The Chimney Sweep *Online Fireplace, Woodstove, Gas Stove and Barbecue Shop*

Sweep's Library: Firewood BTU Comparison Charts

Here are two charts showing the weight and available heat content of one cord of firewood of various species, the first sorted by heat value, and the second sorted alphabetically for easy lookup. The heat value measurement used is the British Thermal Unit, or BTU, which is defined as the amount of thermal energy it takes to raise one pound of water one degree F. One MBTU = one million BTUs.

Firewood Chart A: Sorted by BTU Content

Common Name	Species Name	Pounds /Cord	MBTU /Cord
Osage Orange (Hedge)	Maclura pomifera	4,845	30.0
Hop Hornbeam (Ironwood)	Ostrya virginiana	4,250	26.4
Persimmon, American	Diospyros virginiana	4,165	25.8
Hickory, Shagbark	Carya ovata	4,080	25.3
Dogwood, Pacific	Cornus nuttallii	3,995	24.8
Holly, American	Ilex Opaca	3,995	24.8
Birch, Black	Betula lenta	3,910	24.2
Oak, White	Quercus alba	3,910	24.2
Madrone, Pacific (Arbutus)	Arbutus menziesii	3,825	23.7
Oak, Post	Quercus stellata	3,825	23.7
Locust, Honey	Gleditsia triacanthos	3,825	23.7
Hickory, Bitternut	Carya cordiformis	3,825	23.7
Beech, Blue (Ironwood)	Carpinus caroliniana	3,825	23.7
Mulberry	Morus rubra	3,740	23.2
Locust, Black	Robinia pseudoacacia	3,740	23.2
Maple, Sugar	Acer saccharum	3,740	23.2
Beech, American	Fagus grandifolia	3,655	22.7
Oak, Oregon (Garry)	Quercus garryana	3,655	22.7
Oak, Bur (Mossycup)	Quercus macrocarpa	3,655	22.7
Oak, Red	Quercus rubra	3,570	22.1
Birch, Yellow	Betula alleghaniensis	3,570	22.1
Ash, White	Fraxinus americana	3,485	21.6
Myrtle, Oregon (Pepperwood)	Umbellularia californica	3,485	21.6
Apple	Malus domestica	3,485	21.6

Firewood Chart B: Sorted Alphabetically

Common Name	Species Name	Pounds /Cord	MBTU /Cord
Alder, Red or White	Alnus rubra or rhombifolia	2,380	14.8
Apple	Malus domestica	3,485	21.6
Ash, Black	Fraxinus nigra	2,890	17.9
Ash, Green	Fraxinus pennsylvanica	3,400	21.1
Ash, Oregon	Fraxinus latifolia	3,230	20.0
Ash, White	Fraxinus americana	3,485	21.6
Aspen, American (Poplar)	Populus tremuloides	2,210	13.7
Balsa	Ochroma pyramidale	935	5.8
Bamboo	Poaceae bambusoideae	1,615	10.0
Basswood (Linden)	Tilia americana	2,210	13.7
Beech, American	Fagus grandifolia	3,655	22.7
Beech, Blue (Ironwood)	Carpinus caroliniana	3,825	23.7
Birch, Black	Betula lenta	3,890	24.2
Birch, Gray	Betula populifolia	3,145	19.5
Birch, Yellow	Betula alleghaniensis	3,570	22.1
Birch, White (Paper)	Betula papyrifera	3,230	20.0
Boxelder (Maple Ash)	Acer negundo	2,890	17.9
Buckeye, Ohio	Aesculus glabra	1,955	12.1
Butternut (White Walnut)	Juglans cinerea	2,125	13.2
Catalpa (Catawba)	Catalpa speciosa	2,380	14.8
Cedar, Eastern (Redcedar)	Juniperus virginiana	1,955	12.1
Cedar, White	Thuja occidentalis	1,870	11.6

