

Red Oak vs.

Learn where each works best, and

Civilization wouldn't be where it is without oak trees. Ships wouldn't have been as strong or seaworthy, nor buildings and bridges as large and durable, so trade, travel, and industry wouldn't have thrived as they did. Wine and bourbon certainly wouldn't be as tasty. And woodworkers wouldn't have one of their strongest and most abundant materials for furniture.

There are more than 500 species of oak in the world, with roughly 90 in North America alone. A dozen or so are sold commercially. These fall into two distinct categories, white and red. The differences *between* the two groups are much more significant than the minor differences *within* them.

Wood sold as "white oak" in North America ranges from actual white oak (*Quercus alba*) to chinkapin (*Quercus muehlenbergii*), swamp white oak (*Quercus bicolor*), and bur oak (*Quercus macrocarpa*). Europeans buy and use American white oak but have their own varieties as well. English oak (*Quercus robur*) and sessile oak (*Quercus patraea*) are two white oaks commonly used across the pond.

Other than the fact that bur oak has slightly darker heartwood, it's very hard to tell the difference between these white-oak species.

Wood sold as "red oak" in North America is usually Northern red oak (*Quercus rubra*) or black oak (*Quercus velutina*). But pin oak (*Quercus palustris*), Shumard oak (*Quercus shumardii*), and Southern red oak (*Quercus falcata*) are also in the mix.



Red oak

A variety of species are sold as "red oak" in North America, with very similar appearance, weight, strength, and workability. The most common are Northern red oak and black oak. Others include pin oak, Shumard oak, and Southern red oak. Red oak leaves have pointed or bristled tips.



Most-common species **Northern red oak**

Latin name **Quercus rubra**

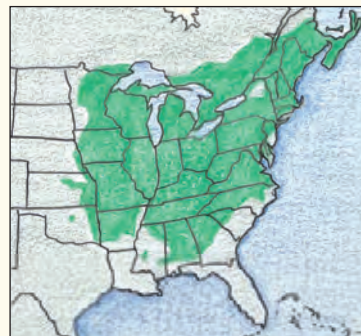
Specific gravity (12% MC) **.7**

Average weight (dry) **43.8 lb./cubic foot**

Janka hardness **1220 lb.**

Radial shrinkage **4%**

Tangential shrinkage **8.6%**



White Oak

BY DAN BOLLOCK

how to identify them like a pro

Sawmills take logs from these species, saw them into boards, and label them white or red oak. At that point, it's nearly impossible to tell their species without a DNA test. And for woodworkers, it's not important, as appearance, weight, strength, and workability are relatively consistent within each category.

What matters, then, is how to tell red oak from white, and understanding the unique qualities of each.

White oak has a lot of advantages

While red and white oak are similarly strong, and both work nicely with hand and power tools, there are lots of important differences between the two.

Red oak is more widely available than white, sold everywhere from home centers to hardware stores. Species sold as white oak, on the other hand, are available mostly from hardwood retailers and small sawmills, where they can be twice as costly as red oak, mostly because the logs are harder to come by.

Aside from price and availability, most of the differences between the types are related to the wood's appearance. Red oak usually has a reddish cast and often runs a little darker than white, though not always. In red oak the color of the heartwood—the larger, inner portion of the log that receives the most use—varies from pale reddish brown to light tan, while



White oak

Like “red oak,” “white oak” is an umbrella term for a variety of species with similar appearance and performance. These include white oak, chinkapin, swamp white oak, and bur oak. In Europe, English oak and sessile oak are often used. White oak leaves have rounded tips.



Most-common species **White oak**

Latin name **Quercus alba**

Specific gravity (12% MC) **.75**

Average weight (dry) **47 lb./cubic foot**

Janka hardness **1350 lb.**

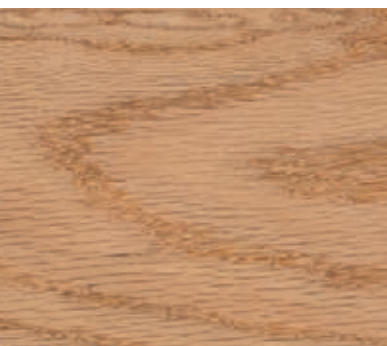
Radial shrinkage **5.6%**

Tangential shrinkage **10.5%**



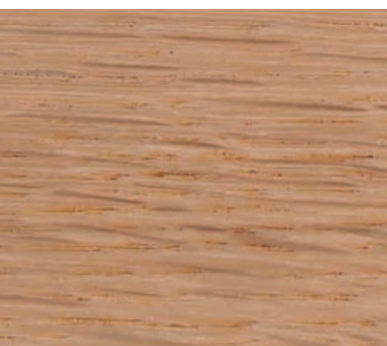
Red oak

Red oak has coarser grain and a warmer tone, which gives projects a rustic look. It's also great for green woodworking, and it's significantly less expensive than white oak.



