

TECHNICAL NOTE NUMBER 218

FOREST PRODUCTS LABORATORY · U. S. FOREST SERVICE · MADISON, WISCONSIN

WEIGHTS OF VARIOUS WOODS GROWN IN THE UNITED STATES

The following table shows the average weights of various woods grown in the United States.

The weights of wood when green, as here recorded, are for material at the moisture condition of the trees when felled. The air-dry weights are for wood at a moisture content of 12 per cent, which is approximately the condition reached without artificial heating by material sheltered from precipitation in the North Central States.

All the data are based on the weights and volumes of small clear specimens from the top 4 feet of 16-foot butt logs of typical trees. Wood thus selected probably averages a trifle heavier than the wood in ordinary structural timbers, poles, posts, and railway ties. Such pieces usually include the pith and are often taken from top logs of low average density.

In any lot of lumber of a given species in the air-dry condition at 12 per cent moisture, the weight per cubic foot will rarely vary more than 10 per cent from the figure shown in the table. In green material, on the other hand, the variation may occasionally be as great as 20 per cent, owing to wide differences in moisture content.

The greatest changes in weight are those which occur in the early stages of drying of green wood. Changes in the moisture content of air-dry wood are attended by only relatively small changes in weight per cubic foot, owing to the counter effect of change in volume as a result of the accompanying shrinkage or swelling.

A practical rule for estimating the weight of air-dry or kiln-dry wood at a moisture content in the neighborhood of 12 per cent, is to regard a 1/2 per cent change in weight as accompanying a 1 per cent change in moisture content. For example, wood at 8 per cent moisture would weigh about 2 per cent less than at 12 per cent, while at 14 per cent the weight would be about 1 per cent more than at 12 per cent.

WEIGHTS (

COMMON NAME

- Alder, red
- Apple, wild
- Ash, Biltmore
- Ash, black
- Ash, blue

- Ash, green

- Ash, Oregon
- Ash, pumpkin
- Ash, white
- Aspen

- Aspen, large-toothed
- Basswood
- Beech
- Beech, blue
- Birch, Alaska

- Birch, gray
- Birch, paper
- Birch, sweet
- Birch, yellow
- Blackwood

- Buckeye, yellow
- Bustic
- Butternut
- Buttonwood, Florida
- Cascara

- Cedar, Alaska
- Cedar, incense
- Cedar, Port Orford
- Cedar, eastern

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WEIGHTS OF VARIOUS WOODS GROWN IN THE UNITED STATES

COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT	
		GREEN	AIR DRY (12% M.C.)
Alder, red	<i>Alnus rubra</i>	45	28
Apple, wild	<i>Pyrus malus</i>	55	47
Ash, Biltmore white	<i>Fraxinus biltmoreana</i>	45	38
Ash, black	<i>Fraxinus nigra</i>	52	34
Ash, blue	<i>Fraxinus quadrangulata</i>	46	40
Ash, green	<i>Fraxinus pennsylvanica lanceolata</i>	49	40
Ash, Oregon	<i>Fraxinus oregona</i>	46	38
Ash, pumpkin	<i>Fraxinus profunda</i>	46	36
Ash, white	<i>Fraxinus americana</i>	48	41
Aspen	<i>Populus tremuloides</i>	42	27
Aspen, largetooth	<i>Populus grandidentata</i>	43	27
Basswood	<i>Tilia glabra</i>	41	26
Beech	<i>Fagus grandifolia</i>	55	44
Beech, blue	<i>Carpinus caroliniana</i>	53	49
Birch, Alaska	<i>Betula alaskana</i>	48	--
Birch, gray	<i>Betula populifolia</i>	46	35
Birch, paper	<i>Betula papyrifera</i>	50	39
Birch, sweet	<i>Betula lenta</i>	57	46
Birch, yellow	<i>Betula lutea</i>	58	43
Blackwood	<i>Avicennia nitida</i>	74	58
Buckeye, yellow	<i>Aesculus octandra</i>	49	25
Bustic	<i>Dipholis salicifolia</i>	77	62
Butternut	<i>Juglans cinerea</i>	46	27
Buttonwood, Florida	<i>Conocarpus erecta</i>	63	50
Cascara	<i>Rhamnus purshiana</i>	50	36
Cedar, Alaska	<i>Chamaecyparis nootkatensis</i>	35	29
Cedar, incense	<i>Libocedrus decurrens</i>	45	26
Cedar, Port Orford	<i>Chamaecyparis lawsoniana</i>	36	29
Cedar, eastern red	<i>Juniperus virginiana</i>	37	33

COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT		COMMON NAME
		GREEN	AIR DRY (12% M.C.)	
Cedar, western red	<i>Thuja plicata</i>	27	23	Haw, pear
Cedar, northern white	<i>Thuja occidentalis</i>	28	22	Hazel, witi
Cedar, southern white	<i>Chamaecyparis thyoides</i>	26	23	Hemlock, e
Cherry, black	<i>Prunus serotina</i>	46	35	Hemlock, n
Cherry, wild red	<i>Prunus pennsylvanica</i>	33	28	Hemlock, w
Chestnut	<i>Castanea dentata</i>	55	30	Hickory, bi
Chinquapin, golden	<i>Castanea pumila</i>	61	32	Hickory, bi
Cottonwood, eastern	<i>Populus deltoides</i>	49	29	Hickory, m
Cottonwood, black	<i>Populus trichocarpa</i>	46	24	Hickory, nu
Cypress, southern	<i>Taxodium distichum</i>	51	32	Hickory, pi
Dogwood, flowering	<i>Cornus florida</i>	64	51	Hickory, sh
Dogwood, Pacific	<i>Cornus nuttallii</i>	55	45	Hickory, wa
Elderberry, blue	<i>Sambucus glauca</i>	65	36	Holly
Elm, American	<i>Ulmus americana</i>	54	35	Hornbeam
Elm, rock	<i>Ulmus racemosa</i>	53	44	Inkwood
Elm, slippery	<i>Ulmus fulva</i>	56	37	Ironwood, t
Fig, golden	<i>Ficus aurea</i>	51	31	Juniper, all
Fir, alpine	<i>Abies lasiocarpa</i>	28	23	Larch, west
Fir, balsam	<i>Abies balsamea</i>	45	26	Laurel, mou
Fir, Douglas (coast type)	<i>Pseudotsuga taxifolia</i>	38	34	Limbo, gurr
Fir, Douglas (mountain type)	<i>Pseudotsuga taxifolia</i>	35	30	Locust, bla
Fir, lowland white	<i>Abies grandis</i>	45	28	Locust, hon
Fir, noble	<i>Abies nobilis</i>	30	26	Madrona
Fir, red	<i>Abies magnifica</i>	48	27	Magnolia, c
Fir, silver	<i>Abies amabilis</i>	36	27	Magnolia, e
Fir, white	<i>Abies concolor</i>	47	26	Mangrove
Gum, black	<i>Nyssa sylvatica</i>	45	35	Maple, bigl
Gum, blue	<i>Eucalyptus globulus</i>	70	52	Maple, blac
Gum, red	<i>Liquidambar styraciflua</i>	50	34	Maple, red
Gum, tupelo	<i>Nyssa aquatica</i>	56	35	Maple, silve
Hackberry	<i>Celtis occidentalis</i>	50	37	Maple, strip
				Maple, suga

