

OUTDOOR WOOD FURNACES

A COMPARISON OF THE TOP 10 MANUFACTURERS

How We Conducted Our Study:

Our study is based on the factors most critical to outdoor wood furnaces - Quality, Price, and Features.

1) Quality is rated based on manufacturer experience, warranty coverage, and the materials that are used in manufacturing – primarily the grade of steel used.

2) Price is rated based on two tiers – a “One Building Model Price” and a “Two Building Model Price”. Each manufacturer has several different sizes of furnaces so we identified which of these would heat an average home no larger than 3,500 square feet for the “One Building Model”. For the “Two Building Model” we identified which model would heat a typical home and a typical pole barn with the combined square footage not to exceed 8,000 square feet.

3) Features are judged according to the industry standards set by the Canadian industry experts at www.outdoorwoodfurnaces.org. These standards have become the industry report card which many consumers refer to when considering an outdoor wood furnace. These standards are outlined in their article “How to Buy an Outdoor Furnace – Hard Facts That Dealers Don’t Want You To Know”. In this article, 36 critical factors are discussed and the authors explain how the industry standards have evolved to address these factors. These factors are listed below (bottom of page 3).

4) Overall – Each manufacturer is given an overall rating on our Stars Scale from 0.0 to 5.0 with 5.0 being the highest rating possible.

Our Top Choice – Hawken Energy

Our top choice among the top ten manufacturers was Hawken Energy. Hawken led the pack for the following reasons:

» Hawken Furnaces give customers the highest energy savings overall

» Hawken Furnaces were the only furnaces to meet or exceed all 36 industry standards

» Hawken Furnaces were priced lower on average than all other stainless steel and mild furnaces

» Hawken’s product quality appears to be the highest based on their 20-year warranty, their high-grade stainless steel (the same durable steel used in nuclear facilities), and the 22-year track record of their manufacturing team.

Discussion

Hawken Energy – The Hawken furnace was the clear winner. We give them a rating of 4.5 stars out of a possible 5.0. The Hawken design appears to have all the bugs worked out, which is no surprise since they have been perfecting their design for over 22 years. We learned that many of the Hawken design features are not understood by (or even visible to) the average consumer. For example, the location of the chimney makes their design maintenance free for

creosote. Most consumers, however, are unaware of these types of hidden design features that we only discovered as a result of our research.

The only flaw we could identify with Hawken Energy is that their dealer network is not as large as others. While Central Boiler, Woodmaster, and Empyre appear to have very large dealer networks, Hawken appears to have focused their attention on providing a superior product, rather than churning out high volumes of furnaces. In spite of this, we found that Hawken furnaces are readily available and that the Hawken dealers were much better educated and had the best customer service orientation.

Central Boiler – Central did not perform well in our study. They earned a rating of 1.5 stars out of a possible 5.0. We spoke with several unhappy Central customers whose furnaces developed leaks or other serious problems and when they requested warranty service from Central, they were told that Central would not honor their claim and that the customer would have to hire an attorney and attempt to sue Central. Central also looked silly for their misleading warranty claim - they boast a 25-year limited warranty. However, we noted in the fine print of the Central Boiler warranty that it only covers the firebox for 10 years, and Central will not cover the cost of labor which is probably 99% of the cost of a repair. Finally, it is oddly confusing that Central

Boiler has chosen a firebox design that is square, in spite of industry experts warning against such a design because their numerous welds are susceptible to failure. Experts are clear on this – the round firebox design is proven to be the best since it has fewer welds and has passed the test of time.

Empyre – Empyre is another manufacturer that did not perform well in our study. Empyre earned a rating of 2.0 stars out of a possible 5.0. Empyre furnaces are constructed with 304 grade stainless steel which, according to our findings, is designed for cosmetic applications in hospitals, kitchens, and for auto trim. Empirical data suggest that 304 grade stainless does not hold up to the stressful and corrosive environment of an outdoor wood furnace and in many cases becomes brittle and cracks or leaks in five to seven years of operation. Other industry participants appear confused at Empyre's continued use of the inferior 304 grade stainless. However, Empyre appears to be positioning itself to discontinue the 304 grade model – it has recently introduced new models which use mild steel and 409 grade stainless. Once Empyre has had five or more years of experience manufacturing furnaces with the 409 grade stainless, we will include these models in our annual study. We expect these new models may be worth consideration in five or more years if Empyre abandons their 304 grade model and focuses their quality efforts on stainless production.

