Strength and Mechanical Properties (inch - pound)[a]

COMMON SPECIES NAMES	MOISTURE CONTENT	SPECIFIC GRAVITY (b)	STATIC BENDING			IMPACT BENDING TO GRAIN	COMPRESSION PARALLEL TO GRAIN	COMPRESSION PERPENDICULAR TO GRAIN	SHEAR PARALLEL TO GRAIN	TENSION PERPENDICULAR TO GRAIN	SIDE HARDNESS
			MODULUS OF RUPTURE	MODULUS OF ELASTICITY (c)	WORK TO MAXIMUM LOAD						
			(lbf/in²)	*(10^6 lbf/in²)*	*(in-lbf/in³)*	*(in.)*	*(lbf/in²)*	*(lbf/in²)*	*(lbf/in²)*	*(lbf/in²)*	*(lbf)*
Alder	Green - 12%	0.37 - 0.41	6,500 - 9,800	1.17 - 1.38	8.0 - 8.4	22 - 20	2,960 - 5,820	250 - 440	770 - 1,080	390 - 420	440 - 590
Ash	Green - 12%	0.45 - 0.60	6,000 - 15,000	1.04 - 1.74	11.8 - 16.6	– - 43	2,300 - 7,410	350-1,420	860 - 2,030	– - 940	– - 1,320
Aspen	Green - 12%	0.35 - 0.39	5,100 - 9,100	0.86 - 1.43	5.7 - 7.7	– - 22	2,140 - 5,300	180 - 450	660 - 1,080	– - 260	– - 350
Basswood	Green - 12%	0.32 - 0.37	5,000 - 8,700	1.04 - 1.46	5.3 - 7.2	16	2,220 - 4,730	170 - 370	600 - 990	280 - 350	250 - 410
Birch	Green - 12%	0.48 - 0.65	6,400 - 16,900	1.17 - 2.17	15.7 - 20.8	29 - 33	3,540 - 7,110	360 - 690	1,130 - 1,700	560 - 570	660 - 950
Cherry	Green - 12%	0.47 - 0.50	8,000 - 12,300	1.31 - 1.49	11.4 - 12.8	34 - 55	2,360 - 8,540	270-1,080	840 - 2,240	– - 950	560 - 1,470
Cottonwood	Green - 12%	0.31 - 0.40	3,900 - 8,500	0.75 - 1.37	4.2 - 7.4	– - 22	1,690 - 4,910	140 - 380	500 - 1,040	– - 580	– - 430
Cypress	Green - 12%	0.42 - 0.46	6,600 - 10,600	1.18 - 1.44	6.6 - 8.2	24 - 25	3,580 - 6,360	400 - 730	810 - 1,000	270 - 300	390 - 510
Elm	Green - 12%	0.46 - 0.63	7,200 - 14,800	1.11 - 1.54	11.8 - 19.8	38 - 56	2,910 - 7,050	360 - 1,230	1,000 - 1,920	– - 660	620 - 1,320
Gum	Green - 12%	0.46 - 0.52	7,100 - 12,500	1.20 - 1.64	10.1 - 11.9	32 - 36	3,040 - 6,320	370 - 620	990 - 1,600	540 - 760	600 - 850
Hackberry	Green - 12%	0.49 - 0.53	6,500 - 11,000	0.95 - 1.19	12.8 - 14.5	43 - 48	2,650 - 5,440	400 - 890	1,070 - 1,590	580 - 630	700 - 880
Hickory/Pecan	Green - 12%	0.56 - 0.75	9,100-20,200	1.29 - 2.26	13.8 - 31.7	– - 104	3,920 - 9,210	760 - 1,980	– - 2,430	– - 680	– - 1,820
Hard Maple	Green - 12%	0.52 - 0.63	7,900 - 15,800	1.33 - 1.83	12.5 - 16.5	39 - 48	3,270 - 7,830	600 - 1,470	1,130 - 2,330	– - 720	840 - 1,450
Pacific Coast Maple	Green - 12%	0.44 - 0.48	7,400 - 10,700	1.10 - 1.45	7.8 - 8.7	23 - 28	3,240 - 5,950	450 - 750	1,110 - 1,730	540 - 600	620 - 850
Soft Maple	Green - 12%	0.44 - 0.54	5,800 - 13,400	0.94 - 1.64	7.8 - 12.5	23 - 32	2,490 - 6,540	370 - 1,000	1,050 - 1,850	– - 600	590 - 950
Red Oak	Green - 12%	0.52 - 0.69	7,400 - 18,100	1.14 - 2.28	8.0 - 21.5	26 - 54	3,000 - 8,740	550 - 1,250	930 - 2,080	– - 1,050	860 - 1,510
White Oak	Green - 12%	0.57 - 0.88	7,200 - 18,400	0.88 - 2.05	9.4 - 19.2	– - 50	3,290 - 8,900	530 - 2,840	1,210 - 2,660	– - 940	– - 1,620
Poplar	Green - 12%	0.40 - 0.42	6,000 - 10,100	1.22 - 1.58	7.5 - 8.8	24 - 26	2,660 - 5,540	270 - 500	790 - 1,190	510 - 540	440 - 540
Sycamore	Green - 12%	0.46 - 0.49	6,500 - 10,000	1.06 - 1.42	7.5 - 8.5	26	2,920 - 5,380	360 - 700	1,000 - 1,470	630 - 720	610 - 770
Walnut	Green - 12%	0.51 - 0.55	9,500 - 14,600	1.42 - 1.68	10.7 - 14.6	34 - 37	4,300 - 7,580	490 - 1,010	1,220-1,370	570 - 690	900 - 1,010

a Results of tests on small clear specimens in the green and air-dried conditions. Definition of properties; impact bending is height of drop that causes complete failure, using 0.71-kg (50-lb) hammer; compression parallel to grain is also called maximum crushing strength; compression perpendicular to grain is fiber stress at proportional limit; shear is maximum shearing strength; tensionis maximum tensile strength; and side hardness is hardness measured when load is perpendicular to grain.

b Specific gravity is based on weight when ovendry and volume when green or at 12% moisture content

c Modulus of elasticity measured from a simply supported, center-loaded beam, on a span depth ratio of 14/1. To correct for shear deflection, the modulus can be increased by 10%.

Source: *Wood Handbook, Wood as an Engineering Material, USDA Forest Service*