Econoburn Technical FAQ

Revised 2-11-10

1) Where can I install my new Econoburn Gasification wood boiler?

Wherever it is most convenient… the Econoburn boiler is much more versatile than traditional wood stoves or wood boilers.

Indoor Model: Installation of the indoor Econoburn is not limited to just the basement. The Indoor boiler also installs easily in a garage or outbuilding, all the while using far less wood than a traditional outdoor wood boiler.

Outdoor Model: The outdoor Econoburn boiler is designed for installation on any stable surface (i.e. concrete). Its specially designed air intake system pre-warms the combustion air to ensure complete gasification.

2) Which installation is less expensive… indoor or outdoor?

If you have a suitable chimney inside your home, an indoor installation will likely be less expensive than an outdoor installation. An outdoor installation requires insulated underground pex tubing, a concrete pad, and a trench for the piping (though no plate heat exchanger is required). On the other hand, if you do not have a suitable chimney inside the home, the cost of relining an existing chimney or building a new chimney from scratch may outweigh the costs of an outdoor installation. Of course, replacing an *existing* outdoor wood furnace with a new Econoburn Outdoor boiler is the LEAST expensive type of installation!

3) Which installation is more efficient… indoor or outdoor?

Both an indoor and outdoor Econoburn boiler will be far more efficient than the typical outdoor wood furnace. However, if glycol (antifreeze) is used, it will reduce the heat transfer rate of water by around 7% to 10%. Another factor to consider is the heat loss of any part of the boiler or piping that is exposed to unconditioned (outside) air.

4) How can I justify the extra cost of a gasification wood boiler over a conventional outdoor wood boiler?

Econoburn boilers are the best-built, most-efficient wood fired boilers anywhere! Though Econoburn boilers may cost slightly more than conventional outdoor wood boilers, their superior efficiency quickly makes up the difference with reduced wood consumption. Also, unlike open-system wood furnaces, there is no need to install a plate heat exchanger (saving hundreds of dollars). Plus, because the Econoburn boiler operates as a pressurized vessel, it often has a life expectancy that is 2-1/2 times longer than conventional wood furnaces. Lastly, further reducing the cost difference, Econoburn boilers are eligible for a $1,500 Federal tax credit!

5) How long are the burn times on an Econoburn wood boiler?

Though burn times vary by application (and by wood species and moisture content), you can expect burn times ranging from 6-8 hours on a cold day for a properly-sized system. What's more, if you install thermal storage, you may only need to fire the boiler once per day for (5 -10 hours at a time) to charge the tank.

6) Do I have to burn dry seasoned wood in my new Econoburn wood boiler?

This is a question that we hear often. The bottom line about firewood quality is this: No matter what stove, boiler, insert, or other wood burning device you are using… the dryer the wood is, the more heat you will get out of it, and the less of it you will burn.

Good, quality fuel is critical to achieve maximum output from the Econoburn boiler. Seasoned hardwood (between 15 -22% average moisture content) will yield the most output. Water in the wood does not burn… it boils. And in order to get water hot enough to boil, it consumes a substantial amount of heat from the wood – heat that is not available to the system. Indeed, extremely high moisture content can even prevent the wood from burning at all. Wood with 15% moisture content is about as dry as wood gets by air drying, and 22% moisture content can be achieved in as little as 6 weeks of summertime air drying, depending on species. While it is possible to burn wood with a moisture content of up to 35 or 40% (completely green depending on species and season), we don't recommend it as the efficiency and output fall dramatically. For reference, wood that is rotten or punky (decaying) will also reduce output and shorten burn times. Punky wood holds vastly lower BTU's per unit of volume compared to high quality seasoned firewood, and can also hold more moisture than even fresh-cut green wood.

7) Is it OK to over-size an Econoburn?

Prior to selecting boiler size, a heat loss calculation for the system is critical. Under-sizing a boiler can result in a system unable to maintain an indoor temperature of 70 degrees; plus, a too-small boiler will shorten burn times. On the other hand, *over-sizing a boiler slightly is acceptable and will lengthen burn times on systems without thermal storage*. Please note, however, at some point during the heating season, any boiler without thermal storage will be oversized for its application. An over-sized boiler will likely spend more time idling and less time gasifying. Excessive idling will reduce the efficiency and cause creosote to build up in the combustion chamber and heat exchanger. To maximize efficiency and reduce creosote, only fill the firebox enough to maintain a fire until the next refueling time is feasible. This will force the boiler into gasification more often by reducing the portion of the heat load satisfied by the upper chamber alone.

8) How efficient is an Econoburn gasification wood boiler in comparison to other boilers?

The Econoburn boiler achieves an amazing 87% thermal efficiency! Conventional style wood furnaces (OWB's) consisting of nothing more than a firebox and a chimney, produce efficiencies of just 25-30%. OWB's allow vast amounts of smoke and gas to escape out of the chimney unburned. The Econoburn reclaims what would normally be lost up the chimney as wasted energy and pollution, saving you time and money.