Woodmaster – One other large manufacturer that appears to have a following is Woodmaster. They

earned a rating of 2.5 stars out of a possible 5.0. Interestingly, we just learned that they have discontinued their stainless steel models. Although their mild steel furnace costs only a few hundred dollars less than the stainless models we considered, it appears to be a good alternative for customers who do not care about long-term quality. The downside of this and other mild steel furnaces we considered was their long list of maintenance items. Mild steel furnaces are highly susceptible to leaks and cracking from corrosion and therefore require maintenance of (i) Ph level of the ash, (ii) Ph level of the boiler water, (iii) creosote removal from the inside of the firebox walls, and (iv) careful creosote maintenance of the chimney. These maintenance items are not required of properly designed stainless furnaces. One other confusing feature is the size of their water capacity. Woodmaster recently reduced their size and they claim it is an enhancement, but we have no evidence that this is good for the consumer – it only makes the unit cheaper for Woodmaster to produce. Again, Woodmaster appears to have the best mild steel furnace, although it appears that most buyers are willing to spend a few hundred dollars more for a stainless steel furnace that will last more than twice as long.

Wood Doctor – A new addition to this edition of our study is Wood Doctor. Little is known about Wood Doctor at this point since they had a change of ownership recently. Their furnaces are built with mild steel. Our biggest concern with Wood Doctor is that their warranty is written with so many loopholes, we could not

understand how much coverage it actually provided. It appears to be a 10-year warranty, which is standard for a mild steel furnace. They earned an initial rating of 2.5 stars.

Hardy – Hardy earned a rating of 1.5 stars out of 5.0, primarily because they use the inferior 304 grade stainless steel. We had difficulty deciding whether to include Hardy in the study because they appear to be focused on a much different market. Hardy products are manufactured in Mississippi and are built for very mild winters in the southern United States. When used in northern states, customers report that their Hardy furnaces consume a very large amount of wood. This is not surprising, however, given their design: if you look inside the firebox, you can see the clear blue sky right out the top of the chimney. This is because they have not included any baffles in their design which limits heat exchange. Therefore, most of the heat generated just rises quickly out the chimney with minimal heat transfer. Furthermore, their water jacket does not completely encircle the firebox. Hardy also lost points because its firebox steel was surprisingly thin – only 16 gauge – and their unit also requires a cement slab.

Heatmor – Heatmor earned a rating of 3.0 stars out of 5.0. Their design was perhaps the most unusual since their firebox does not have a floor. Looking into the firebox of a new unit, you see the ground! Heatmor states that customers must place their unit on a cement slab (a disadvantage), and then place sand in the bottom

of the firebox. Several consumers indicated that this sounded like a good idea at first, but it became problematic when the time came to remove the ash. Further, since the unit does not have a floor, the relatively small water jacket is in the shape of an inverted horseshoe which does not allow optimal heat transfer. The small water jacket places these units at a disadvantage because they are only barely able to keep up with the other products in this class.

Summary

Our study evaluated the top 10 outdoor wood furnace manufacturers based on their quality, prices and features. Although other manufacturers exist who are producing furnaces to burn wood outdoors, none of them have the critical mass to be worthy of inclusion in our study. We will review the list next year for our next study.

The outdoor wood furnace industry has clearly stated standards available for all to see and evaluate. These standards are outlined by industry experts at www.outdoorwoodfurnaces.org. These standards helped us formulate our algorithm to determine ranking. These standards also simplified our study since they are independent and widely recognized. Based on these standards and the other factors we considered, our rankings are as follows:

The following is the list of industry standards found at www.outdoorwoodfurnaces.org upon which our study was based:

- » LENGTH OF CHIMNEY

- » CHIMNEY LOCATION
- » CHIMNEY CAPS
- » FURNACE DOOR INSULATION
- » DOOR ANTI-BLOWBACK CATCH
- » TYPE OF DOOR GASKETS
- » TYPE OF DOOR CONSTRUCTION
- » SIZE OF DOOR
- » INSULATED, CAST or WATER-JACKETED DOORS
- » LEGS vs SKIRTING
- » RUST CONTROL
- » LONGEVITY OF STAINLESS STEEL
- » ANTIFREEZE AS A RUST INHIBITOR
- » FREEZE PREVENTION
- » WEIGHT OF STEEL
- » INSULATION TYPES
- » WATER JACKET LOCATION
- » OUTSIDE WATER JACKET
- » SIZE OF WATER STORAGE
- » HEATING CAPACITY
- » EFFICIENCY
- » FLOOR HEATING vs FORCED AIR or PASSIVE
- » HOOKING INTO AN EXISTING PRESSURE SYSTEM
- » TYPE OF WATER PIPE
- » CREOSOTE
- » DEPTH OF FIREBOX
- » ASH REMOVAL
- » SAFETY FEATURES
- » COMPONENT REPLACEMENT
- » WOOD CONSUMPTION
- » WATER EXPANSION
- » HOUSING
- » DRAFT CONTROL—MANUAL, ELECTRIC, FORCED AIR
- » STRENGTH
- » CONTROLS
- » TESTING