CUBIC FOOT AIR DRY (12% M.C.)	COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT	
			GREEN	AIR DRY (12% M.C.)
23	Haw, pear	<i>Crataegus tomentosa</i>	63	48
22	Hazel, witch	<i>Hamamelis virginiana</i>	59	43
23	Hemlock, eastern	<i>Tsuga canadensis</i>	49	28
35	Hemlock, mountain	<i>Tsuga mertensiana</i>	44	31
28	Hemlock, western	<i>Tsuga heterophylla</i>	42	28
30	Hickory, bigleaf shagbark	<i>Hicoria laciniosa</i>	62	48
32	Hickory, bitternut	<i>Hicoria cordiformis</i>	63	46
29	Hickory, mockernut	<i>Hicoria alba</i>	64	51
24	Hickory, nutmeg	<i>Hicoria myristicaeformis</i>	60	42
32	Hickory, pignut	<i>Hicoria glabra</i>	64	53
51	Hickory, shagbark	<i>Hicoria ovata</i>	64	51
45	Hickory, water	<i>Hicoria aquatica</i>	68	43
36	Holly	<i>Ilex opaca</i>	57	40
35	Hornbeam	<i>Ostrya virginiana</i>	60	49
44	Inkwood	<i>Exothea paniculata</i>	71	56
37	Ironwood, black	<i>Hamnidium ferreum</i>	86	80
31	Juniper, alligator	<i>Juniperus pachyphloea</i>	42	36
23	Larch, western	<i>Larix occidentalis</i>	48	36
26	Laurel, mountain	<i>Kalmia latifolia</i>	62	48
34	Limbo, gumbo	<i>Bursera simaruba</i>	38	21
30	Locust, black	<i>Robinia pseudacacia</i>	58	49
	Locust, honey	<i>Gleditsia triacanthos</i>	61	44
28	Madrona	<i>Arbutus menziesii</i>	60	46
26	Magnolia, cucumber	<i>Magnolia acuminata</i>	49	34
27	Magnolia, evergreen	<i>Magnolia grandiflora</i>	62	35
27	Mangrove	<i>Rhizophora mangle</i>	77	67
26	Maple, bigleaf	<i>Acer macrophyllum</i>	47	34
35	Maple, black	<i>Acer nigrum</i>	54	40
52	Maple, red	<i>Acer rubrum</i>	50	38
34	Maple, silver	<i>Acer saccharinum</i>	45	33
35	Maple, striped	<i>Acer pennsylvanicum</i>	37	32
37	Maple, sugar	<i>Acer saccharum</i>	56	44

COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT		COMMON NAME
		GREEN	AIR DRY (12% M.C.)	
Mastic	<i>Sideroxylon mastichodendron</i>	77	65	Pine, longle
Myrtle, Oregon	<i>Umbellularia californica</i>	54	39	Pine, moun
Oak, black	<i>Quercus velutina</i>	63	43	Pine, pitch
Oak, bur	<i>Quercus macrocarpa</i>	62	45	Pine, pond
Oak, California black	<i>Quercus californica</i>	66	40	Pine, red
Oak, canyon live	<i>Quercus chrysolepis</i>	71	54	Pine, sand
Oak, chestnut	<i>Quercus montana</i>	61	46	Pine, shortl
Oak, gambel	<i>Quercus gambelii</i>	62	51	Pine, slash
Oak, laurel	<i>Quercus laurifolia</i>	65	44	Pine, sugar
Oak, live	<i>Quercus virginiana</i>	76	62	Pine, easte
Oak, Oregon white	<i>Quercus garryana</i>	69	51	Pine, weste
Oak, pin	<i>Quercus palustris</i>	63	--	Pine, weste
Oak, post	<i>Quercus stellata</i>	63	47	Finon
Oak, red	<i>Quercus borealis</i>	63	44	Plum, pige
Oak, southern red	<i>Quercus rubra</i>	62	41	Poisonwood
Oak, scarlet	<i>Quercus coccinea</i>	62	--	Poplar, bal
Oak, swamp red	<i>Quercus rubra pagodaefolia</i>	67	48	Poplar, yel
Oak, swamp chestnut	<i>Quercus prinus</i>	65	47	Redwood
Oak, swamp white	<i>Quercus bicolor</i>	69	50	Rhododend
Oak, water	<i>Quercus nigra</i>	63	44	Sassafras
Oak, white	<i>Quercus alba</i>	62	48	Serviceber
Oak, willow	<i>Quercus phellos</i>	67	49	Silverbell-t
Osage orange	<i>Toxylon pomiferum</i>	62	--	Sourwood
Palmetto, cabbage	<i>Sabal palmetto</i>	54	27	Spruce, bla
Paradise-tree	<i>Simarouba glauca</i>	37	24	Spruce, En
Persimmon	<i>Diospyros virginiana</i>	63	52	Spruce, re
Pecan	<i>Hicoria pecan</i>	61	47	Spruce, Sit
Pine, jack	<i>Pinus banksiana</i>	50	30	Spruce, wh
Pine, Jeffrey	<i>Pinus jeffreyi</i>	47	28	Stopper, g
Pine, limber	<i>Pinus flexilis</i>	39	28	Sugarberry
Pine, loblolly	<i>Pinus taeda</i>	54	38	Sumach, s
Pine, lodgepole	<i>Pinus contorta</i>	39	29	Sycamore