Ash, Green	Fraxinus pennsylvanica	3,400	21.1
Maple, Black	Acer nigrum	3,400	21.1
Walnut, Black	Juglans nigra	3,230	20.0
Maple, Red	Acer rubrum	3,230	20.0
Ash, Oregon	Fraxinus latifolia	3,230	20.0
Birch, White (Paper)	Betula papyrifera	3,230	20.0
Tamarack (Larch)	Larix laricina	3,145	19.5
Birch, Gray	Betula populifolia	3,145	19.5
Hackberry	Celtis occidentalis	3,145	19.5
Juniper, Rocky Mtn	Juniperus scopulorum	3,145	19.5
Cherry, Black	Prunus serotina	3,145	19.5
Coffeetree, Kentucky	Gymnocladus dioicus	3,060	19.0
Sorrel (Sourwood)	Oxydendrum arboreum	3,060	19.0
Elm, Red	Ulmus rubra	3,060	19.0
Eucalyptus (Red Gum)	Eucalyptus camaldulensis	2,975	18.4
Elm, American	Ulmus americana	2,975	18.4
Sycamore, American	Platanus occidentalis	2,890	17.9
Maple, Big Leaf	Acer macrophyllum	2,890	17.9
Elm, White (Russian)	Ulmus laevis	2,890	17.9
Ash, Black	Fraxinus nigra	2,890	17.9
Boxelder (Maple Ash)	Acer negundo	2,890	17.9
Pine, Norway (Red)	Pinus resinosa	2,890	17.9
Fir, Douglas	Pseudotsuga menzies II	2,805	17.4
Maple, Silver	Acer saccharinum	2,805	17.4
Compressed Sawdust Logs *	Presto homofecit stipes	2,000	16.5
Pine, Pitch	Pinus rigida	2,635	16.3
Pine, Lodgepole	Pinus contora latifolia	2,465	15.3
Hemlock	Pinaceae tsuga	2,465	15.3
Spruce, Black	Picea mariana	2,465	15.3
Catalpa (Catawba)	Catalpa speciosa	2,380	14.8
Pine, Ponderosa	Pinus ponderosa	2,380	14.8
Alder, Red or White	Alnus rubra or rhombifolia	2,380	14.8
Pine, Jack (Canadian)	Pinus banksiana	2,380	14.8
Spruce, Sitka	Picea sitchensis	2,380	14.8
Pine, White (Idaho)	Pinus monticola	2,236	14.3
Willow	Salix	2,295	14.2
Fir, Concolor (White)	Abies concolor	2,295	14.2
Basswood (Linden)	Tilia americana	2,210	13.7
Aspen, American (Poplar)	Populus tremuloides	2,210	13.7
Butternut (White Walnut)	Juglans cinerea	2,125	13.2
Pine, White (Eastern)	Pinus strobus	2,125	13.2
(Whitecedar)			
Cherry, Black	Prunus serotina	3,145	19.5
Coffeetree, Kentucky	Gymnocladus dioicus	3,060	19.0
Compressed Sawdust Logs *	Presto homofecit stipes	2,000	16.5
Cottonwood (Balsam Poplar)	Populus trichocarpa	2,040	12.6
Dogwood, Pacific	Cornus nuttallii	3,995	24.8
Elm, American	Ulmus americana	2,975	18.4
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Weight and Heat content figures are based on seasoned wood at 20% moisture content, and 85 cu ft of wood per cord. A cord of wood is defined as a stack 4 feet high, 4 feet deep and 8 feet long, which comes to 128 cu ft, but we deduct for air space between the pieces in the stack.

*** Compressed sawdust logs sell by weight, not volume. BTU content given is for one ton (2,000 lbs)**

To read about how we derived the numbers for our charts, click here.

Regardless of what species of wood you burn, it won't produce optimal heat output and burn time unless it is properly seasoned. You can read more about why you shouldn't burn unseasoned fuel wood here.

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A Correction from Wyoming

Just a comment on your BTU chart. A cord of wood is 4X4X8 SOLID! (as in stacked lumber) so when you deducted the "air space" it was an error. However... you did use the same formula for all species, so the BTU content in relation to each other is still accurate, even though the number isn't accurate for a cord. I did like the fact that you put weights on the list also. Guys are constantly telling me they can get 1 1/2 cords on a pick-up. Didn't think they were... looking at these weights, now I'm sure. Thanks for the info.

Mike

Hi Mike,

I'll admit that a tight stack of dimensional lumber will have very little airspace, but dimensional lumber is sold by the board/foot, not the cord. Our charts are concerned with fuel wood, which is irregular-shaped rounds and splits off the tree. The correction for airspace between pieces didn't originate with us, it is a widely held standard in the hearth product and solid fuel industries, and we consider it pretty accurate.

