

Fuelwood Facts

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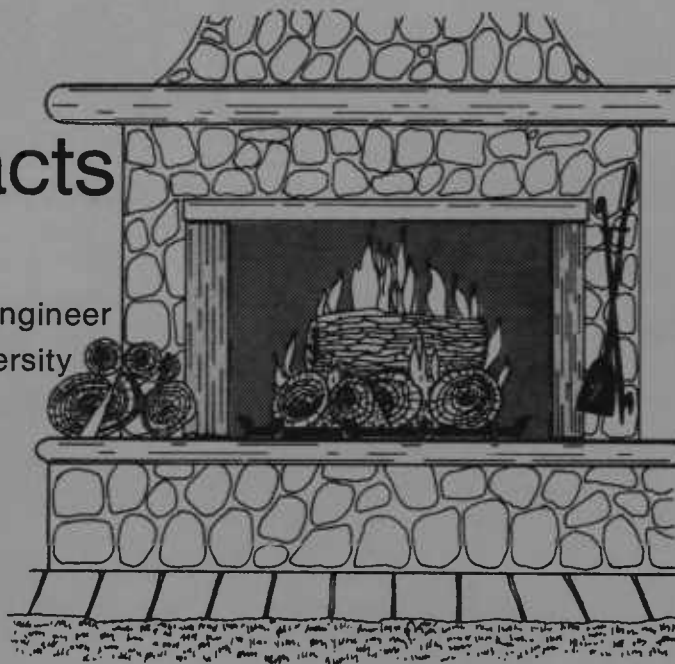
Fireplaces and wood stoves, popular aesthetic accessories of the recent past, are rapidly gaining prominence as primary or supplemental heat sources for homes. The rising costs, and in some instances actual shortages, of conventional home heating energies have led to greatly increased utilization of wood as a heating fuel.

Firewood, one of nature's most common methods of storing solar energy, is a renewable energy source. It is a relatively clean, efficient, safe energy source having low sulfur content and is generally found throughout the country. Its primary products of combustion are carbon dioxide, water vapor and ash. The ash content is low—only one to two percent by weight—and that which does remain can be used as a worthwhile soil conditioner.

A wood fire is easy to start and produces a large quantity of heat in a short time as well as adding a cheerful atmosphere to the home. It is important that ample air be supplied to any wood fire to assure complete burning of combustible gases. Wood fires are ideal where heat is required only occasionally, for warming a living area on cool days or for supplying extra heat in extremely cold weather. When considering wood as a primary heat source, several factors must be carefully weighed to assure satisfactory results and acceptable efficiencies.

Heat from Wood

The heat content of any fire depends upon wood density, resin, ash and moisture. A rule of thumb often used for estimating heating value of firewood is: "One cord of well-seasoned hardwood (weighing approximately two tons) burned in an airtight, draft-controlled wood stove with a 55-65% efficiency is equivalent to approximately 175 gallons of #2 fuel oil or 225 therms of natural gas consumed in normal furnaces having 65-70% efficiencies." Generally, hardwoods, which provide



long-burning fires, contain the greatest total heating value per unit of volume. Softwoods, which give a fast-burning, crackling blaze, are less dense and contain less total heating value per unit of volume. All woods dried to the same moisture content contain approximately the same heat value per pound—from 8,000 to 9,500 Btu for fully dried wood and 5,500 to 8,500 for air-seasoned wood.

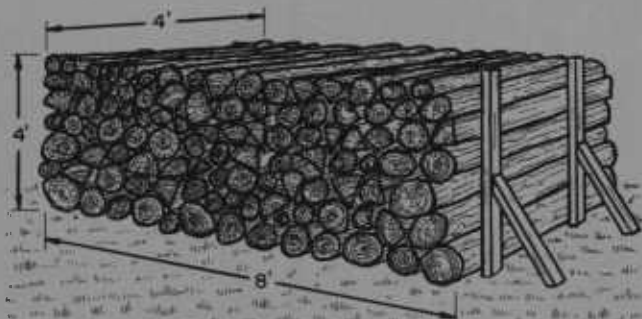
Wood Characteristics

When considering the type of wood for use as firewood, several characteristics are important. These include: (a) heat value, (b) ease of splitting, (c) weight per volume unit, (d) ease of starting, (e) amount of smoking, (f) fragrance, (g) extent of sparking, and (h) coaling qualities. Moisture content of the wood, number of knots and pitch content all affect these characteristics. The accompanying chart lists characteristics of the more common woods used as firewood.

