

Buying Hardwood

In this column, we recently covered softwood lumber—both framing and finish material that you get from a standard lumberyard or retail building material outlet (see “A Trip to the Lumberyard,” Apr/21). While you can find a limited selection of hardwood at the big box stores, you’re better off buying hardwood lumber and moldings from a specialty hardwood and millwork dealer. Even a small dealer will usually have a larger selection of hardwood species and molding profiles, and you have a lot more control over the quality.

Buying hardwood is usually a completely different process from running to the lumberyard. For one thing, the largest selection of woods is usually rough-surfaced material. Often, the hardwood dealer will receive bundles from a mill that include boards ripped from the same tree, and these remain stacked together so you have a better chance to match the grain and tone of the boards. This rough material is often sold by the board foot, which gets tallied up first, and then if you want the shop to dimension any of it, you pay for that as a separate charge. We’ll come back to that, but first let’s cover some basics.

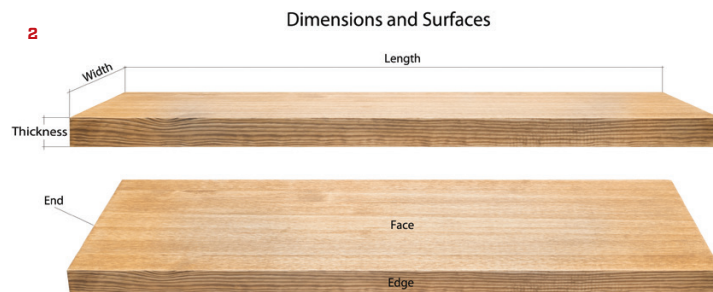
ROUGH LUMBER SIZING

Rough-cut lumber is sized by thickness in $\frac{1}{4}$ -inch increments: $\frac{4}{4}$ (called out as “four quarter”) stock is one inch thick, $\frac{5}{4}$ is $1\frac{1}{4}$ inches thick, $\frac{6}{4}$ is $1\frac{1}{2}$ inches thick, $\frac{8}{4}$ is 2 inches thick, and so on. It’s an odd convention established by the National Hardwood Lumber Association (NHLA), which has been using the system since the organization was founded in 1898. But there was good reason for it then: In an old sawmill, the sawyer could control the bed of the saw with a lever that ratcheted the log ahead of the blade between each pass. Four clicks on the ratchet equaled 1 inch; five clicks, $1\frac{1}{4}$; six clicks, $1\frac{1}{2}$; and so on.

While the thickness of most rough lumber is given in quarter sizes, it can also apply to dressed sizes. Rough-cut boards are typically surfaced (run through a thickness planer) by shaving off about $\frac{3}{32}$ inch per side, making the dressed thickness a total of $\frac{3}{16}$ inch thinner. So the “dimensioned,” or “dressed,” thickness for $\frac{4}{4}$ lumber at the time of milling is $\frac{13}{16}$ inches; for $\frac{5}{4}$ surfaces, it’s $1\frac{1}{16}$ inches; for $\frac{6}{4}$, $1\frac{5}{16}$ inches; for $\frac{8}{4}$, $1\frac{13}{16}$ inches; and so on. Most carpenters will refer to dressed $\frac{5}{4}$ material as “five quarter” but usually call dressed $\frac{4}{4}$ “1-by” material. Also remember that the dressed thickness stated here is at the time of milling and that the lumber can shrink as it dries or swell as it absorbs moisture. So, for example, a dressed $\frac{5}{4}$ board might be $1\frac{1}{8}$ inches thick or 1 inch thick, depending on site conditions. When using the material on site, always check your actual dimensions.

BOARD FOOT PRICING

Unlike softwood lumber, which is sold by the stick, hardwood is often sold by volume measured in board feet, and the prices vary by thickness. The price of lumber is



In addition to selling rough-sawn lumber, some dealers provide S4S (surfaced four sides) material, sorted into even widths with the lengths marked on the ends (1). When rough hardwood is purchased, it is typically priced by the board foot, with an upcharge for finishing. To sort out pricing and finishing, be sure you are clear on the terminology for board dimensions and surfaces (2).



