A4163

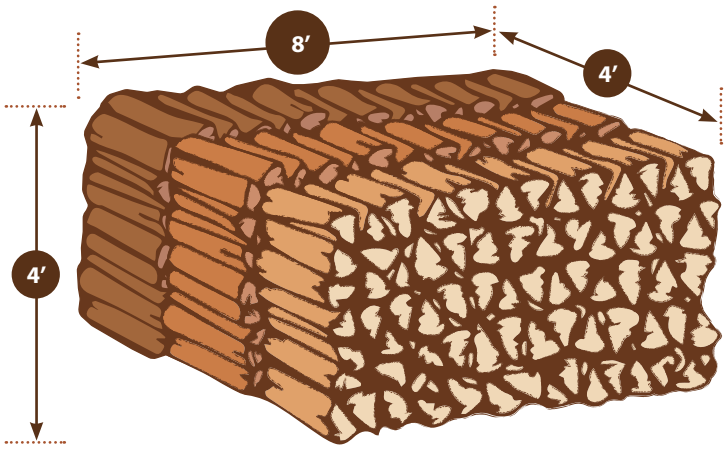
Tips for Buying, Drying, and Storing Firewood

Scott Sanford

The thought of sitting in front of a wood-burning fireplace or stove, sipping a warm beverage, evokes a cozy, perhaps even romantic, feeling. However, wood that won't burn or doesn't fit in the firebox of the stove can be a distracting nuisance. The recommendations in this fact sheet can help make your wood use—from purchasing to burning—a warm experience.

Wisconsin has no state standards or set specifications for the sale of firewood, but the moisture content, tree species, and size and quantity of wood directly affect the amount of heat firewood is capable of producing. Most firewood is purchased through informal agreements and often with no guarantee of quality or performance. Specifying the quantity, type of wood (softwood or hardwood), log length, maximum cross section, and maximum moisture content before purchasing will help ensure the firewood meets your needs and expectations.

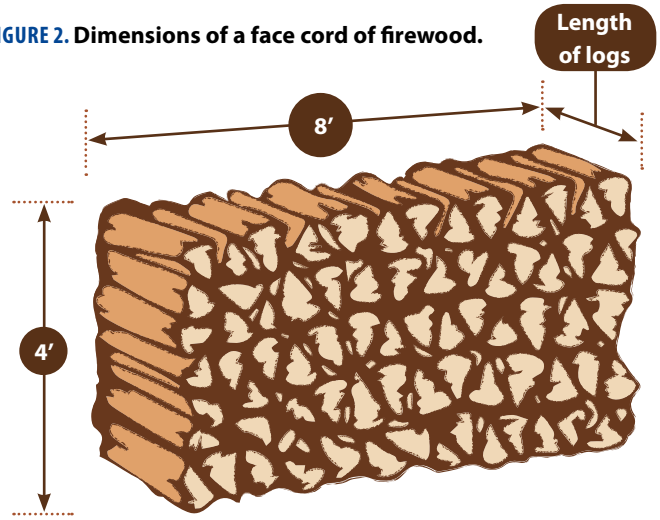
FIGURE 1. Dimensions of a cord of firewood.



Buy local

Buy it where you burn it. Wisconsin has become home to several tree-killing invasive insects and diseases, such as the Emerald Ash Borer, Gypsy Moth, and oak wilt. Unless the wood has been heat-treated to kill pests, moving firewood can potentially transport invasive species and spread disease. Sourcing wood within a 10-mile radius will reduce the chances of introducing these pests into your yard or neighborhood.

FIGURE 2. Dimensions of a face cord of firewood.



Quantity of wood

Firewood is normally measured by the *cord*, which is a stack of wood 4 feet high, 8 feet wide, and 4 feet deep, equal to 128 cubic feet (figure 1). If the wood is thrown in a pile, it will require about 180 cubic feet to result in a cord of wood when stacked. Some firewood buyers like to purchase logs and cut them themselves, so they might buy what is known as a "loggers cord" or "pulp cord." This type of cord consists of either 8-foot-long logs stacked 4 feet high and 4 feet wide or 4-foot-long logs stacked 4 feet high and 8 feet wide.

Over the years the term "cord" has been used loosely for smaller quantities of wood. A "face cord," "fireplace cord," or "rick" is a stack of wood 4 feet high by 8 feet long by the length of one log (figure 2). The volume of wood of one of these types of cords varies depending on the length of the logs. It can be ¼ of a full cord if the logs are 12 inches long, ⅓ of a cord if the logs are 16 inches long, or ½ of a cord if the logs are 24 inches long.

A long bed pickup truck without racks holds about ½ cord of wood, while one with racks the height of the truck cab holds approximately one cord.

