TECHNICAL NOTE NUMBER 218
FOREST PRODUCTS LABORATORY UNITED STATES FOREST SERVICE
MADISON, WISCONSIN REVISED JULY, 1931

WEIGHTS OF VARIOUS WOODS GROWN IN THE UNITED STATES

The following table shows the average weights and specific gravities of various woods grown in the United States. The weights of wood when green, as here recorded, include the moisture present at the time the trees were felled, and is based on the average of heartwood and sapwood pieces as represented by test specimens taken from pith to the bark. 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. Particularly in the species which have a high moisture content in the sapwood, large variations in weight when green may occur, depending on the proportion of sapwood. Since young softwood trees contain a larger proportion of sapwood than old trees, their wood averages heavier when green.

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 ½ per cent change in weight as accompanying a 1 percent 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.

Specific gravity (right-hand column) is the relation of the weight of a substance to the weight of an equal volume of water. In the following table specific gravity is based on the weight of the oven-dry wood and its volume when green. The specific gravity gives a direct indication of the amount of wood substance in a given volume, and affords a means for making comparisons of the weight of the dry wood of different species.

The weight of oven-dry wood in pounds per cubic foot (based on volume when green) can be calculated from column 3 by multiplying the specific gravity by 62.4, the weight of water in pounds per cubic foot. The difference between the weight of any oven-dry wood calculated in this manner and the corresponding weight when green is the average weight of moisture present per cubic foot in the green wood.

WEIGHTS OF VARIOUS WOODS GROWN IN THE UNITED STATES

COMMON AND BOTANICAL NAMES	WEIGHT PER CUBIC FOOT		SPECIFIC GRAVITY
	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Alder, red (*Alnus rubra*)	46	28	0.37
Apple, wild (*Malus pumila*) var.	55	47	.61
Ash, Biltmore white (*Fraxinus biltmoreana*)	45	38	.51
Ash, black (*Fraxinus nigra*)	53	34	.46
Ash, blue (*Fraxinus quadrangulata*)	46	40	.53
Ash, green (*Fraxinus pennsylvanica lanceolata*)	49	40	.53
Ash, Oregon (*Fraxinus oregona*)	46	38	.50
Ash, pumpkin (*Fraxinus profunda*)	46	36	.48
Ash, white (*Fraxinus americana*)	48	42	.55
Aspen, (*Populus tremuloides*)	43	27	.35
Aspen, largetooth (*Populus grandidentata*)	43	27	.35
Basswood, (*Tilia glabra*)	41	26	.32
Beech, (*Fagus grandifolia*)	54	45	.56
Beech, blue (*Carpinus caroliniana*)	53	48	.58
Birch, Alaska (*Betula alaskana*)	48	38	.49
Birch, gray (*Betula populifolia*)	46	35	.45
Birch, paper (*Betula papyrifera*)	50	39	.48
Birch, sweet (*Betula lenta*)	57	46	.60
Birch, yellow (*Betula lutea*)	57	43	.55
Blackwood, (*Avicennia nitida*)	74	58	.83
Buckeye, yellow (*Aesculus octandra*)	49	25	.33
Bustic, (*Dipholis salicifolia*)	77	62	.86
Butternut, (*Juglans cinerea*)	46	27	.36
Buttonwood, Florida (*Conocarpus erecta*)	64	50	.69
Cascara, (*Rhamnus purshiana*)	50	36	.50
Catalpa, (*Catalpa speciosa*)	41	29	.38
Cedar, Alaska (*Chamaecyparis nootkatensis*)	36	31	.42
Cedar, incense (*Libocedrus decurrens*)	45	26	.35

