



### American White Oak (*Quercus Macrocarpa*)

<b>Botanical Name:</b>	<i>Quercus macrocarpa</i>
<b>Other Common Names:</b>	Blue oak, Bur Oak, Cucharillo, Encino, Encino negro, Mamecillo, Mossy overcup oak, Mossycup oak, Oak, Roble, Roble amarillo, Roble colorado, Roble encino, Roblecito, Scrub oak, White oak
<b>Common Uses:</b>	Cooperages, Flooring, Fuelwood, Mine timbers, Piling, Poles, Posts, Railroad ties, Veneer, Core Stock, Crossties, Decorative veneer, Domestic flooring, Factory flooring, Figured veneer, Foundation posts, Parquet flooring, Pile-driver cushions, Plain veneer, Stakes, Sub-flooring, Utility poles
<b>Region:</b>	North America
<b>Country:</b>	Canada, United States
<b>Distribution:</b>	Bur oak is reported to occur in Manitoba, New Brunswick, Ontario, Quebec, and Saskatchewan, all in Canada. In the United States it is reported to be found in the states of Alabama, Arkansas, Indiana, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, North Carolina, North Dakota, Nebraska, New Hampshire, New Jersey, Louisiana, Delaware, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Maryland, Massachusetts, Connecticut, Iowa, Illinois, Mississippi, Montana, Texas, Virginia, Vermont, Wisconsin, West Virginia, and Wyoming. The tree is often found in pure stands on dry uplands, limestone and gravelly ridges, sandy plains, and loamy slopes to moist flood plains of streams.

### Numerical Values for: *Quercus macrocarpa*

<u>Category</u>	<u>Green</u>	<u>Dry</u>	<u>Unit</u>
Bending Strength	6700	11767	psi
Crushing Strength (Perp.)	715	1245	psi
Max. Crushing Strength	2980	5840	psi
Static Bending (FSPL)	2700	6100	psi
Impact Strength	61	29	inches

Stiffness	835	1070	1000 psi
Work to Maximum Load	16	14	in-lbs/in <sup>3</sup>
Hardness		1369	lbs
Shearing Strength		1820	psi
Specific Gravity	0.59	0.67	
Weight	62	46	lbs/cu.ft.
Radial Shrinkage (G->OD)		4	%
Tangential Shrink. (G->OD)		7	%
Volumetric Shrink. (G->OD)		13	%

### Tree & Wood Descriptions for: *Quercus macrocarpa*

Product Sources	<p>It is not known at present whether some material from this species is obtainable from sustainably managed, salvaged, recycled, or other environmentally responsible sources.</p> <p>For commercial purposes, several species in the white oak group, including Bur oak, are mixed together. Supplies of white oak are reported to be abundant, especially in the form of veneers, at moderate prices.</p>
Tree Data	<p>The tree, which is also planted for shade, ornament, and shelterbelts, usually attains a height of 50 to 80 feet (15 to 24 m) and a diameter of 24 to 48 inches (60 to 120 cm).</p>
Sapwood Color	<p>The sapwood is whitish to light brown in color, and is variable in width.</p>
Heartwood Color	<p>White oak heartwood is reported to vary in color from light tan or pale yellow brown to pale or dark brown. The wood may also have a pinkish tinge. Variations in color and grain are reported to be considerable, but are not as pronounced as in red oak.</p>
Grain	<p>Grain is open, and rays are typically longer than those in red oak. Crotches, swirls and burls, are occasionally present and plainswan boards have a plumed or flare-grained appearance. The grain pattern is tighter, and figuring is usually lower in riftsawn lumber. Quartersawn materials often have a flake pattern which is sometimes referred to as tiger rays or butterflies.</p>
Texture	<p>The wood is medium to coarse textured.</p>
Odor	<p>There is no distinctive odor or taste.</p>

Movement in Service	Dimensional stability of seasoned timber is reported to be moderate, and the wood is reported to exhibit medium movement in use.
Natural Durability	Heartwood resistance to decay is reported to be high in white oaks. Logs are reported to be susceptible to severe attack by ambrosia beetles, and standing trees and logs are also readily attacked by forest longhorn or Butrespid beetles.  Resistance to Impregnation  White oak heartwood is reported to have exceptionally poor response to treatment with preservatives. Sapwood has moderate resistance to impregnation. High natural resistance to decay allows the heartwood to be used outdoors without chemical protection.
Resistance to Abrasion	White oak timbers are reported to have exceptional resistance to wear which makes them highly suitable for applications such as flooring in heavy traffic areas.
Chemical Staining	Tannin in white oak is reported to react with iron and iron compounds in the presence of moisture to produce blue-black stains in the wood.
Effect on Metals	Metals used with white oak timber should be painted or galvanized to prevent corrosion. White oak is somewhat acidic and is reported to promote corrosion in iron and steel under damp conditions. Vapors from timber in the green condition may also corrode other metals, such as lead.
Veneering Qualities	Some logs are reported to be converted into veneers. Quartered veneer are flake figured, while the very popular straight line figure is prominent in rift cut veneer.
Strength Properties	White oaks are reported to be generally low in stiffness and moderate in bending and crushing strengths. Their working properties are reported to depend to a large extent on the rate of growth of the trees: slow grown trees are reported to respond better to hand and machine tools. Faster grown southern species are reported to yield wood that is harder than the slower growing Appalachian trees.

### **Working Properties for: *Quercus macrocarpa***

Blunting Effect	The wood has moderate blunting effect on cutting tools.
Cutting Resistance	Cutting resistance is reported to be generally medium but is variable. Cross-cutting and narrow-bandsawing are reported to be satisfactory.

Planing	Machining characteristics of white oak timbers are reported to vary with species and rate of growth. Softer timber from slow-growth trees are reported to be generally easier to work. Planing properties are rated as good, but a cutting angle of 20 degrees has been recommended.
Turning	Turning operations are reported to be rather easy, and turned surfaces tend to be clean.
Boring	The material responds readily to boring operations to produce clean, bored surfaces.
Mortising	Mortising qualities are reported to be very good.
Gluing	The wood has satisfactory gluing qualities.
Nailing	The material is reported to nail with some difficulty, and should be pre-bored.
Screwing	Screwing characteristics are rated as good.
Sanding	Sanding operations are reported to be generally easy, and sanded surfaces tend to be smooth.
Staining	Some finishing products, especially those with high water content such as bleach and water-based finishes, may react with tannins to turn the wood green or brown.
Steam Bending	White oak timbers are reported to have exceptional steam bending qualities, and defect-free material is reported to bend to very small radius of curvature. Proper precautions should be taken to prevent chemical staining of steamed wood in contact with iron or steel.
Response to Hand Tools	Timber from slow-growth white oak trees are reported to be softer and are easier to work with hand tools.

### **Drying for: *Quercus macrocarpa***



Ease of Drying	The material is generally difficult to dry.
Drying Defects	Drying defects that may occur in this species include end- and surface-checks, iron stains, ring failure, collapse, gray sapwood stain, and honeycomb.
Kiln Schedules	Upland T4 - C2 (4/4); T3 - C1 (8/4) US Lowland T2 - C1 (4/4) US
T/R Ratio	1.65  This indicator is more meaningful if it is used together with other drying information and actual shrinkage data in the tangential and radial directions. (Refer to the Numerical Values window).

*Credits for information:*

*Woodworkersource.com*