We expect the outdoor wood furnace business to continue its dramatic growth for the following reasons: 1) The savings is undeniable – roughly 75 percent for most homeowners. 2) Rising fuel prices are forcing consumers to find lower-cost heating solutions. 3) Wood is the most abundantly available renewable resource. 4) Wood burning is completely safe for the environment. Carbon dioxide is absorbed by wood as it

Hawken Energy	★	★	★	★	★	4.5
Royall	★	★	★	★	★	3.0
Heatmor	★	★	★	★	★	3.0
Woodmaster	★	★	★	★	★	2.5
Wood Doctor	★	★	★	★	★	2.5
Empyre	★	★	★	★	★	2.0
Hardy	★	★	★	★	★	1.5
Central Boiler	★	★	★	★	★	1.5
Aquatherm	★	★	★	★	★	1.0
Taylor	★	★	★	★	★	1.0

grows, and only released by wood as it either is burned or decays on the forest floor – with no net increase (unlike fossil fuels). Because of these and other factors, we expect outdoor wood furnaces will continue to increase in popularity in the coming years, and we expect the outdoor wood furnace industry to continue to grow dramatically.

Energy Industry Comparison Report OUTDOOR WOOD FURNACES

Features	Hawken Manufacturer	Energy Central Boiler	Hardy	Empyre	Aqua-Therm	Heatmor	Taylor	Royall	Central Boiler Mild Steel	Wood Master Mild Steel	Wood Doctor Mild Steel
Steel	409 Ultra Form™ Stainless	409 Stainless	304 Stainless	409 Stainless	409 Stainless	304 Stainless	304 Stainless	Mild Steel	Mild Steel	Mild Steel	Mild Steel
Warranty	20 Years	25 Years	10 Years	15 Years	10 Years	6 Years	20 Years	20 Years	10 Years	10 Years	10-Year
1 Building Model Price	\$5,950	\$7,025	\$7,460	\$8,525	\$5,995	\$8,184	\$7,496	\$5,570	\$5,295	\$7,690	25-Year Warranty does not include firebox
2 Building Model Price	\$7,475	\$8,735	Large Model Not Avail.	\$9,560	\$7,595	Large Model Not Avail.	\$8,594	\$7,100	\$6,595	\$8,200	
Comments	<ul style="list-style-type: none"> » Industry best warranty » Highest quality steel » Meets or exceeds all 36 industry standards » Highest overall cost savings » Most user-friendly installation kit » UL Listed and CSE tested » Limited dealer network 	<ul style="list-style-type: none"> » Fails 16 industry standards » Installation parts package costly and complicated » Forced draft fan extra » Digital controls subject to weather damage » Square firebox has too many welds – a weakness 	<ul style="list-style-type: none"> » 304 Stainless susceptible to warping and cracking » Firebox steel too thin – only 16 gauge thickness » Light-duty units made in Mississippi – commonly used in southern states » Requires cement slab » Domestic hot water use requires completely separate piping to/from furnace » No way to turn off draft fan while loading and no smoke vent – blows smoke in face » Fails 19 industry standards 	<ul style="list-style-type: none"> » 65% Lower water capacity – which means lower heat capacity » Uses troublesome bladder tank » Requires exterior building, or purchase of housing » Fails 11 industry standards » Not UL Listed 	<ul style="list-style-type: none"> » No floor in firebox – requires sand fill removal » Complicated ash removal » Requires cement slab » Not UL Listed » 50% Lower water capacity – which means lower heat capacity » Fails 14 industry standards 	<ul style="list-style-type: none"> » 304 Stainless susceptible to warping and cracking » Cement door frequently cracks » Bypass flue requires heavy maintenance » No smoke vent while loading for night time » Complicated domestic hot water requirements » Fails 19 industry standards 	<ul style="list-style-type: none"> » Mild steel subject to rust, corrosion and leaks » Unusual pressurized design » Fails 9 industry standards » Many dealers will not carry 	<ul style="list-style-type: none"> » Mild steel subject to rust, corrosion and leaks » Mild steel requires high creosote maintenance » Forced draft fan extra » Square firebox has too many welds – a weakness » Fails 16 industry standards 	<ul style="list-style-type: none"> » Mild steel subject to rust, corrosion and leaks » Fails 13 industry standards » Grate and auger \$450 extra » No safety latch on door » Digital controls subject to weather damage » 33% Lower water capacity » Door susceptible to warping 	<ul style="list-style-type: none"> » Mild steel subject to rust, corrosion and leaks » New ownership and manufacturing will require several years of perfecting » Warranty is difficult to understand 	

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