Wood Measures

The common unit of wood measurement is the standard cord—a pile of wood stacked 4 feet wide, 4 feet high, 8 feet long, with a total volume of 128 cubic feet. The actual volume of wood in such a pile depends upon the size and straightness of pieces and how they are split, but usually averages about 2/3 actual wood and 1/3 void space. Various shaped stacks or piles are often assembled to approximate either a full or some fraction of the

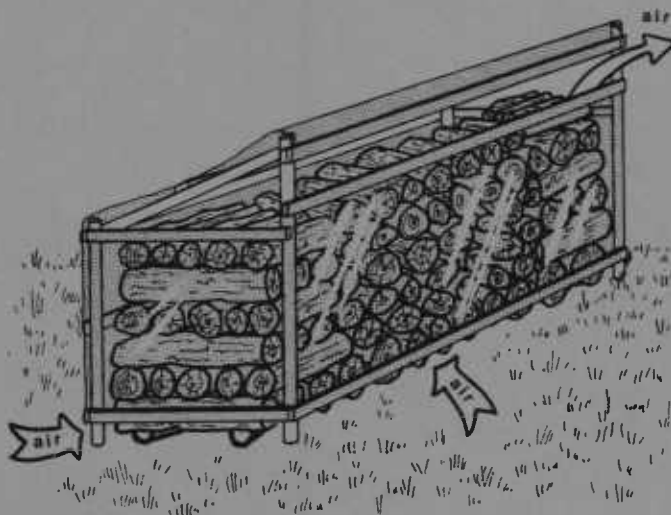




Standard cord of wood is a pile of 4-foot long logs stacked 8 feet wide and 4 feet high, with a total volume of 128 cubic feet. A face cord is a pile of 16- to 18-inch long logs stacked 8 feet wide and 4 feet high. A cord of green wood will shrink at least 8% in volume during seasoning.

standard cord and sold accordingly. A common unit is the "face cord" or rick—a stack 4 feet high and 8 feet long but only 16 inches deep, containing 1/3 of a cord. Other commonly used units are "pickup load" and "bundle." The "pickup load" should contain 1/3 cord, which requires an 8-foot bed, 19 inches deep or a 6-foot bed with full 24-inch sides. The "bundle" may vary but usually contains 5-1/3 cubic feet or 1/24th of a standard cord. The buyer must use his own judgment in determining how closely the unit he is buying approximates a standard cord.

Firewood is often sold by weight. Freshly cut or green wood can contain from 40 to 60% moisture by weight, whereas properly-seasoned wood contains only 15 to 20%. Select the driest wood when buying by weight.

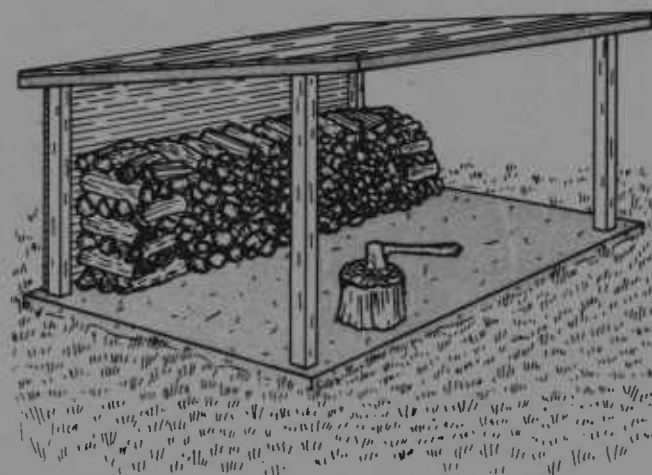


Combination wood dryer/shelter is provided by this simply-constructed solar wood dryer. Stack wood loosely to provide greater surface area and hasten drying. Cracks or checks in log ends indicate good seasoning.

Firewood Preparation

Wood should be dried as much as possible before burning. Properly-seasoned wood has about 7,700 Btu maximum usable energy per pound versus only about 5,000 Btu available from green wood. For best results, season or air-dry wood for at least six to eight months after cutting. This should bring the moisture content down to 15 to 20% by weight. The best time to cut wood is during the winter or early spring before the sap runs. If the tree is felled when fully leafed out, let it lie until leaves have become crisp to allow leaves to draw out as much moisture as possible from the tree before further cutting.

Drying time is greatly reduced if wood is cut into firewood length and split, especially pieces larger than 8 inches in diameter. Splitting is easiest when wood is frozen or green and should be done before wood is stacked. Wood must be properly stacked for satisfactory drying. The greater the surface area exposed to air, the more rapid the drying. Therefore, stack wood loosely and keep it off moist ground. The stack should be located in an open area for good air circulation—avoid stacking in woodlots for seasoning.



