

Strength Properties of Commercially Important Woods

Collected From: http://www.woodbin.com/ref/wood/strength_table.htm

The table below provides laboratory-derived values for several mechanical properties of wood that are associated with wood strength. Note that due to sampling inadequacies, these values may not necessarily represent average species characteristics.

Source: U.S. Forest Products Laboratory

Tree Species	Average Specific Gravity, Oven Dry Sample (0-1.0)	Static Bending Modulus of Elasticity (E) 10⁶ psi	Impact Bending, Height of Drop Causing Failure inches	Compress. Parallel to Grain, Max Crushing Strength psi	Compress. Perpen. to Grain, Fiber Stress at Prop. Limit psi	Shear Parallel to Grain, Max Shear Strength psi
U. S. Hardwoods						
Alder, Red	0.41	1.38	20	5,820	440	1,080
Ash, Black	0.49	1.60	35	5,970	760	1,570
Ash, Blue	0.58	1.40	–	6,980	1,420	2,030
Ash, Green	0.56	1.66	32	7,080	1,310	1,910
Ash, Oregon	0.55	1.36	33	6,040	1,250	1,790
Ash, White	0.60	1.74	43	7,410	1,160	1,910
Aspen, Bigtooth	0.39	1.43	–	5,300	450	1,080
Aspen, Quaking	0.38	1.18	21	4,250	370	850
Basswood	0.37	1.46	16	4,730	370	990
Beech, American	0.64	1.72	41	7,300	1,010	2,010
Birch, Paper	0.55	1.59	34	5,690	600	1,210
Birch, Sweet	0.65	2.17	47	8,540	1,080	2,240

Birch, Yellow	0.62	2.01	55	8,170	970	1,880
Butternut	0.38	1.18	24	5,110	460	1,170
Cherry, Black	0.50	1.49	29	7,110	690	1,700
Chestnut, American	0.43	1.23	19	5,320	620	1,080
Cottonwood, Balsam Poplar	0.34	1.1	-	4,020	300	790
Cottonwood, Black	0.35	1.27	22	4,500	300	1,040
Elm, Eastern	0.40	1.37	20	4,910	380	930
Elm, American	0.50	1.34	39	5,520	690	1,510
Elm, Rock	0.63	1.54	56	7,050	1,230	1,920
Elm, Slippery	0.53	1.49	45	6,360	820	1,630
Hackberry	0.53	1.19	43	5,440	890	1,590
Hickory, Bitternut	0.66	1.79	66	9,040	1,680	-
Hickory, Nutmeg	0.6	1.70	-	6,910	1,570	-
Hickory, Pecan	0.66	1.73	44	7,850	1,720	2,080
Hickory, Water	0.62	2.02	53	8,600	1,550	-
Hickory, Mockernut	0.72	2.22	77	8,940	1,730	1,740
Hickory, Pignut	0.75	2.26	74	9,190	1,980	2,150
Hickory, Shagbark	0.72	2.16	67	9,210	1,760	2,430
Hickory, Shellbark	0.69	1.89	88	8,000	1,800	2,110
Honeylocust	-	1.63	47	7,500	1,840	2,250
Locust, Black	0.69	2.05	57	10,180	1,830	2,480
Magnolia,Cucumbertree	0.48	1.82	35	6,310	570	1,340
Magnolia, Southern	0.50	1.40	29	5,460	860	1,530
Maple, Bigleaf	0.48	1.45	28	5,950	750	1,730
Maple, Black	0.57	1.62	40	6,680	1,020	1,820
Maple, Red	0.54	1.64	32	6,540	1,000	1,850
Maple, Silver	0.47	1.14	25	5,220	740	1,480

