

RELATIVE WOOD STRENGTHS

Wood has several kinds of strength. For a rough, general estimate of strength, refer to the **specific gravity** or density of the wood. When you need more detailed information, there are several additional choices. Engineers measure the **compressive strength** by loading a block of wood parallel to the grain until it breaks, and the **bending strength** by loading a block perpendicular to the grain. Both are measured in pounds per square inch (psi). **Stiffness** is determined by applying a load to a beam until it deflects a certain amount, and it's measured in millions of pounds per square inch (Mpsi). To find **hardness**, engineers drive a metal ball halfway into the wood's surface. The force used is recorded in pounds (lb). In each case, the higher the number, the stronger the wood.

Wood Species	Specific Gravity	Compressive Strength (psi)	Bending Strength (psi)	Stiffness (Mpsi)	Hardness (lb)
Domestic Hardwoods					
Alder, Red	0.41	5820	9800	1.38	590
Ash	0.6	7410	15000	1.74	1320
Aspen	0.38	4250	8400	1.18	350
Basswood	0.37	4730	8700	1.46	410
Beech	0.64	7300	14900	1.72	1300
Birch, Yellow	0.62	8170	16600	1.72	1260
Butternut	0.38	5110	8100	1.19	490
Cherry	0.5	7110	12300	1.49	950
Chestnut	0.45	5320	8600	1.23	540
Elm	0.5	5520	11800	1.34	830
Hickory	0.72	9210	20000	2.16	1820
Maple Hard	0.63	7830	15800	1.83	1450
Maple, Soft	0.54	6340	9500	1.64	950
Oak, Red	0.63	6760	14300	1.78	1290
Oak, White	0.68	7440	15200	1.78	1360
Poplar	0.42	5540	10100	1.58	540
Sassafras	0.46	4760	9000	1.12	380
Sweetgum	0.52	6320	12400	1.64	850
Sycamore	0.49	5380	10000	1.42	770
Walnut	0.55	7580	14600	1.68	1010
Domestic Softwoods					
Cedar, Aromatic R	0.47	6020	8800	0.88	900
Cedar, Western R	0.32	4560	7500	1.11	350
Cedar, White	0.42	3960	6500	0.8	320
Cypress	0.46	6360	10600	1.44	570
Fir, Douglas	0.49	7230	12400	1.92	710
Hemlock	0.45	7200	11300	1.63	540
Pine, Ponderosa	0.43	5320	8200	1.19	460
Pine, Sugar	0.36	4460	8200	1.29	380
Pine, White	0.35	4820	8500	1.24	380
Pine, Yellow	0.59	8470	14500	1.98	870
Redwood	0.35	5220	7900	1.1	420
Spruce, Sitka	0.4	5610	10200	1.57	510
Imported Woods					
Bubinga	0.71	10500	22600	2.48	2690
Jelutong	0.36	3920	7300	1.18	380
Lauan	0.4	7360	12700	1.77	780
Mahogany, African	0.45	6700	10700	1.4	830
Mahogany, Genui	0.45	6780	11500	1.5	800
Purpleheart	0.67	10230	19100	2.27	1860
Rosewood, Brazil	0.8	11020	22000	2.72	2720
Rosewood, Indian	0.75	9220	16900	1.78	3170
Teak	0.55	8410	14600	1.55	1000

*After kiln-drying. Specific gravity may be slightly higher in green wood.