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 Technical Note
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Domestic Wood Species Having High Impact Bending Strength

The majority of mechanical properties of domestic wood species published in the USDA Forest Products Laboratory's Wood Handbook (1999) are based on test results of small, clear-wood specimens published in the USDA Technical Bulletin No. 479 (Markwardt and Wilson, 1935). One of the properties published in this report is Impact Bending strength, which involves dropping a 50-lb hammer onto a simply supported wood beam specimen. The height that causes complete failure of the wood specimen is recorded. This test measures the ability of wood to absorb shock that causes stresses beyond the proportional limit.

A complete survey was conducted on all woods tested in Markwardt and Wilson (1935), and only those species having Impact Bending strength greater than, or approximately equal to, White Ash (*Fraxinus americana*) were reproduced in the table below.

Common name	Scientific name	S.G.	Height of drop (in.)	MOE (x10 ⁶ lb/in ²)	MOR (lb/in ²)	Hardness (lbs.)
White Ash	<i>Fraxinus americana</i>	0.60	43	1.77	15,400	1,320
Beech	<i>Fagus grandifolia</i>	0.64	41	1.72	14,900	1,300
Birch,						
Sweet	<i>Betula lenta</i>	0.65	47	2.17	16,900	1,470
Yellow	<i>Betula alleghaniensis</i>	0.62	55	2.01	16,600	1,260
Elm,						
Cedar	<i>Ulmus crassifolia</i>	0.64	--	1.48	13,500	1,320
Winged	<i>Ulmus alata</i>	0.66	--	1.65	14,800	1,540
Rock - northern	<i>Ulmus thomasii</i>	0.63	56	1.54	14,800	1,320
Slippery (Red)	<i>Ulmus rubra</i>	0.53	45	1.49	13,000	860
Hackberry	<i>Celtis occidentalis</i>	0.53	43	1.19	11,000	880
Hickory,						
Shagbark	<i>Carya ovata</i>	0.72	67	2.16	20,200	--
Bitternut	<i>Carya cordiformis</i>	0.66	66	1.79	17,100	--
Mockernut	<i>Carya tomentosa</i>	0.72	77	2.22	19,200	--
Pignut	<i>Carya glabra</i>	0.75	74	2.26	20,100	--
Water	<i>Carya aquatica</i>	0.62	53	2.02	17,800	--
Locust,						
Black	<i>Robinia pseudoacacia</i>	0.69	57	2.05	19,400	1,700
Honey	<i>Gleditsia triacanthos</i>	0.60*	47	1.63	14,700	1,580
Hophornbeam	<i>Ostrya virginiana</i>	0.70	49	1.70	14,100	1,860
Red Oak Group,						
Pin	<i>Quercus palustris</i>	0.63	45	1.73	14,000	1,510
Northern Red	<i>Quercus rubra</i>	0.63	--	1.82	14,300	1,290
Scarlet	<i>Quercus coccinea</i>	0.67	53	1.91	17,400	1,400
Swamp Red	<i>Q. rubra pagodaefolia</i>	0.68	49			
Swamp White	<i>Quercus bicolor</i>	0.72	49			
Water	<i>Quercus nigra</i>	0.63	44			
White	<i>Quercus alba</i>	0.68	37			
Willow	<i>Quercus phellos</i>	0.69	42			
White Oak Group,						
Post	<i>Quercus stellata</i>	0.67	46			
Osage Orange	<i>Toxylon pomiferum</i>	-	120			
Sugar Maple	<i>Acer saccharum</i>	0.63	40	1.83	15,800	1,450
Red Maple	<i>Acer rubrum</i>	0.54	32	1.64	13,400	950
Serviceberry	<i>Amelanchier canadensis</i>	0.74	59			

Markwardt and Wilson. 1935. Strength and Related Properties of Woods Grown in the United States. Tech. Bulletin No. 479