Maple, Sugar	0.63	1.83	39	7,830	1,470	2,330
Oak, Black	0.61	1.64	41	6,520	930	1,910
Oak, Cherrybark	0.68	2.28	49	8,740	1,250	2,000
Oak, Laurel	0.63	1.69	39	6,980	1,060	1,830
Oak, Northern Red	0.63	1.82	43	6,760	1,010	1,780
Oak, Pin	0.63	1.73	45	6,820	1,020	2,080
Oak, Scarlet	0.67	1.91	53	8,330	1,120	1,890
Oak, Southern Red	0.59	1.49	26	6,090	870	1,390
Oak, Water	0.63	2.02	44	6,770	1,020	2,020
Oak, Willow	0.69	1.90	42	7,040	1,130	1,650
Oak, Bur	0.64	1.03	29	6,060	1,200	1,820
Oak, Chestnut	0.66	1.59	40	6,830	840	1,490
Oak, Live	0.88	1.98	–	8,900	2,840	2,660
Oak, Overcup	0.63	1.42	38	6,200	810	2,000
Oak, Post	0.67	1.51	46	6,600	1,430	1,840
Oak, Swamp Chestnut	0.67	1.77	41	7,270	1,110	1,990
Oak, Swamp White	0.72	2.05	49	8,600	1,190	2,000
Oak, White	0.68	1.78	37	7,440	1,070	2,000
Sassafras	0.46	1.12	–	4,760	850	1,240
Sweetgum	0.52	1.64	32	6,320	620	1,600
Sycamore, American	0.49	1.42	26	5,380	700	1,470
Tupelo, Black	0.50	1.20	22	5,520	930	1,340
Tupelo, Water	0.50	1.26	23	5,920	870	1,590
Walnut, Black	0.55	1.68	34	7,580	1,010	1,370
Willow, Black	0.39	1.01	–	4,100	430	1,250
Yellow-poplar	0.42	1.58	24	5,540	500	1,190

U. S. Softwoods

Baldcypress	0.46	1.44	24	6,360	730	1,000
Cedar, Alaska	0.44	1.42	29	6,310	620	1,130
Cedar, Atlantic White	0.32	0.93	13	4,700	410	800
Cedar, Eastern Redcedar	0.47	0.88	22	6,020	920	-
Cedar, Incense	0.37	1.04	17	5,200	590	880
Cedar, Northern White	0.31	0.80	12	3,960	310	850
Cedar, Port-Orford	0.43	1.70	28	6,250	720	1,370
Cedar, Western Redcedar	0.32	1.11	17	4,560	460	990
Douglas-fir, Coast	0.48	1.95	31	7,230	800	1,130
Douglas-fir, Interior West	0.50	1.83	32	7,430	760	1,290
Douglas-fir, Interior North	0.48	1.79	26	6,900	770	1,400
Douglas-fir, Interior South	0.46	1.49	20	6,230	740	1,510
Fir, Balsam	0.35	1.45	20	5,280	404	944
Fir, California Red	0.38	1.50	24	5,460	610	1,040
Fir, Grand	0.37	1.57	28	5,290	500	900
Fir, Noble	0.39	1.72	23	6,100	520	1,050
Fir, Pacific silver	0.43	1.76	24	6,410	450	1,220
Fir, Subalpine	0.32	1.29	-	4,860	390	1,070
Fir, White	0.39	1.50	20	5,800	530	1,100
Hemlock, Eastern	0.40	1.20	21	5,410	650	1,060
Hemlock, Mountain	0.45	1.33	32	6,440	860	1,540
Hemlock, Western	0.45	1.63	23	7,200	550	1,290
Larch, western	0.52	1.87	35	7,620	930	1,360
Pine, Eastern white	0.35	1.24	18	4,800	440	900

Pine, Jack	0.43	1.35	27	5,660	580	1,170
Pine, Loblolly	0.51	1.79	30	7,130	790	1,390
Pine, Lodgepole	0.41	1.34	20	5,370	610	880
Pine, Longleaf	0.59	1.98	34	8,470	960	1,510
Pine, Pitch	0.52	1.43	–	5,940	820	1,360
Pine, Pond	0.56	1.75	–	7,540	910	1,380
Pine, Ponderosa	0.40	1.29	19	5,320	580	1,130
Pine, Red	0.46	1.63	26	6,070	600	1,210
Pine, Sand	0.48	1.41	–	6,920	836	–
Pine, Shortleaf	0.51	1.75	33	7,270	820	1,390
Pine, Slash	0.59	1.98	–	8,140	1,020	1,680
Pine, Spruce	0.44	1.23	–	5,650	730	1,490
Pine, Sugar	0.36	1.19	18	4,460	500	1,130
Pine, Virginia	0.48	1.52	32	6,710	910	1,350
Pine, Western white	0.38	1.46	23	5,040	470	1,040
Redwood, Old-growth	0.40	1.34	19	6,150	700	940
Redwood, Young-growth	0.35	1.10	15	5,220	520	1,110
Spruce, Black	0.42	1.61	23	5,960	550	1,230
Spruce, Engelmann	0.35	1.30	18	4,480	410	1,200
Spruce, Red	0.40	1.61	25	5,540	550	1,290
Spruce, Sitka	0.40	1.57	25	5,610	580	1,150
Spruce, White	0.36	1.43	20	5,180	430	970
Tamarack	0.53	1.64	23	7,160	800	1,280