The majority of lumber at a hardwood dealer is rough sawn. Here are three rough, live-sawn logs (3). When available, having them stacked like this makes it easy to match grain. Dealers may also bundle S2S material (4), with two sides surfaced to an even thickness but both edges left rough, so the boards will be of varying width.

also affected by grade and by the cut (visible in the orientation of growth rings).

A board foot is not a measure you'll likely use for anything other than pricing; it's not something you use for building. One board foot is the equivalent of a chunk of wood 1 foot long by 1 foot wide by 1 inch thick. I use "equivalent" because not all the stock you buy will be 1 inch (or $\frac{3}{4}$). An $\frac{8}{4}$ -by-6-inch-wide-by-1-foot-long board is also one board foot. So is a $\frac{6}{4}$ -by-8-inch-wide-by-1-foot-

long board. To calculate board feet, use the equation Thickness x Width x Length / 12 = Board Feet. Remember to keep the units the same, so if your board dimensions are in inches, you need to divide the answer by 12 to get the number of board feet.

HARDWOOD LUMBER GRADES

The NHLA grading rules for hardwood are different from those for softwood lumber. These are the grades, ranked from most expensive to least:

FAS. "First And Seconds" is used for hardwood lumber boards that have a minimum size of 6 inches wide by 8 feet long. To qualify as grade FAS, both sides of the board must have at least 83.33% ($\frac{10}{12}$) clear wood (that is, wood with no knots or other appearance defects). Also, the clear areas must be a minimum size of 3 inches wide by 7 feet long, or 4 inches wide by 5 feet long. (In other words, you can't have a board with a bunch of small knots distributed over the face. Large swaths of the board need to be completely clear.) FAS material is often used to mill large solid-wood moldings.

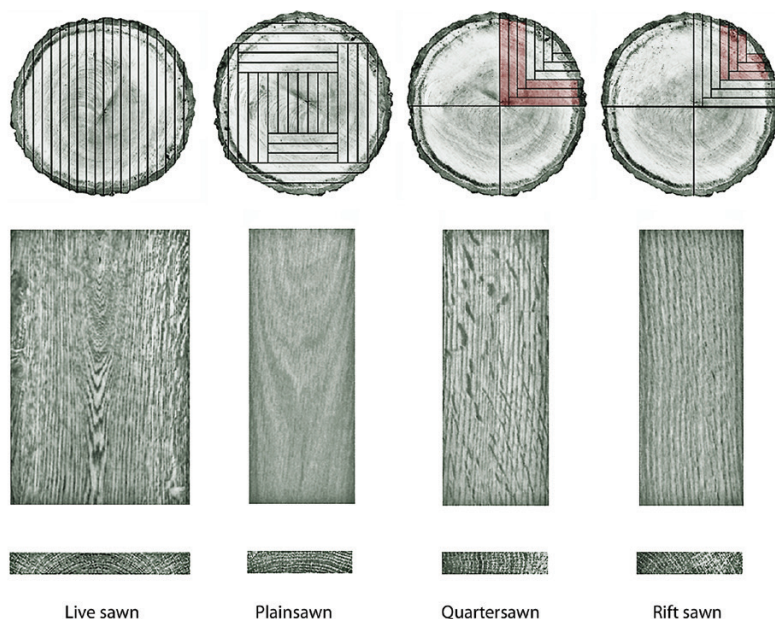
F1F is nearly always shipped with FAS. The boards must have one "better" face that meets all FAS criteria, while the poor face must meet all the requirements of the Number 1 Common grade (see below).

Select. This grade is virtually the same as F1F (one face mostly clear) except for the minimum board size required: Selects can be as small as (but no smaller than) 4 inches wide by 6 feet long.

Number 1 Common (No. 1C) is sometimes called "cabinet grade" because the board sizes work well for cabinet doors. No. 1-grade boards must be a minimum of 3 inches wide by 4 feet long, and both faces must have 66.66% ($\frac{8}{12}$) clear wood. The smallest clear area allowed is 3 inches by 3 feet or 4 inches by 2 feet.