Split, dry wood should be protected from weather, especially frozen snow and ice. Woodshed can be constructed easily and inexpensively with pole construction. Simpler protection can be provided with planks, plywood, sheets of metal roofing or plastic placed over stacked wood to keep out rain, snow and ice.

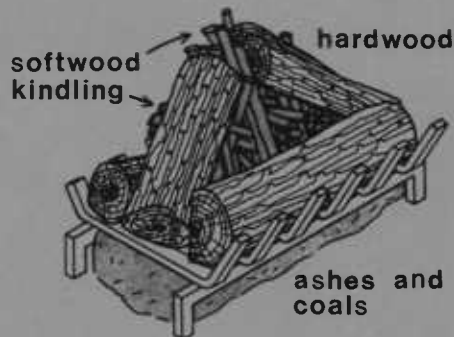
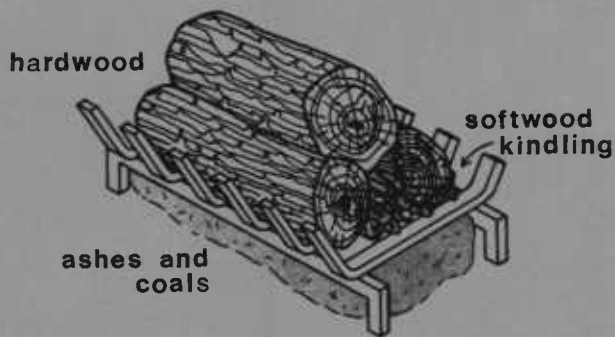
Store firewood outdoors, under partial or full protection from the elements, and no closer than 25 feet from the house. Keep area around wood clear of weeds, leaves, debris, etc., to discourage rodents, snakes, insects, and other unwanted pests from making their home in the stacked wood. Avoid storing large quantities in the house, warm garage or basement because the heat will activate insect and fungi or spore activity and bring about hatching of any insect eggs in or on the wood.

Fuelwood Characteristics

Species	Heat ¹	Weight ²	Ease of splitting	Ease of starting	Coaling qualities	Sparks	Fragrance
Alder	M-L	2540	Easy	Fair	Good	Moderate	Slight
Apple	H-M	4400	Difficult	Difficult	Excellent	Few	Excellent
Ash	H	3440	Easy-Mod.	Fair-Diff.	Good-Exc.	Few	Slight
Aspen	L	2160	Easy	Easy	Good	Few	Slight
Basswood	L		Easy	Easy		Few	Good
Beech	H	3760	Difficult	Difficult	Excellent	Few	Good
Birch, White	M	3040	Easy	Easy	Good	Moderate	Slight
Birch, Yellow	H-M	3680	Moderate	Easy		Moderate	
Boxelder						Many	
Cedar, West. Red	M-L	2060	Easy	Easy	Poor	Many	
Cherry	M	3200	Easy	Difficult	Excellent	Few	Excellent
Chestnut	L						Good
Cottonwood	L	2160	Easy	Easy	Good	Moderate	Slight
Dogwood	H	4230	Difficult			Few	
Elm	M	2260	Very Diff.	Fair	Good	Very Few	Fair
Eucalyptus							Good
Fir, Douglas	M	2970	Easy	Easy	Fair	Moderate	Slight
Fir, Grand	L	2160					
Hemlock	M-L	2700	Easy	Easy	Poor	Many	Good
Hickory	VH	4240	Moderate	Fair-Diff.	Excellent	Moderate	Excellent
Ironwood (Hornbeam)	VH	4000	Very Diff.	Very Diff.	Excellent	Few	
Juniper	M	3150				Many	Good
Larch, Western	H-M	3330	Easy-Mod.	Easy	Fair	Many	Slight
Locust, Black	VH	3840	Very Diff.	Difficult	Excellent	Very Few	Slight
Madrone	H	4320	Difficult	Difficult	Excellent	Very Few	Slight
Maple, Red	H-M	3200	Moderate	Fair-Diff.	Excellent	Few	
Maple, Sugar	H	3680	Moderate	Difficult	Excellent	Few	Good
Mesquite	VH		Very Diff.	Very Diff.	Excellent	Few	
Mulberry	M						
Oak, Red	H	3680	Moderate	Difficult	Excellent	Few	Fair
Oak, White	VH	4200	Moderate	Difficult	Excellent	Few	
Osage Orange	H						Excellent
Pecan	H		Moderate		Good	Few	Good
Pine, Lodgepole	L	2610	Easy	Easy	Fair	Moderate	Good
Pine, Ponderosa	M-L	2240	Easy	Easy	Fair	Moderate	Good
Pine, White	M-L	2250	Easy	Easy	Poor	Moderate	Good
Pine, Yellow	H-M	2610	Easy	Easy	Fair	Moderate	Good
Poplar	L	2080	Easy	Easy	Fair	Moderate	Bitter
Redwood	M	2400	Easy	Easy-Fair	Poor	Many	Slight
Spruce, Engelman	L	2070	Easy	Easy	Poor	Few	Slight
Spruce, Norway	L	2240	Moderate	Easy	Poor	Many	Slight
Spruce, Sitka		2340	Easy				
Sweet Gum	M		Difficult	Fair		Few	
Sycamore	M	3300	Very Diff.	Fair		Few	
Tamarack	H-M		Easy-Mod.	Easy-Fair		Many	
Walnut	H-M		Moderate	Fair	Good	Few	Fair
Willow	L	2540	Easy	Fair	Poor	Moderate	Slight

