

Drying Lumber

After a piece of wood is sawn, in most cases it needs to be dried. For centuries, wood has been air dried. The wood is stacked, with the boards separated to allow air to circulate. Today, most lumber goes to a kiln for drying. The biggest benefit of kiln drying being the reduction of time needed. Wood does not kiln-dry well if it is more than 4" thick, and some exotic species, even 2" thick, split apart when put in a kiln.

Air drying can take a year or more. Kiln drying speeds up the process to three or four weeks. There is an ongoing debate about how the drying process affects the wood. Some carvers say that kiln-drying makes the wood harder. Others feel that there are more defects in air-dried lumber.

The only place I've found a significant difference in lumber that has been air-dried vs. lumber that was kiln-dried is with black walnut. During the kiln-drying process, walnut is often steamed, which darkens the sapwood and lightens the heartwood, so it is a uniform color through the whole piece of wood. It doesn't make the wood unattractive, but it is something to keep in mind when you are planning a project. Air-dried walnut shows a sharp color shift from light to dark between the sapwood and heartwood.

One advantage to kiln-drying is that the higher temperatures tend to kill off any parasites, such as fungus, insects, or bacteria, that are in the wood. There is a movement in the country that would require that any wood shipped from one state to another be kiln-dried to prevent the spread of these parasites.

Surfaced vs. Unsurfaced

The difference in the level of machining or preparation can also be referred to as dressed and undressed. In some lumber yards, you can still find a board that measures a full 2", 3", or even 4" thick. Unfortunately, it probably has not been planed yet—it's unsurfaced or rough sawn.

The problem with rough-sawn lumber is that it's impossible to see what kinds of problems lurk underneath. Some defects become obvious once the wood is planed, but they are all but invisible in rough sawn lumber. Lots of wood dealers have their



Before this piece of English lime was surfaced, it was almost impossible to see the pin knots and curly grain beneath the roughness.

boards already planed, so reading the grain is easy to do. Others have a planer on hand to provide dressed lumber, although there's usually a charge.

Bottom line: Go where the boards are already surfaced. Ask to carry the wood outside if that's what it takes to look for defects. Unfortunately, most lumber is stored in warehouse-like structures, where lighting is dim.

Wood Defects

Because of how it grows and how it was treated after it was cut, wood has a host of problems. At the top of the list

are knots. A knot is an area of discolored wood where a branch grew out of the trunk. Knots are hard to carve and sometimes pop out, leaving you with a hole, so they rarely add to the beauty of a carving. Wood without knots is called "clear."

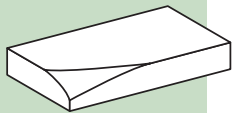
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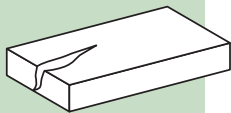
Even quality lumber may have defects. If the wood is really appealing, I find a project that fits into the knot-free portion and cut out between the knots.

Defects in Wood

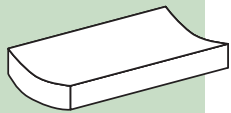
Some wood defects are obvious. Some, such as internal pin knots, show up later.



Wane
Bark along the edge of the board, or missing wood along the edge of the board, usually caused by bark dropping off.



Checking
Splitting of the board, usually at the ends, but also at other spots.



Cupping
Warping across the width of a board.



Bow
Warping along the face that runs from one end to the other.



Bend (or Crook)
Warping along the edge that runs from one end to the other.



Warping (or Twist)
Distortion of the wood's shape.

Illustration from
Woodworker's Pocket Reference

Other major defects include checks and splits, which are essentially cracks that are usually the result of uneven drying. It happens to both air-dried and kiln-dried lumber. Most of the cracks are on the end of a board, so it's easy to cut the defect away, but that's money lost.

Sometimes you'll hear that a board is "cupped." This means there is a hollow in the center of the board where the sides have warped up. On the other hand, a bow is when the board warps along its length. A twist is when it does both. These problems can be corrected, but it is a lot of work!

Since I glue up a lot of panels for relief carving, I take a board, hold it at eye level, and sight along its length. Severe distortions mean I reject the wood; but minor ones I can handle, even though it means time spent woodworking rather than carving.

I also dread finding stains in a board.

They usually appear where you least expect them, and they are very difficult to cover up, even with paint. Minerals in the wood cause stains. Fungus is another culprit, creating an effect called spalting.

With thin boards, stains are usually visible and are rejected. But when they reveal themselves only during carving, they are more difficult to deal with and sometimes may require you to scrap the entire project.

There are a few other possible defects. Worms bore through wood—especially butternut—and leave behind holes, ruining many fine boards. And then there's gum, pitch, or sap, which are resinous liquids that show up both on the surface and in pockets under the surface of the wood. This goo sticks to tools and makes finishing difficult.

Nominal Measurements

Now that you understand how wood is prepared, and the defects to look out for, it's time to discuss how wood is sold. Lumber is measured and priced by volume. Most of us understand that a 2 x 4 isn't

Cut 2" thick at the sawmill, this board was reduced by a planer to the nominal dimension of 1³/₄".



really 2" x 4". It started that way when it was cut at the sawmill, but the board was then passed through a planer, which smoothed 1/2" off both faces and edges, giving you a board measuring 1 1/2" x 3 1/2". Many types of wood are sold by the board foot—which is calculated on the rough dimensions.

I've purchased 1" walnut that was milled to 3/4", 13/16", and 1". I recently bought some white oak boards that measured 15/16" thick, but there were a lot of skips—meaning that the boards should have gone through the planer at least one more time. For most 1" hardwood lumber, the nominal thickness should be 13/16" or 1".

With thicker boards, the discrepancies seem to disappear. Most surfaced 2" hardwood lumber is exactly 1 3/4" thick.

In most cases, lumber thickness is given in "quarters." In the hardwood lumber industry, 4/4 is 1"-thick lumber and 8/4 is 2"-thick lumber. Reduce

the fraction to a whole number, and you have the thickness in inches. It's still very confusing, because the quarters could refer to the wood surfaced or unsurfaced.

Since you are often buying wood by the board foot, you should familiarize yourself with a very simple volumetric formula. Start with the thickness, width and length of your board. Multiply these dimensions together, then divide by 144 to determine board feet. For example, the formula for a board measuring 1" thick x 12" square is:

$$\frac{1" \times 12" \times 12"}{144} = 1 \text{ bf.}$$

Yard workers do make mistakes in their measurements. I now carry a small tape measure when I go to purchase wood. To paraphrase an old saying, measure twice and buy once.

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