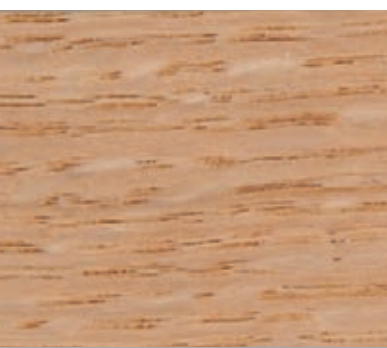
FLATSAWN

Flatsawn red oak has a somewhat coarse, common look, associated with hardwood flooring and less-expensive cabinetry. Chosen and used carefully, however, its strong grain lines can be an asset.



RIFTSAWN

The diagonally oriented growth rings in riftsawn material create straight grain lines on all four sides of a leg, for example, creating a calm look that emphasizes the lines of the piece.



QUARTERSAWN

All oaks have rays, which radiate out from the center of the log. They are bisected in quartersawn boards, creating interesting grain patterns. These are less pronounced in red oak than white.

white oak's heartwood runs from pale or greenish tan to grayish brown. The grain of the two woods is also very different. Red oak has a higher number of large pores, making its grain look coarser and its grain lines more prominent.

Ray fleck—All oaks have rays, an internal structure that radiates outward from the pith, or center, of the log like the spokes of a bicycle wheel. These are bisected when the wood is quartersawn, leaving stripes, called ray fleck, on a board's surface, that are distinct from the grain lines. But the rays in white oak are much wider than those in red, creating beautiful striped patterns on quartersawn boards.

Fuming—Due to a higher amount of tannic acid, white oak is also more sensitive to ammonia, developing a deep golden-brown color when exposed to it. This phenomenon—along with white oak's prominent ray fleck—helped to launch a furniture



***Big, bold grain enlivens a table base.** Furniture maker Andrew Hunter chose red oak for the base of this trestle table. The cathedrals of the flatsawn wood at the center of the legs are framed by the straight grain of the riftsawn edges, offering visual pop along with a sense of order.*

movement, Arts and Crafts, whose makers relied on this beautifully figured material to bring understated elegance to simple forms.

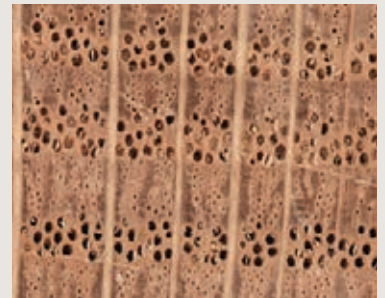
Riftsawn white oak, on the other hand, has a quiet look, which allows the form and design of a piece to take center stage.

Weather resistance—Red oak's larger pores are wide open, letting water and air pass through easily (if you blow through a piece of red oak into a glass of soapy water, you'll get bubbles). White oak's pores are not only smaller overall, but also plugged with a shimmering, cottony-looking material called tyloses, which makes the wood more impervious to water and blocks fungal growth, making the wood rot-resistant and much more suitable for outdoor use.

White oak is also prized for barrels for aging wine and liquor, due to its strength and plugged pores, among other factors related to flavoring and filtering.



Telling white from red: The difference is in the pores



Red oak has big, empty pores. The earlywood part of the growth ring has large, open pores, and the latewood pores are much more prominent in red oak than white.



White oak has tyloses. In white oak, the large, earlywood pores are filled with a shimmery material called tyloses, which makes the wood more waterproof and weather-resistant than red oak. And white oak's latewood pores, barely visible at 10x magnification, are much smaller than those in red oak.

Red oak has its pluses—With its reddish cast and coarse grain, red oak is often associated with inexpensive hardwood flooring and stock cabinetry. But it has some advantages over white oak. For one, it offers similar strength with a much lower price tag. And clear, straight-grained, defect-free red oak is easy to find. Add the fact that it splits and steams as beautifully as white oak, and it's a wonderful material for greenwood furniture making.

