Interesting Information on Firewood

Introduction

This blog is just a mix of information on firewood, some charts, and some data. It is unlike my typical blogs, but I wanted to share to those who have an interest in wood burning.

Wood Densities

The denser the wood, the better it is as fuel. Woods in High and Medium categories are the best fuel woods.

The chart below lists woods from densest to least dense. Density varies with conditions. Some softwoods are denser than hardwoods because these terms relate to taxonomy, not physical properties.

Densities of Various North American Woods

Hardwoods

High	Medium	Low
Live Oaks	Sugar Maple	Red Alder
Eucalyptus	American Beech	Large Tooth Aspen
Hop Hornbeam	Honey Locust	Basswood
Dogwood	Yellow Birch	Chestnut
Hickory	White Ash	Catalpa
Shadbush	Elm	Black Willow
Persimmon	Black Gum	Box Elder
White Oak	Red Maple	Tulip Poplar
Black Birch	Black Walnut	Butternut
Black Locust	Paper Birch	Quaking Aspen
Apple	Red Gum	Cottonwood
Blue Beech	Cherry	Willow
Crabs	Holly	Balsam Poplar
Red Oak	Grey Birch	
	Sycamore	
	Oregon Ash	
	Sassafras	
	Magnolia	

Softwoods

High	Medium	Low
Slash Pine	Yew	Ponderosa Pine
Pone Pine	Tamarack	Red Fir
Western Larch	Nut Pines (Pinyon)	Noble Fir
Longleaf Pine	Shortleaf Pine	Black Spruce
	Junipers	Bald Cypress
	Loblolly Pine	Redwood
	Douglas Fir	Hemlocks
	Pitch Pine	Sitka Spruce
	Red Cedar	Yellow Cedar
	Norway Pine	White Spruce
		White Pine
		Balsam Fir
		Western Red Cedar
		Sugar Pine

Source: Gay, Larry. The Woodcutting and Heating Book. Garden Way Publishing, 1974.

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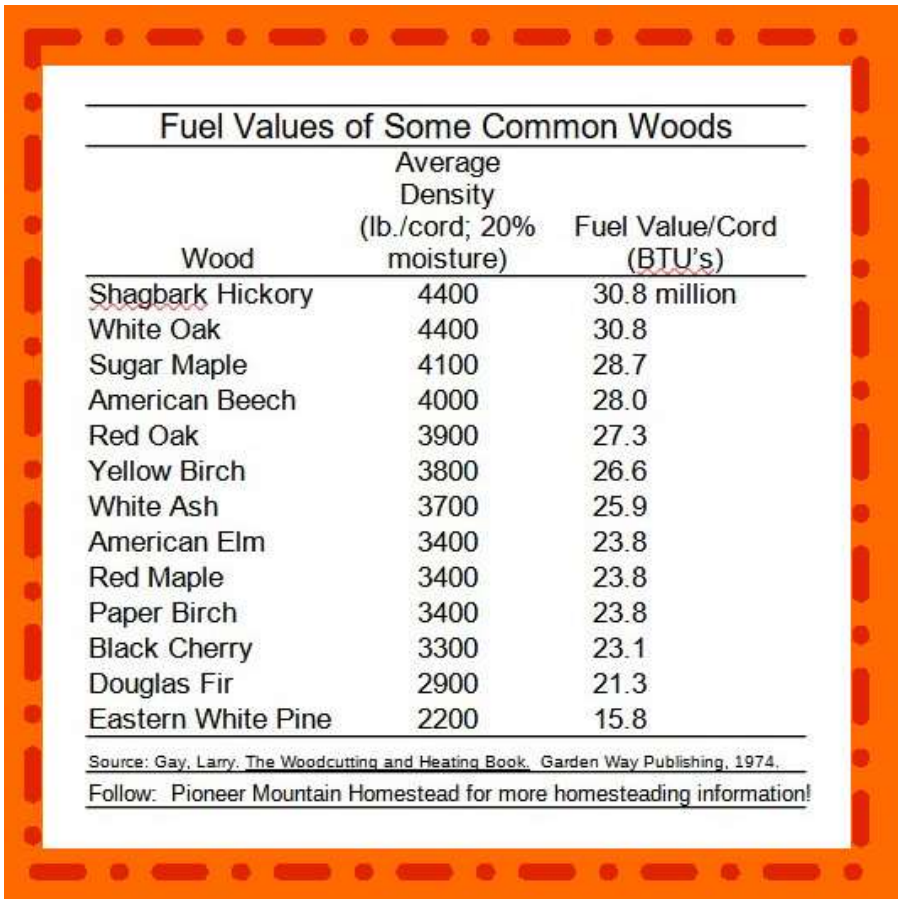
Fuel Value of Woods

An air dried cord of firewood has about 20% moisture still remaining in it (this is often referred to as "seasoned" firewood). As every wood species weighs differently, breaking down firewood by the pound to conclude the amount of fuel value it contains makes comparing various wood types easier.

A bone dry pound of wood represents 8600 BTUs (this would be as if you could get the wood to zero percent moisture). Since, in the real world, an air dried cord is about 20% moisture, this is taken into consideration when calculating BTUs. Therefore, air dried (20% moisture) hardwood firewood contains about 7,000 BTUs per pound with Douglas Fir containing 7360 BTUs per pound and White Pine containing 7200 BTUs per pound. (Why are Douglas Fir and White Pine different? The answer is because they have inflammable resins in the wood that the others do not).

By knowing the type of wood you are burning, you can calculate the number of anticipated BTUs you will get from the wood. However, there is one more important factor to consider in how much fuel value you will get from your firewood. That factor is the efficiency of the wood stove burning it. For example, if you have a wood stove that is only 50% efficient and you are burning white oak, you can anticipate 15.4 million BTU's from the wood. If your wood stove is 60% efficient, you increase your BTUs to 18.5 million which is a 20% increase in BTUs for raising efficiency 10%.

Knowing all this information is helpful when determining whether wood is your best choice for heat (over oil, gas, or electric) and for determining whether upgrading to a more efficient stove is cost effective.



Fuel Values of Some Common Woods

Wood	Average Density (lb./cord; 20% moisture)	Fuel Value/Cord (BTU's)
Shagbark Hickory	4400	30.8 million
White Oak	4400	30.8
Sugar Maple	4100	28.7
American Beech	4000	28.0
Red Oak	3900	27.3
Yellow Birch	3800	26.6
White Ash	3700	25.9
American Elm	3400	23.8
Red Maple	3400	23.8
Paper Birch	3400	23.8
Black Cherry	3300	23.1
Douglas Fir	2900	21.3
Eastern White Pine	2200	15.8

Source: Gay, Larry. The Woodcutting and Heating Book. Garden Way Publishing, 1974.

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Can I Burn Wet Wood?

The simple answer is “yes”. In fact, extra moisture in wood does not lower the fuel value. However, burning wet wood is not recommended because it reduces efficiency. It takes energy to vaporize the water in the wood. Additionally, full combustion is often not achieved due to the cooling effect of vaporizing the water. You will therefore lose efficiency of your fuel (wood). Additionally, water vapor from wet wood can cool your chimney flue gases.

If you have no choice but wet (green) wood, it is best to split it into small pieces. Green ash wood is the most preferred wet wood due to its low moisture content on the stump.