And consider the price you'd pay for a cord of dimensional lumber! If you put together a 4' wide x 4' tall stack of 8' long Doug Fir 4x4's, it would take 188 of them (considering actual size, 3-1/2" x 3-1/2"), which would run

you $1740.00 at the lumber yard at today's price.

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A Correction from Plymouth, Minnesota

I need to address your silly comment about the airspace in a cord of wood. Back in the day, a cord of wood was 4x4x8 as it is today. However, it was made up of unsplit logs in 8ft lengths stacked 4ft high and 4ft wide. Logs then were commonly 2ft in diameter or much lager. Therefore, cords could easily be comprised of four 24" logs stacked two each high and two each wide.

Bruce

Hi Bruce,

In my 35 years in the wood heat business, I've never heard of cordwood being sold or delivered in 8-foot lengths. In fact, here in Washington State, it isn't even LEGAL to sell firewood in anything but 16" lengths. Nonetheless, your statement intrigued me, so I did a little research.

After a couple of hours on the internet, I was unable to find anyone, anywhere, offering fuel wood for sale in 24" diameter 8-foot lengths.

Here's what I did find:

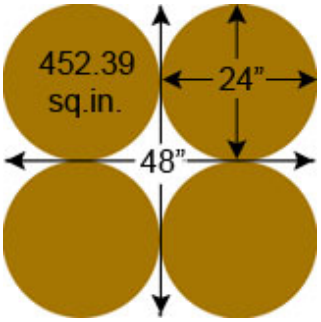
According to a 2009 report by the State of Minnesota, the most popular fuelwood species in your state are Oak & Ash.

With that in mind, let's examine the "Bruce Cord", comprised of four 8' long by 24" diameter Oak or Ash logs.

These logs would be green, as it would take many, many years to season an 8' length.

Which means that, according to the Engineer's Toolbox, each of your 8' x 24" logs would weigh about 1,200 pounds!

Makes me wonder how those cords you refer to get delivered.



Next, let's examine the math. If you look at the diagram, you'll see that each of your 24" logs occupies a cross-sectional area of 452.39 square inches. Four of them occupy just 1809.56 square inches of the 48" x 48" space (2304 square inches). This leaves 494.4 square inches of airspace, or 21% of the total volume. So, your "cord" of 24" diameter logs contains 6% LESS wood than a cord of cut and split pieces (15% airspace).

Even if someone could come up with a practical way to deliver half-ton hunks of wood to residences, what would motivate a buyer to choose that format, knowing that at the end of the hours of hard work required to process it, his woodpile would be 6% short of a cord?

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A Comment from New Zealand:

BTUs? What century was your chart produced? I thought the world measured energy in Joules(J), Kilojoules (KJ), Megajoules (MJ) these days!

I am 70 next birthday, and can distinctly remember learning about energy in high school science classes around 1955~59. We did learn the BTU at first, but the next year we changed to Joules for energy, and were told that the reason was that all science throughout the world was done in metric units, so we better get used to it!

The next few years were an exciting time, as New Zealand changed over to the metric system for everyday use. By this time I was myself a high school teacher and we had the challenge of converting all teaching to metric units. Metric measurement is now universal throughout the country.

OK, I do actually realise you are in the US, and the US has farther to go down this road than any other country in the world. I will just say when the change finally comes your way, embrace it wholeheartedly. It may seem difficult initially, but once you are used to it you will NEVER want to go back to the old system. I have heard literally hundreds of old diehards utter similar sentiments a short time after they have had to change!

Cheers,
Graeme


We might be tempted to convert our firewood rating chart over from MBTUs to MegaJoules, but we have one consideration: how many times have we been sitting at our favorite tavern, glass in hand, and found ourselves engaging in some version of the following exchange?

Bob: "Say, during my last sip I noticed that my pounder of Budweiser has warmed up exactly one degree F while I've been holding it. How much energy did my body have to give up to make that happen?"

Tom: "One BTU."

An easy exchange, no? Now let's try the same conversation in a NZ pub:

Kevin: "Say, during my last sip I noticed that my 0.453592 kg glass of Mac's Gold has warmed up exactly .55555 degrees C while I've been holding it. How much energy did my body have to give up to make that happen?"

Graeme: "1,055 Joules."

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Thanks for the chart, very helpful, love the joke at the end

Ryan Weems


Joke?

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