

Wood as a Heating Fuel...

Hard Woods Are the Best But Pine Has Its Place

By Diamond Joe Wolcot

Today's efficient woodstoves make using wood as a heating fuel one of the best—not to mention most romantic—ways to heat your home. Especially in areas where wood is cheap and you don't have to worry about air pollution.

Here are a few of the facts about using wood as a fuel.

The Combustion Process

Combustion occurs in three stages:

The first stage heats the wood and drives off moisture without warming the stove. It's important to season wood to get rid of most of this moisture content.

The second stage, which begins at about 500°F, breaks down the wood chemically, and volatile matter begins to vaporize. At about 1100°F, the gases burst into flame. Fifty to sixty percent of the wood's potential heat is released during this stage.

The third stage is the burning of the charcoal that remains after the burning of the volatile gases. The charcoal, which burns at temperatures in excess of 1100°F, gives you that nice long fire for the night.

Table 1. Wood and other fuels.

A Cord of Air-Dry Wood Equals	Tons of Coal	Gallons of Fuel Oil	Therms of Natural Gas	Kilowatt Hours of Electricity
Hickory, Hop Hornbeam (Ironwood), Black Locust, White Oak, Apple =	0.9	146	174	3800
Beech, Sugar Maple, Red Oak, Yellow Birch, White Ash =	0.8	133	160	3500
Gray and Paper Birch, Black Walnut, Black Cherry, Red Maple, Tamarack (Larch), Pitch Pine =	0.7	114	136	3000
American Elm, Black and Green Ash, Sweet Gum, Silver and Bigleaf Maple, Red Cedar, Red Pine =	0.6	103	123	2700
Poplar, Cottonwood, Black Willow, Aspen, Butternut, Hemlock, Spruce =	0.5	86	102	2200
Basswood, White Pine, Balsam Fir, White Cedar =	0.4	73	87	1900

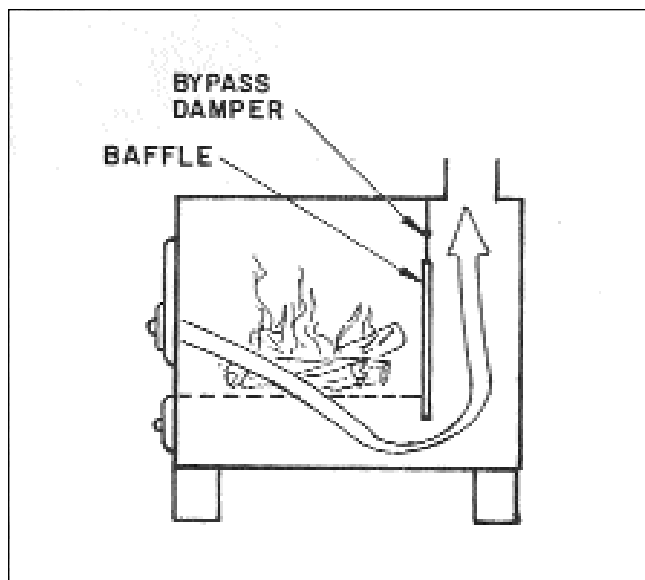


Figure 1. Typical baffle for a long flame.

Efficient Burning

For efficient burning, the volatile gases must be mixed with the proper amount of air and kept at a high heat so they burn completely inside the stove. Since wood burns with a long yellow flame, it is important to buy a woodstove that has a long flame path so that most of the heat from the volatile gases is captured.

An airtight woodstove with a baffle built into the firebox (see Figure 1) fulfills that requirement. The baffle, heated by the fire, creates the necessary long flame path to completely burn the gases.

In a standard fireplace or stove without a baffle, most of the volatile gases go up the chimney. A good airtight stove with a baffle is up to six times more efficient than a standard fireplace, and twice as efficient as a Franklin stove.

Creosote

Creosote is a brown or black sticky substance that forms on your stove pipe or chimney. As a general rule, soft woods create more creosote, and the dense smoke from a smoldering fire gives off the most. A cool chimney is fertile ground for creosote build-up.

The danger of creosote is that heavy accumulations can catch fire in your chimney or stove pipe and cause a chimney fire. Many a home has been burned to the ground with such a fire.

Unfortunately, the more efficient stoves produce the most creosote because they deliver most of the wood's heat to the room, thus leaving the stove pipe relatively cool.

A good hot fire when you first start up your stove is a good way to burn off small amounts of creosote that have collected inside the stove pipe. However, a real hot fire inside a stove that has a big creosote build-up in the chimney pipe may start a chimney fire.