***Based on volume when green.**

COMMON AND BOTANICAL NAMES	WEIGHT PER CUBIC FOOT		SPECIFIC GRAVITY
	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Cedar, Port Orford (*Chamaecyparis lawsoniana*)	36	29	.40
Cedar, eastern red (*Juniperus virginiana*)	37	33	.44
Cedar, western red (*Thuja plicata*)	27	23	.31
Cedar, northern white (*Thuja occidentalis*)	28	22	.29
Cedar, southern white (*Chamaecyparis thyoides*)	26	23	.31
Cherry, black (*Prunus serotina*)	46	35	.47
Cherry, pin (*Prunus pennsylvanica*)	33	28	.36
Chestnut (*Castanea dentata*)	55	30	.40
Chinquapin, golden (*Castanopsis chrysophylla*)	61	32	.42
Cottonwood, black (*Populus trichocarpa*)	46	24	.32
Cottonwood, eastern (*Populus deltoides*)	49	28	.37
Cypress, southern (*Taxodium distichum*)	50	32	.42
Dogwood, flowering (*Cornus florida*)	64	51	.64
Dogwood, Pacific (*Cornus nuttallii*)	55	45	.58
Douglas fir, (*Pseudotsuga taxifolia*) coast type	38	34	.45
Douglas fir (*Pseudotsuga taxifolia*) inland empire type	37	31	.41
Douglas fir (*Pseudotsuga taxifolia*) mountain type	35	30	.40
Elder, blueberry (*Sambucus coerulea*)	65	36	.46
Elm, American (*Ulmus americana*)	54	36	.46
Elm, rock (*Ulmus racemosa*)	54	44	.57
Elm, slippery (*Ulmus fulva*)	56	37	.48
Fig, golden (*Ficus aurea*)	51	31	.44
Fir, alpine (*Abies lasiocarpa*)	28	23	.31
Fir, balsam (*Abies balsamea*)	45	26	.34
Fir, corkbark (*Abies arizonica*)	29	21	.28
Fir, lowland white (*Abies grandis*)	44	28	.37

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COMMON AND BOTANICAL NAMES	WEIGHT PER CUBIC FOOT		SPECIFIC GRAVITY
	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Fir, noble (*Abies nobilis*)	30	26	.35
Fir, red (*Abies magnifica*)	48	27	.37
Fir, silver (*Abies amabilis*)	36	27	.35
Fir, white (*Abies concolor*)	47	26	.35
Gum, black (*Nyssa sylvatica*)	45	35	46
Gum, blue (*Eucalyptus globulus*)	70	52	62
Gum, red (*Liquidambar styraciflua*)	50	34	.44
Gum, tupelo (*Nyssa aquatica*)	56	35	.46
Gumbo, limbo (*Bursera simaruba*)	38	22	.30
Hackberry (*Celtis occidentalis*)	50	37	.49
Haw, pear (*Crataegus tomentosa*)	63	48	.62
Hemlock, eastern (*Tsuga canadensis*)	50	28	.38
Hemlock, mountain (*Tsuga mertensiana*)	44	33	.43
Hemlock, western (*Tsuga heterophylla*)	41	29	.38
Hickory, bigleaf shagbark (*Hicoria laciniosa*)	62	48	.62
Hickory, bitternut (*Hicoria cordiformis*)	63	46	.60
Hickory, mockernut (*Hicoria alba*)	64	51	.64
Hickory, nutmeg (*Hicoria myristicaeformis*)	60	42	.56
Hickory, pignut (*Hicoria glabra*)	64	53	.66
Hickory, shagbark (*Hicoria ovata*)	64	51	.64
Hickory, water (*Hicoria aquatica*)	68	43	.61
Holly, (*Ilex opaca*)	57	40	.50
Hop-hornbeam (*Ostrya virginiana*)	60	50	.63
Inkwood, (*Exothea paniculata*)	71	56	.73
Ironwood, black (*Rhamnidium ferreum*)	86	80	1.04
Juniper, alligator (*Juniperus pachyphloea*)	42	36	.48
Larch, western (*Larix occidentalis*)	48	36	.48
Laurel, mountain (*Kalmia latifolia*)	62	48	.62
Locust, black (*Robinia pseudacacia*)	58	48	.66
Locust, honey (*Gleditsia triacanthos*)	61	44	.60
Madrona, (*Arbutus menziesii*)	60	46	.58

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COMMON AND BOTANICAL NAMES	WEIGHT PER CUBIC FOOT		SPECIFIC GRAVITY
	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Magnolia, cucumber (*Magnolia acuminata*)	49	34	.44
Magnolia, evergreen (*Magnolia grandiflora*)	62	35	.46
Magnolia, mountain (*Magnolia fraseri*)	47	31	.40
Mangrove (*Rhizophora mangle*)	77	67	.89
Maple, bigleaf (*Acer macrophyllum*)	47	34	.44
Maple, black (*Acer nigrum*)	54	40	.52
Maple, red (*Acer rubrum*)	50	38	.49
Maple, silver (*Acer saccharinum*)	45	33	.44
Maple, striped (*Acer pennsylvanicum*)	37	32	.44
Maple, sugar (*Acer saccharum*)	56	44	.57
Mastic (*Sideroxylon foetidissimum*)	77	65	.89
Myrtle, Oregon (*Umbellularia californica*)	54	39	.51
Oak, black (*Quercus velutina*)	63	43	.56
Oak, bur (*Quercus macrocarpa*)	62	45	.58
Oak, California black (*Quercus kelloggii*)	66	40	.51
Oak, canyon live (*Quercus chrysolepis*)	71	54	.70
Oak, chestnut (*Quercus montana*)	61	46	.57
Oak, laurel (*Quercus laurifolia*)	65	44	.56
Oak, live (*Quercus virginiana*)	76	62	.81
Oak, Oregon white (*Quercus garryana*)	69	51	.64
Oak, pin (*Quercus palustris*)	63	44	.58
Oak, post (*Quercus stellata*)	63	47	.60
Oak, red (*Quercus borealis*)	63	44	.56
Oak, Rocky mountain white (*Quercus utahensis*)	62	51	.62
Oak, scarlet (*Quercus coccinea*)	62	47	.60
Oak, southern red (*Quercus rubra*)	62	41	.52
Oak, swamp red (*Quercus rubra pagodaefolia*)	68	48	.61
Oak, swamp chestnut (*Quercus prinus*)	65	47	.60

