in a year is only slightly better, testing from 56% to 59%.

AFUE ignores over sizing effects.

The modern home frequently insulates the

delivering heat or hot water in just over 90 seconds from a cold start.

Additionally, instead of having heat in the unit at the end of a cycle, System 2000 recovers this energy and automatically distributes it to the home or stores it in the domestic hot water storage tank. This assures that it will be longer before there is another heat call for either heat or hot water.

And since the boiler only runs when there is a call for heat, standby losses are virtually eliminated.

The combustion produced by System 2000's patented chamber and boiler design is so stable that it is installed *without* a draft regulator – reducing infiltration – a significant home energy saving.

Compare Energy Kinetics System 2000 performance to the conventional boiler and you'll realize real fuel efficiency of 83%. When System 2000 operates, it runs at peak efficiency and with virtually no off cycle losses so over sizing concerns vanish.

With System 2000 you have a system that actually comes close to its AFUE rating and has the potential to save hundreds of gallons annually (20% - 30%) over a conventional boiler.

It's time the heating industry had an accurate way to measure efficiency.

AFUE remains a misleading indicator that should be improved with an index that truly measures a hot water system's efficiency. The heating industry needs it. The homeowner deserves it. Once you're able to accurately compare different heating system's efficiency, we know you and your customers will select System 2000.

Where Fuel is Used (and lost) in 3 different heating systems

	<u>Boiler with Tankless coil</u>	<u>Demand fired Unit w/Tank</u>	<u>System 2000</u>
Annual Fuel Usage needed For Space & Hot Water	497 Gallons	497 Gallons	497 Gallons
Chimney Loss	123 Gallons	118 Gallons	78 Gallons
AFUE Rating	86%	86%	87%
Additional Non-AFUE losses			
(A) Jacket Loss	44 Gallons	42 Gallons	12 Gallons
(B) Standby Loss	131 Gallons	112 Gallons	6 Gallons
(C) Room Air Loss	85 Gallons	75 Gallons	6 Gallons
Annual Fuel Usage	880 Gallons/Yr.	844 Gallons/Yr.	599 Gallons/Yr.
Real Efficiency Of each system	56%	59%	83%

minimal insulation or a dry base boiler) ("A") or the actual draft regulator losses which occur when the unit operates with a real chimney ("C").

AFUE assumes boilers are like furnaces.

AFUE assumes that a boiler runs like a furnace which cools down between demand calls, doesn't operate all summer or most of the spring and fall. AFUE doesn't take into account the standby losses ("B") from maintaining temperature for a tankless coil, which keeps the chimney warm or the draft regulator which pumps heated home air into the chimney. Nor does it consider jacket losses into a basement from a unit staying at 180°. Over the course of a year, actual efficiency for a boiler with tankless coil is in the 56% range.

Demand firing helps...but not much.

Many manufacturers recommend hot water storage tanks to provide a better supply of hot water than the tankless coil. They imply that there will be fuel savings because the boiler is cold start and will only be run on demand. That approach has a problem, because each time heat or hot water is called for, it can take 6 to 10 minutes to heat the boiler up to temperature. When the demand fired boiler shuts off, all that

basement from the rest of the house and has better overall insulation with resultant small heat losses, so the boilers selected to provide adequate hot water recovery are considerably oversized.

The heat up energy of a typical cast iron boiler with 6 to 13 gallons of water in it is so great, relative to the heating load or meeting a 20 gallon hot water draw, that annual fuel efficiency drops even further. This is not reflected in the AFUE rating procedure, which assumes the boiler is only slightly larger than the calculated heat loss.

AFUE rating can be higher than steady state efficiency.

A final point of interest is that with careful laboratory testing to this procedure, it is possible to have an AFUE rating which is higher than steady state efficiency.

For delivered efficiency, System 2000 is the real winner.

Energy Kinetics System 2000 integrates a very compact, low mass (only 2 ½ gallons water and 160 pounds of steel), heavily insulated boiler, domestic hot water tank and solid state System Energy Manager with energy recovery cycle.

The unique counter flow boiler design absorbs more heat from the flue gases for an 87% combustion efficiency. Its low mass can start



SYSTEM 2000
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