CUBIC FOOT AIR DRY (12% M.C.)	COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT	
			GREEN	AIR DRY (12% M.C.)
65	Pine, longleaf	<i>Pinus palustris</i>	51	41
39	Pine, mountain	<i>Pinus pungens</i>	54	37
43	Pine, pitch	<i>Pinus rigida</i>	54	35
45	Pine, pond	<i>Pinus rigida serotina</i>	49	38
40	Pine, red	<i>Pinus resinosa</i>	42	33
54	Pine, sand	<i>Pinus clausa</i>	38	34
46	Pine, shortleaf	<i>Pinus echinata</i>	51	38
51	Pine, slash	<i>Pinus caribaea</i>	56	48
44	Pine, sugar	<i>Pinus lambertiana</i>	51	25
62	Pine, eastern white	<i>Pinus strobus</i>	36	25
51	Pine, western white	<i>Pinus monticola</i>	35	27
--	Pine, western yellow	<i>Pinus ponderosa</i>	45	28
47	Finon	<i>Pinus edulis</i>	51	37
44	Plum, pigeon	<i>Coccolobis laurifolia</i>	73	55
41	Poisonwood	<i>Rhus metopium</i>	55	37
--	Poplar, balsam	<i>Populus balsamifera</i>	42	22
48	Poplar, yellow	<i>Liriodendron tulipifera</i>	38	28
47	Redwood	<i>Sequoia sempervirens</i>	54	30
50	Rhododendron, great	<i>Rhododendron maximum</i>	62	40
44	Sassafras	<i>Sassafras sassafras</i>	44	32
48	Serviceberry	<i>Amelanchier canadensis</i>	61	52
49	Silverbell-tree	<i>Mchrodendron carolinum</i>	44	32
--	Sourwood	<i>Oxydendrum arboreum</i>	53	38
27	Spruce, black	<i>Picea mariana</i>	32	28
24	Spruce, Engelmann	<i>Picea engelmanni</i>	39	23
52	Spruce, red	<i>Picea rubra</i>	34	28
47	Spruce, Sitka	<i>Picea sitchensis</i>	32	27
30	Spruce, white	<i>Picea glauca</i>	34	27
28	Stopper, garber	<i>Eugenia garberi</i>	73	61
28	Sugarberry	<i>Celtis laevigata</i>	48	36
38	Sumach, staghorn	<i>Rhus hirta</i>	41	33
29	Sycamore	<i>Platanus occidentalis</i>	52	35

COMMON NAME	BOTANICAL NAME	WEIGHT PER CUBIC FOOT	
		GREEN	AIR DRY (12% M.C.)
Tamarack	<i>Larix laricina</i>	47	37
Umbrella, Fraser	<i>Magnolia fraseri</i>	47	31
Walnut, black	<i>Juglans nigra</i>	58	39
Walnut, Mexican	<i>Juglans rupestris</i>	55	40
Willow, black	<i>Salix nigra</i>	50	26
Willow, western black	<i>Salix lasiandra</i>	50	31
Yew, Pacific	<i>Taxus brevifolia</i>	54	44