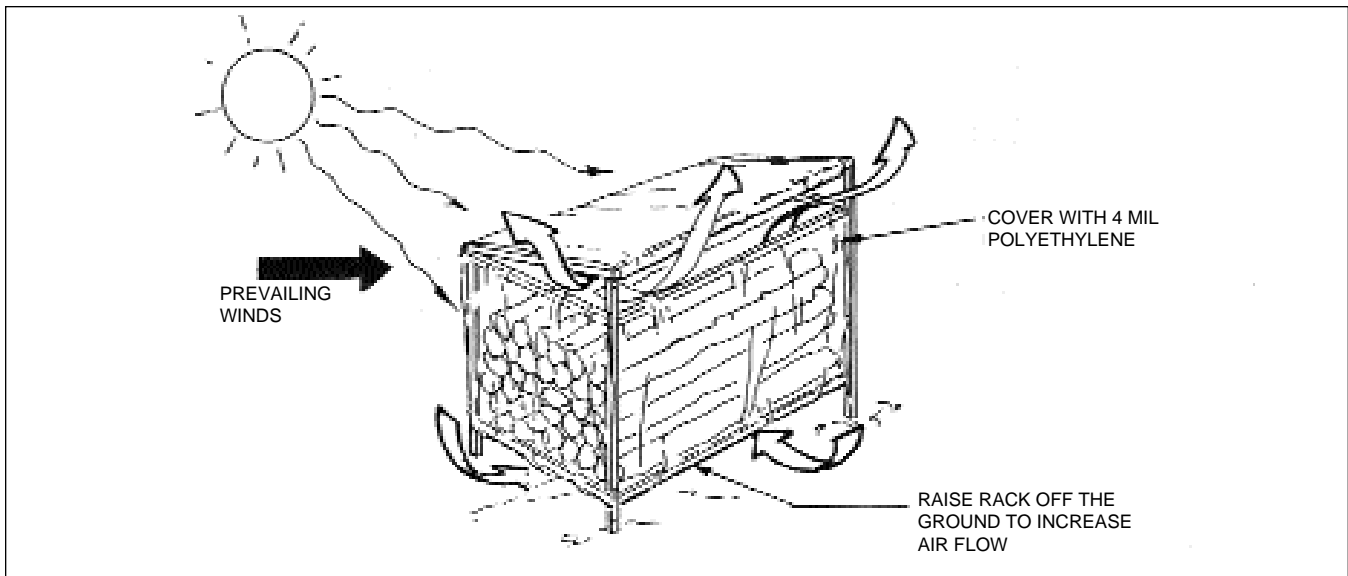


Figure 2. A solar wood dryer.

Chimney Fire

A chimney fire gives off a rushing roar. If your chimney catches fire, close down all the drafts and squirt a fire extinguisher or throw baking soda onto the fire inside the stove. The chemical will be sucked up the chimney and often will put the fire out. The best way to prevent a chimney fire is to clean it periodically with a stiff wire brush.

Wood Values

The heating value of wood varies greatly, depending on the wood. In general, the heaviest woods have the greatest heating value. Table 1 compares various types of wood to other heating fuels.

Other factors also affect the desirability of various types of wood. They include ease of splitting, extent of smoking, coaling qualities, and availability.

Pine, for example, has less heat value than oak but still makes a nice hot fire and is usually cheap or readily available in the forest. Oak, on the other hand, forms the coals you need to get a fire through the night as you sleep, but it's more expensive than pine. Table 2 compares the most important characteristics of wood.

Seasoning Wood

Seasoned wood has more heat value and is less likely to form creosote deposits than unseasoned wood. Normally you season wood for six to nine months, but the drying process can be accelerated dramatically by stacking it loosely off the ground so that air circulates freely through it, and by putting it in a simple solar dryer, as illustrated in Figure 2.

If you cut your own trees for firewood in the summer, let them lie for a week. The leaves will draw moisture from the wood and help the seasoning process.

Table 2. Characteristics of wood.

Species	Splitability	Ease of Starting	Heavy Smoke	Sparks	Coaling Qualities
Apple	Hard	Hard	No	Few	Excellent
Ash	Medium	Fair	No	Few	Good
Beech	Hard	Hard	No	Few	Excellent
Birch	Medium	Easy	No	Moderate	Good
Cedar	Easy	Easy	Yes	Many	Poor
Cherry	Medium	Easy	No	Few	Excellent
Cottonwood	Easy	Easy	Medium	Moderate	Good
Elm	Hard	Fair	Medium	Few	Good
Hemlock	Easy	Easy	Medium	Many	Poor
Hickory	Medium	Fair	No	Moderate	Excellent
Locust, Black	Hard	Hard	No	Few	Excellent
Maple	Medium	Hard	No	Few	Excellent
Oak	Hard	Hard	No	Few	Excellent
Pine	Easy	Easy	Medium	Moderate	Fair-Poor
Poplar, Yellow	Easy	Easy	Medium	Moderate	Fair
Spruce, Norway	Medium	Easy	Yes	Many	Poor
Sycamore	Medium	Fair	Medium	Few	Good
Tamarack(Larch)	Easy	Easy	Medium	Moderate	Poor
Walnut	Medium	Fair	No	Few	Good
Willow	Medium	Fair	No	Moderate	Poor