Last, red oak's warm tones and prominent grain lines combine nicely with certain woods.

How to tell the two apart

Because their colors can overlap, it's easier than you might think to mistake red oak for white oak, or vice-versa. In the early years of my woodworking career, I accidentally mixed white and red oak in a tabletop. The mistake was obvious after I applied varnish,



A quiet look. Riftsawn red oak has subtle grain when compared to the dark, exaggerated cathedrals common in flatsawn or rotary-cut red oak. This table by Mike Farrington is a great example. He recommends paying close attention to what the grain is doing when using red oak.

White oak

While red and white oak are similarly strong and workable with all sorts of tools, white oak has a number of aesthetic advantages including its prominent ray fleck and ability to darken with ammonia.



QUARTERSAWN

Quartersawn white oak is prized for its tiger-striped ray patterns, called ray fleck. These are especially prominent when the growth rings are perpendicular to the surface, and the rays parallel.



RIFTSAWN

Riftsawn white oak has a relatively quiet look, with straight grain lines on all four faces of a board, making it perfect for the legs in the photo at lower right. It also pairs beautifully with quartersawn elements.



FLATSAWN

Because the pores in white oak are relatively smaller than they are in red, the grain lines in flatsawn white oak are much less prominent. White oak's cool, light-brown tone adds to its elegance.



generating some consternation and a few choice words.

Armed with a little knowledge of wood anatomy, however, you can easily tell white from red, every time. In many cases, you can do this with the naked eye. In others, you'll need a small magnifier called a loupe, or jeweler's loupe, which is cheap and widely available.

Start with color and rays—Start with color. If there is a hint or more of red, there is good chance you're looking at red oak. If the color is tan with no red, it's probably white oak.

Next, check the rays on a flatsawn, or "plainsawn," board. If the boards are weathered or roughsawn, clean up the face or edge with a hand plane, planer, or jointer. At the lumberyard, a block plane works well to clean up a small area for inspection.

The rays on a flatsawn oak board will show up as dashes that are parallel to the grain. If most of the dashes are shorter than

$\frac{3}{4}$ in., the wood is very likely to be red oak. If most of the dashes are longer than $\frac{3}{4}$ in., the oak is very likely white. Another route to identification is the bubble test mentioned earlier.

Grab a loupe to be really sure—If an initial inspection leaves you confused, it's time to shave a small section of end grain with a sharp hand plane or razor and take a close look at the pores, using a 10x magnifying lens. Inspecting wood this way has helped me to better understand its structure and made me a better woodworker.

In the early part of the growing season, oak creates large pores, clustered three to five across in the outermost growth ring. These are seen as grain lines on the face and edges of a board. As spring turns to summer, however, rain diminishes, growth slows, and the tree produces smaller pores.

Start by looking at the latewood part of the growth rings. In both species, the earlywood pores are relatively large, clustered



The crown of Arts and Crafts furniture. This bed by Kevin Rodel exemplifies the beauty of white oak. The tight straight grain of the quartersawn oak accentuates the structure of the piece while the prominent ray fleck decorates the wide, flat surfaces.

three to five across. In the latewood part of the rings, however, the pores are much smaller in white than red, and more clustered together. This is easy to see with your loupe.

Next, look into the big earlywood pores. If they are open and empty, the wood you are scrutinizing is definitely red oak. If most of the pores have a shimmery substance in them (tyloses), the wood is white oak.

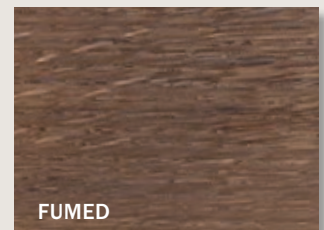
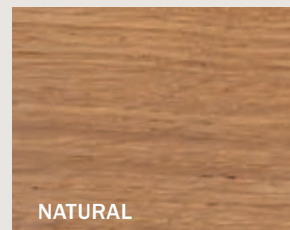
Red or white, oak is one of the strongest, most accessible hardwoods in the world. To be sure which type you are buying, take a handplane, razor, and loupe to the lumberyard. You'll learn more about the material you are working with, and appreciate wood even more deeply. □

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White oak fumes beautifully

Exposing white oak to ammonia fumes turns it a deep brown, seen often in Arts and Crafts furniture. The color change penetrates below the surface, so sanding won't affect it, and the darkness of the tone is easy to control. Red oak can be fumed also, but the difference is much more subtle.

WHITE OAK



RED OAK