9) Does it matter what species of wood I burn in my Econoburn wood boiler?

Yes, though any type of wood (including pine) can be burned in an Econoburn, choice of species will greatly influence burn times. For example, pine will burn much more quickly than hard maple. Below is an estimate for the energy content of common wood species – the more energy (BTU's), the longer the burn time. Figures are based on 20% moisture content.

Species	Million BTU's/cord (4'x4'x8')	Weight per cord (lbs)
Shagbark Hickory	28.0	4,330
Eastern Hornbeam	27.5	4,250
Ironwood	27.1	4,015
Black Birch	26.8	3,895
Black Locust	26.7	3,830
Bitternut Hickory	26.7	3,830
Apple	26.5	4,115
White Oak	25.8	4,020
Sugar Maple	24.2	3,800
Red Oak	24.0	3,685
White Ash	23.6	3,690
Yellow Birch	23.5	3,655
Red Elm	21.6	3,110
Paper Birch	20.3	3,180
White Birch	20.3	3,180
Black Walnut	20.2	3,192
Cherry	20.0	3,120
Green Ash	19.9	2,880
American Elm	19.6	3,150
Black Ash	19.2	3,065
Red Maple	18.8	3,035
Hemlock	15.9	2,480
Quaking Aspen	14.5	2,290
White Pine	14.3	2,240

10) What is thermal storage and how is it used?

Thermal storage is heat energy in the form of hot water. The objective is to fire the boiler at full throttle for a few hours, and store – in 500-1,000 gallon water tanks – all excess heat not needed by the heating system. Afterwards, your system draws heat from the storage tanks to provide heat for your home. Burning wood this way ensures that the combustion is as efficient as possible by keeping your boiler in its gasification mode for the entire run time. Plus, it provides more flexibility with regard to when you have to fire your boiler. For example, in the shoulder seasons (early fall and late spring), you may only have to fire the boiler once every few days in order to charge the thermal storage tanks.

11) Some gasifiers need thermal storage to operate… does the Econoburn?

No. Econoburn was designed to be flexible. With proper operation and maintenance, there is no need for thermal storage beyond the water that the boiler itself holds. That said, thermal storage does present some advantages – see #10 above.

12) How much maintenance is there on an Econoburn wood boiler?

Clean boilers are more efficient than dirty ones. Fortunately, the Econoburn runs very cleanly and is designed to operate with minimal maintenance. Just follow these steps:

A) Econoburn's turbulators and heat exchange tubes will need to be cleaned once per season.
B) The bottom chamber should be cleaned twice per week during steady use. (Ash in the lower chamber can reduce thermal transfer through the lower refractory mass.)
C) The upper chamber should be kept clean by letting the boiler burn down to coals several times per week and raking the ash though the nozzle into the bottom chamber for removal.
D) Excess ash and loose soot should be removed as soon as the boiler is shut down for the season.

13) The Econoburn wood boilers are made from carbon steel… won't they rust?

No! Unlike traditional outdoor wood furnaces, the Econoburn boiler is a closed loop system (the water inside the boiler is not open to the outside air). With no oxygen in the system, no rust can occur! Note: do not use pex tubing that does not have an oxygen barrier.

14) Why purchase a carbon steel Econoburn wood boiler over a stainless steel wood boiler?

Carbon steel is the best material for building a wood boiler. Carbon steel has about half the thermal expansion rate of 300 series stainless steel. While carbon steel is stable under extreme temperatures, stainless steel has a tendency to "stretch," causing what is known as Stress Corrosion Cracking. Secondly, Carbon steel has a much higher thermal conductivity rating than stainless steel. This means that the heat produced in your boiler gets into the water faster, resulting in less heat loss through your chimney. A more efficient, longer lasting boiler means less wood, less work, and less expense!

15) Does the Econoburn boiler produce any smoke?

There are a couple times during a burn cycle that an Econoburn will produce a small amount of smoke. After lighting a new fire, it will take a few minutes to establish a coal bed large enough to raise the temperature of the refractory to a point where the woodgas will combust. This generally takes between 10 and 30 minutes during which time your boiler will produce a little smoke. Once a coal bed is established, the smoke is burned before it is allowed to exit the stack, sending a clean, colorless, and nearly odorless gas up your chimney. Another time your boiler will produce a little smoke is immediately after the boiler comes out of an idle state. During idle, the coal bed and refractory cool down somewhat. It generally takes a minute or two for the blower to fan the coals and generate the heat required to again begin combustion of the woodgas.

16) Is the Econoburn certified for indoor use?

Yes, Econoburn's indoor model is safe to install indoors. Indeed, it can be installed with as little as 0" clearance to combustibles on each side and 18" clearance to combustibles in the back. In addition, the Econoburn boiler carries the ETL - WHI listing. WHI is the safety standard mark used by the solid fuel industry and is the legal equivalent of UL. WHI tests not only to UL standards, but also CSA (Canadian) standards, which are far more difficult to achieve.

17) Is Econoburn's efficiency rating certified?

Yes, two independent labs have certified the efficiency of the boiler.