Number 2A Common (No. 2AC) is often referred to as "economy grade" because of its price. It is also the grade of choice for the U.S. hardwood flooring industry. Number 2A Common-grade material must be at least 3 inches wide and 4 feet long; one face must have at least 50% ($\frac{6}{12}$) clear wood; and the clear area must be at least 3 inches by 2 feet. A board is graded as 2AC if the poorer face meets these requirements, even if the other face is better.

Number 2B Common (No. 2BC) has the same requirements as



Hardwood pricing will vary by how the boards are milled from a log. On the less expensive end are live sawn and plainsawn material. The grain pattern on the face of live-sawn boards will vary. Plainsawn material (also called “flatsawn”) will mostly have characteristic “cathedral” bands on the face. Quartersawn and rift-sawn material is at the higher end of the price spectrum. Quartersawn material is usually the most expensive, and the most stable. Bear in mind that NHLA rules require only 80% of the grain to be 60 to 90 degrees to the face for quartersawn, and 30 to 60 degrees for rift sawn. This means some boards may have some grain that is pitched at a shallower angle.

Number 2A Common material, but there are no restrictions on the size of the clear area as long as all the areas of the board are sound.

Number 2 Common is a combination of 2A Common and 2B Common, with no percentage of either grade required.

LUMBER CUT

How a board is cut from a log will have a notable effect on the grain pattern of the face, as well as on how dimensionally stable a board is—that is, how likely it is to warp with changes in moisture content. The hardwood dealer knows the cut from the mill and will sort and price the lumber accordingly, but for most of us, it is difficult to see the grain on a rough board. If you want to see and evaluate the grain pattern for yourself, you can carry a low-angle block plane with you. Most dealers will not mind if you smooth a corner of a board face to reveal and verify the grain.

Live sawn is the easiest way to mill a log. The log is sliced up from one side to the other, so you get a variety of grain patterns, depending on which way the growth rings are oriented at any particular point. A few of the boards near the center will have mostly vertical grain, but on either side of center are a variety of boards that will react differently as the wood absorbs moisture or dries. Live-sawn lumber is the easiest material to use if you are trying to match grain.

Plainsawn lumber is milled to maximize the yield from the log. Most of the boards will be flatsawn, revealing the classic “cathedral” grain pattern (see photo illustration, above). The end grain of these boards will mostly have an arc shape, and these boards are the most likely to cup (the grain swells on the face at the top of the arc if the moisture level is higher on that side of the board than on the other).

Quartersawn lumber is usually the most expensive per board foot. It is cut from logs that are first quartered. Each quarter is then milled to keep the grain orientation as vertical as possible through the thickness of the board. Technically, a board with at least 80% of the grain at 60 to 90 degrees from the face of the board qualifies as quartersawn; the material closest to the center has the most “vertical grain” (closest to 90). Quartersawn material is very dimensionally stable, and in woods with strong medullary rays will have a “flecked” grain pattern that is especially prized.

Rift sawn material is cut from the outer portion of quartered logs. In this region of the log, the grain is not as vertical, but the face of the boards will still mostly show the characteristic parallel bands, though not as many flecks as in woods with strong medullary rays. Boards with grain from 30 to 60 degrees from the face qualify as rift-sawn material.

SURFACING OPTIONS

When buying hardwood, I will often select rough-cut lumber and then have the dealer surface both sides and rip and plane one edge, a finish known as “S3S” (surfaced three sides). For this, I am charged for the material by the board foot plus a milling charge of roughly 10 cents per pass (about 40 cents total per board, which includes two passes for the edge—one through the table saw and one through the joiner).

A lot of dealers will also have pre-surfaced material in stock. “S4S” material is surfaced all four sides, and S2S has both faces surfaced to an even thickness but both edges left rough. Next to rough-sawn lumber, most material in many hardwood outlets will be S2S material, stacked in bundles of even thickness but of varying width.