Weight can also be used as a purchase measurement along with the moisture content of the wood. Table 1 can be used as a guide for the expected weight of a seasoned (dry) cord of wood. If purchasing wood by weight, a cord of mixed hardwood at 20% moisture could weigh 3000 to 3500 pounds while a cord of softwood might weigh 2300 to 2600 pounds.

Species of wood

Tree species is important when choosing and buying firewood. Typically wood is sold as "hardwood" or "softwood," often based on the structure, density, and other distinctive characteristics of the wood. Softwood species include pines, spruce, and fir trees (evergreens). They will season more quickly and are easier to ignite, but they have a lower overall energy content and emit more smoke than hardwoods (table 1). Hardwood species are trees with broad leaves and range from hickory to willow. They can be divided into two sub groups: high-density and low-density species. High-density species include oaks, maples, elm, hickory, beech, and cherry, and they produce more heat per cord. Low-density hardwood species, such as box elder, cottonwood, poplar, and willow, weigh less per volume, have lower energy content, and burn more like softwoods. All wood has an energy content of about 8000 Btu per pound at 20% moisture, but the density varies by species such that a cord of oak will weigh more than a cord of poplar and thus contains more energy.

TABLE 1. Burning characteristics of select wood species.

Wood species	Weight (lbs/cord)		Energy per dry cord (million Btus)	Relative smoke emissions
	Green	Air-dried		
White oak	5573	4200	29.1	low
Black locust	4616	4016	27.9	low
Bur oak	4960	3768	26.2	low
Sugar/rock maple	4685	3680	25.5	low
Birch	4312	2992	20.8	medium
Douglas fir	3319	2970	20.7	high
Green ash	4184	2880	20.0	low
American elm	4456	2872	20.0	medium
Silver maple	3904	2752	19.0	low
Box elder	3589	2632	18.3	medium
Cottonwood	4640	2272	15.8	medium
Spruce	2800	2240	15.5	medium
White fir	3585	2104	14.6	medium

Source: M. Kuhns & T. Schmidt, Heating with Wood, University of Nebraska-Extension

Cross-section size

Splitting firewood promotes faster drying, as dry wood burns better and provides more heat. All logs should be split at least once regardless of size, otherwise the bark of many tree species holds the moisture in and the logs won't dry out. No piece of wood should have a cross-section measuring larger than 6 inches. If you need wood to dry faster, split it into smaller pieces.

Moisture content and drying

"Ready to Burn" firewood should have a moisture content of less than 20%, ideally about 15%. The only real way to know the moisture content is to split a piece of wood and use a moisture tester (figure 3). Moisture meters can be purchased for $30 to $50. Other signs that the wood is seasoned include cracks in the ends of the wood and bark that is falling off.

Burning wet wood is a waste! Freshly cut wood will have a moisture content of 45% to 50%. If the moisture level is greater than 20%, you won't get much heat out of it, it won't burn well, and it will emit more smoke. It typically takes one to two summers for high-moisture wood to dry down to less than 20% moisture. Denser wood, like oak or maple, will take two summers to dry, while less dense wood like box elder or poplar will dry in one summer if split. Some species of wood, such as oak, won't dry if the bark remains on (even a smaller branch) and must be split to facilitate drying. If you are burning wood and you see moisture seeping from the ends, it's not dry enough. For videos and a brochure on how best to season your firewood and use a wood moisture meter, please visit EPA's Burn Wise website at **www.epa.gov/burnwise**.

FIGURE 3. Moisture meter.

Storage

If firewood is in direct contact with the ground, it will absorb moisture and not dry out. It is best to stack wood on pallets or logs to provide an air space between the ground and the wood to facilitate faster drying. Covering the top of a stack will help keep rain and snow from wetting the logs, but avoid covering the sides so air can flow between the logs. When stacking wood, placing the bark-covered side of the wood up will help to shed any water that does infiltrate the stack. If piling wood, having it on a hard surface such as concrete will help reduce moisture absorption. Long narrow piles will dry better than one big pile.

Following these tips will help you make informed choices when buying firewood and help ensure that the wood you buy burns as expected. For more information, refer to these resources:

- EPA's Burn Wise program **www.epa.gov/burnwise**
- Wisconsin State Wood Energy Team **www.wisconsinwoodenergy.org**

Additional reading

- Sanford, S. 2018. *How to Compare Heating Fuels*, Publication A4162, University of Wisconsin-Extension. **https://learningstore.uwex.edu/Assets/pdfs/A4162.pdf**.
- Sanford, S. and D. Liebl, 2014. *Wood Heating Appliances for Homes and Businesses*, Publication GWQ066, University of Wisconsin-Extension. **https://learningstore.uwex.edu/Assets/pdfs/GWQ066.pdf**.

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