¹ VH—Very High; H—High; M—Medium; L—Low.

² Approximate weight, lb/cord, for air-seasoned (20% moisture content) wood.



Properly-laid fire has a bank of ashes 1-2 inches below bottom of grate, uses softwood kindling for starting and hardwood logs for slow, steady burning. Allow space between logs for air passage.

Cost of Cutting Your Own Wood

Firewood is very seldom totally "free." Many people purchase firewood from local suppliers. Others like to cut their own. The following chart can be used to estimate the cost of cutting wood under your particular situation.

Costs for Cutting Cord of Wood

Saw Costs: \$_____ annual cost ÷ _____ cords/yr	\$_____
Mileage: _____ mi/load x _____ loads/cord x _____¢/mi	\$_____
Labor-Cut: _____ hr/load x _____ loads/cord x \$_____/hr	\$_____
Labor-Load & Haul: _____ hr/load x _____ loads/cord x \$_____/hr	\$_____
Labor-Split & Stack: _____ hr/load x _____ loads/cord x \$_____/hr	\$_____
Permit—Charge per cord	\$_____
Total cost per cord	\$_____

Assume: Annual saw costs—maintenance, depreciation, fuel = \$30 to \$40
 Mileage costs = \$.15/mile for average pick-up or car/trailer setup
 Labor costs at a figure that fits situation—
 if a "recreational activity," could be no charge.

Building a Better Fire

Before lighting a fire, make sure the thermostat is turned down so air heated by the central furnace will not go up the chimney. The easiest and best fire for either a stove or fireplace is achieved with a mixture of softwoods and hardwoods—combining softwoods for easy igniting with hardwoods for longer burning and good coaling qualities. A cardinal rule of fireplace management is: keep a thick bed of ashes underneath, but no closer than an inch or two to the bottom of grate, forming a bed for glowing coals that drop through. The coals yield a steady heat and aid in igniting fresh fuel as it is added. Keep the fire burning by adding small amounts of wood at regular intervals. A small, hot fire is much better than a large, roaring blaze because it burns more completely and produces less creosote.

Precautions

Coal should never be burned in a stove or heater designed for wood. Artificial or manufactured logs, which are composites of sawdust, chips, colorful chemicals, starch binders and wax, should be burned only in open brick fireplaces—the wax burns at too hot a temperature for metal stoves and chimneys. When using manufactured logs in fireplaces, never crumble the burning log with tongs or poker. Avoid using wood salvaged from poles, posts and lumber that has been treated with wood preservatives such as creosote or pentachlorophenol; these chemical compounds may vaporize upon combustion and cause respiratory problems for those breathing the fumes. Wet or green wood or highly-resinous wood should not be burned because of the large amounts of wood tars, creosote and wood extractives given off which can coat chimney flues and cause serious chimney fires if ignited.

Which Wood Burns Best?

Beech wood fires are bright and clear,
 If the logs are kept a year.
 Chestnut's only good, they say,
 If for long it's laid away.
 Birch and pine logs burn too fast,
 Blaze up bright and do not last.
 Elm wood burns like a church yard mold,
 Ev'n the very flames are cold.
 Poplar gives a bitter smoke,
 Fills your eyes and makes you choke.
 Apple wood will scent your room
 With incense like perfume.
 Oak and maple, if dry and old,
 Keep away the winter cold.
 But ash wood wet and ash wood dry
 A king shall warm his slippers by.

—Anonymous