

WOOD ENERGY

Alaska's Renewable Energy Resource

Heating your Home with Wood

Choosing the Right Wood Burning Appliance for You

Outdoor Wood Burners

Price volatility of heating fuel, along with associated environmental concerns, has increased interest in alternative fuels for residential heating options. Outdoor wood-fired boilers (OWB), or hydronic heaters, are popular in many areas where wood is plentiful and winters are cold.

An OWB is a large firebox surrounded by a water jacket housed in an insulated shed; a short smoke stack is located outside of the building or buildings being heated. The OWB burns wood to heat the water (or water-antifreeze mix) and is usually easily connected to existing heating systems. A heat exchanger or direct circulation conveys heat into the structure's forced air, boiler or radiant floor heating system. The OWB can also provide domestic hot water.

Unqualified heaters can be substantially dirtier and less efficient than other wood burning appliances. Inadequate combustion technology causes cool, smoldering fires that emit substantial amounts of smoke. The short stack of many heaters also emits smoke close to the ground, where it tends to linger. In communities where these units have become popular, serious wood smoke air pollution problems are often pitting neighbor against neighbor. Many communities, including some here in Alaska, have begun to regulate the use and locations of OWBs. An OWB is best suited for large structures with high heat loads or multiple buildings in sparsely populated areas.



Outdoor wood burner

Clean, Efficient Wood Stoves

In February 2015, the U.S. Environmental Protection Agency (EPA) updated its clean air standards for residential wood heaters. The updates, based on improved wood heater technology, strengthen emissions standards for new stoves, and for the first time include previously unregulated new wood heaters, including outdoor wood-fired boilers (also known as hydronic heaters). These new standards will not affect wood heaters already in use, and emission standards will be phased in over the next five years for new heaters. For more information on the new Performance Standards for hydronic heaters, visit www2.epa.gov/residential-wood-heaters/fact-sheet-summary-requirements-wood-fired-hydronic-heaters.

Most hydronic heaters manufactured after 2007 have been designed to meet voluntary emission limits and are 90% cleaner burning than earlier models. These new standards build on those voluntary limits and allow manufacturers five years to lower emissions of new stoves to meet the lower limits. Wood-burning hydronic heaters sold in the United States will be required to have a permanent label indicating they are EPA-certified to meet emission limits in the final rule. Appliances that currently meet the voluntary limits are considered "EPA-qualified." A complete list of qualified hydronic heaters can be found at www.epa.gov/burnwise/owhlist.html.

PHASE 2 QUALIFIED

U.S. Environmental Protection Agency
2008 Hydronic Heater Program

Phase 2 Qualified models are cleaner and pollute less than those models that have not met this emission level. Exposure to smoke has been associated with respiratory stress and other health problems. Models that have lower smoke emissions may reduce your risk.

For more information go to www.epa.gov/woodheaters

**HYDRONIC HEATERS
SMOKE EMISSIONS RANGE**

Lower Emissions	Higher Emissions
0.00	2.0
0.32	0.50

▲ 0.32 EPA PHASE 2 EMISSIONS LEVEL
● THIS MODEL

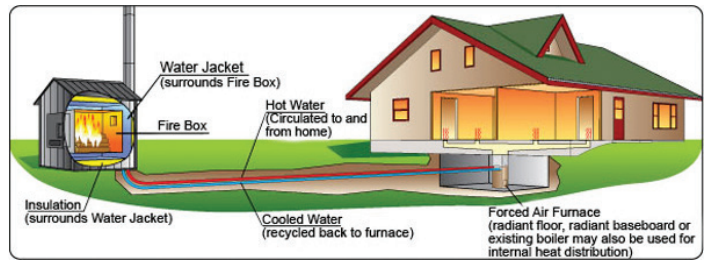
Heaters with lower emissions produce less smoke when installed and operated properly.

MANUFACTURER: XXXX
MODEL NUMBER: XXXX
B-HOUR OUTPUT HEATING: 112,000 BTU/Hr
B-HOUR OUTPUT HEATING: 70% (using higher heating value)
B-HOUR AVERAGE EFFICIENCY: 80% (using lower heating value)
FINE PARTICLE EMISSIONS: 6.1 GRAMS /HR (average)
17.4 GRAMS /HR (maximum test cell)
0.17 LBS /MILLION BTU INPUT
0.26 LBS /MILLION BTU OUTPUT
0.08 GRAMS /HR /10,000 BTU OUTPUT

EPA has determined, based on testing by an accredited independent laboratory, that this model qualifies at the Phase 2 emissions level for U.S. EPA's Voluntary Program.

Before purchasing an OWB:

1. Research existing and proposed regulations; know local codes and required setbacks, if any.
2. Purchase the cleanest, most efficient burner available.
3. Carefully select location; consider prevailing winds, proximity to surrounding buildings and adjacent neighbors.
4. Ensure that you have adequate and appropriate storage space for a season's supply of wood (expect to burn eight to 15 cords annually).
5. Have a professional install the OWB and connection to the home heating system. Consider installing a taller smoke stack to avoid releasing smoke low to the ground.
6. Follow all manufacturer's guidelines and use the Best Burn Practices recommended for OWB (<http://co.fairbanks.ak.us/landmanagement/FNSB-EPA%20Mfts%20Recommended%20Best%20Burn%20Practices.pdf>).
7. Avoid operating during late spring and early fall — smoldering fires in cool, not cold, weather will create excessive smoke, consume more wood and degrade the burner.



Graphic courtesy of Hearth, Patio and Barbecue Association (www.hpba.org/)

Advantages:

- Can heat large structures or multiple buildings effectively
- Reduce fire hazard and lower home insurance costs since the burner is located outside the home
- Improve indoor air quality
- Can burn larger pieces of wood, reducing preparation work

Disadvantages:

- Relatively inefficient compared to other wood-burning appliances
- Produce large amounts of heavy smoke, especially during startup
- Generally very expensive to purchase and install
- Prone to corrosion and accumulation of debris

Additional resources:

EPA BurnWise – Choosing the Right Hydronic Heater
www.epa.gov/burnwise/woodboilers.html

Woodheat.org – Outdoor Boilers
www.woodheat.org/outdoor-boilers.html

Hearth.com Articles
www.hearth.com/econtent/index.php/articles/owb