

Hardwood Species	CO₂e Measured
by Common Name	in lbs./Bd. Ft.
Alder	3.6100
Ash, White	5.2969
Ash, Black	4.3831
Ash, Green	5.0956
Aspen, Quaking	3.3609
Balsam	3.4074
Basswood	3.3609
Beech	5.8081
Birch, Paper	4.8943
Birch, Yellow	5.6841
Cherry, Black	4.5380
Chestnut	3.8720
Cottonwood, Black	3.0976
Cypress, Southern	4.1818
Elm, Rock	5.6841
Elm, American	4.5225
Gum, Black	4.5225
Hackberry	4.7703
Hickory	6.5825
Hickory, Pecan	6.0714
Locust, Black	6.3501
Magnolia, Southern	4.5225
Maple, Sugar	5.6841
Maple Red	4.9562
Maple, Silver	3.4848
Oak, Red	5.6841
Oak, White	6.0714
Sweet gum	4.3831
Tupelo, Black	4.5225
Tupelo, Water	4.5225
Poplar, Yellow (Tulip)	3.6397
Sycamore	4.3831
Walnut, Black	4.9097

Softwood Species by	CO₂e Measured
Common Name	in lbs./Bd. Ft.
Cedar, Red Western	3.1545
Fir, Douglas, Coastal	4.7451
Hemlock, Western	4.4296
Larch, Western	5.1142
Pine, Ponderosa	3.9363
Redwood, 2nd Growth	3.4631
Spruce, Sitka	3.8793

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Amounts of CO₂e in Pounds per Board Foot for Common Urban Forest Tree Species (Walnut Example)

1	2	3	4	5	6
Species	Weight of 1,000 bd. ft. @ 12% moisture content	Weight of 1,000 bd. ft. @ 0% moisture content	Weight of 1,000 (48%) per 1,000 bd. ft.	Amount of Carbon per bd. ft.	Amount of CO ₂ e in lbs. per bd. ft.
Walnut, Black	3,170.0000	2,789.6000	1,339.0080	1.3390	4.9097

Weights by species (walnut in above example) in column 2 are from the two sources cited below.*

The weight in column 3 is from column 2 reduced by 12% to the weight at 0% moisture content.

The equation is: wet weight – (wet weight x .12) = dry (0%) weight.

3170 lbs. – (3170 lbs. x .12) = 3170 – 380.4 = 2,789.6 lbs. Or, 3170 lbs. x (100.00 – 0.12) = 2,789.6 lbs.

Note: do not divide. Example: 3,170 ÷ 1.12 = ~~2,830.4~~ lbs.

Amount of carbon in column 4 is the weight in column 3 reduced by 0.48 for hardwoods. Slightly more than one-half of a softwood tree is carbon, hence, use 0.52 for softwoods instead of 0.48.

Amount of carbon per bd. ft. in column 5 is the weight in column 4 divided by 1,000 (bd. ft.).

Finally, in column 6, the amount of CO₂e per board foot from column 5 is multiplied by 3.6667**. This equals the molecular weight of CO₂e.

For walnut, CO₂e is 4.9097 lbs./bd. ft. For every bd. ft. of walnut used to make a product (versus fuel or mulch), 4.9097 lbs. of CO₂ does not form in the atmosphere that would have otherwise formed had that bd. ft. been burned or used as mulch.

For Sherrill/Bratkovich reports (2011, 2018) go to www.dovetailinc.org. Search under publication titles or under Bratkovich. There are many reports on urban wood utilization on this site, all free and down-loadable in PDF format.

Other resources: <https://www.fs.usda.gov/naspf/programs/wood-education-and-resource-center>.

<http://urbanwood.org/about/details/recycle-ann-arbor/>.

http://www.ncufc.org/urban_wood_utilization_introduction.php

Also see Wood-Mizer's <https://www.youtube.com/watch?v=RbA1beXE7r0>.

*Karl E. Wenger (ed.), *Forestry Handbook*, 2nd edition, 1984, John Wiley & Sons, Inc., Table 4, pg. 583.

http://www.globalwood.org/tech/tech_wood_weights.htm (note: do not use this site's method of calculating weight at 0% MC. It does not do the calculations correctly).

**The molar mass of CO₂ is C @ 1 x 12 + O₂ @ 2 x 16 = 44: 44/12 = 3.6667 (note: the 12 in the denominator of 44/12 represents carbon).

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