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	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Oak, swamp white (*Quercus bicolor*)	69	50	.64
Oak, water (*Quercus nigra*)	63	44	.56
Oak, white (*Quercus alba*)	62	48	.60
Oak, willow (*Quercus phellos*)	67	49	.56
Osage-orange (*Toxylon pomiferum*)	62	--	.76
Palmetto, cabbage (*Sabal palmetto*)	54	27	.37
Paradise-tree (*Simarouba glauca*)	37	24	.33
Pecan (*Hicoria pecan*)	61	47	.60
Persimmon (*Diospyros virginiana*)	63	52	.64
Pigeon, plum (*Coccolobis laurifolia*)	73	55	.77
Pine, jack (*Pinus banksiana*)	50	30	.39
Pine, Jeffrey (*Pinus jeffreyi*)	47	28	.37
Pine, limber (*Pinus flexilis*)	39	28	.37
Pine, loblolly (*Pinus taeda*)	54	38	.50
Pine, lodgepole (*Pinus contorta*)	39	29	.38
Pine, longleaf (*Pinus palustris*)	50	41	.55
Pine, mountain (*Pinus pungens*)	54	37	.49
Pine, northern white (*Pinus strobus*)	36	25	.34
Pine, Norway (*Pinus resinosa*)	42	34	.44
Pine, pitch (*Pinus rigida*)	50	35	.45
Pine, pond (*Pinus rigida serotina*)	49	38	.50
Pine, sand (*Pinus clausa*)	38	34	.45
Pine, shortleaf (*Pinus echinata*)	51	38	.49
Pine, slash (*Pinus caribaea*)	56	48	.64
Pine, sugar (*Pinus lambertiana*)	51	25	.35
Pine, western white (*Pinus monticola*)	35	27	.36
Pine, western yellow (*Pinus ponderosa*)	45	28	.38
Pinon (*Pinus edulis*)	51	37	.50
Poisonwood (*Rhus metopium*)	54	37	.51
Poplar, balsam (*Populus balsamifera*)	40	23	.30
Poplar, yellow (*Liriodendron tulipifera*)	38	28	.38

*Based on volume when green.

COMMON AND BOTANICAL NAMES	WEIGHT PER CUBIC FOOT		SPECIFIC GRAVITY
	GREEN	AIR DRY (12% M.C.)	OVEN DRY*
Redwood (*Sequoia sempervirens*)	55	30	.41
Rhododendron, great (*Rhododendron maximum*)	62	40	.50
Sassafras (*Sassafras sassafras*)	44	32	.42
Serviceberry (*Amelanchier canadensis*)	61	52	.66
Silverbell-tree (*Mohrodendron carolinum*)	44	32	.42
Sourwood (*Oxydendrum arboreum*)	53	38	.50
Stopper, red (*Eugenia confusa*)	73	61	.83
Spruce, black (*Picea mariana*)	32	28	.38
Spruce, Engelmann (*Picea engelmanni*)	39	23	.31
Spruce, red (*Picea rubra*)	34	28	.38
Spruce, Sitka (*Picea sitchensis*)	33	28	.37
Spruce, white (*Picea glauca*)	35	28	.37
Sugarberry (*Celtis laevigata*)	48	36	.47
Sumach, staghorn (*Rhus hirta*)	41	33	.45
Sycamore (*Platanus occidentalis*)	52	35	.46
Tamarack (*Larix laricina*)	47	37	.49
Walnut, black (*Juglans nigra*)	58	39	.51
Walnut, little (*Juglans rupestris*)	55	40	.53
Willow, black (*Salix nigra*)	50	26	.34
Willow, western black (*Salix lasiandra*)	50	31	.39
Witch-hazel (*Hamamelis virginiana*)	59	43	.56
Yew, Pacific (*Taxus brevifolia*)	54	44	.60

*Based on volume when green.