

T W O R O C K
SCHOOL OF WOODWORKING

1890 Middle Two Rock Road,
Petaluma, CA 94952
(707) 776 6530

How to Buy Wood

Evening Lecture with Mark Tindley - 28th September 2022

List of things to take with you when buying wood

The basics:

- A list of what you want to buy - well organized and legibly written (preferably typed).
- Tape measure
- A freshly sharpened block plane
- A cut list for your project.
- Pen, paper and clipboard.

And if you want to be ultra-prepared:

- A friend. If you have to sort through big heavy boards you are going to need someone to help you.
- Calculator (We highly recommend buying the "Measure Master Pro" for your cell phone. The "Board Feet" option is particularly useful).
- Moisture meter (preferably pinless)
- A cordless circular saw (you may need to cut it to fit in your vehicle!)

Wood buying etiquette - how to have the best experience.

Call ahead to check they have what you are looking for and ask whether you need an appointment or an account. Even if an account isn't needed you may be offered a discount by having one.

If you are in any doubt what you can and can't do you should always ask.

If you arrive at a wood yard and start wandering around without knowing the ropes or speaking to someone you may find yourself straying into dangerous or restricted areas.

On arrival you should normally visit the front counter or office and let them know what you are

there for. We can't promise you what the level of customer service is going to be but we can tell you that you are going to get the best service by having a good idea of what you want beforehand and being honest about what you know and what you don't. If they use terms you don't understand - ask them what they mean. Pretending to be more knowledgeable than you are is not going to help.

Always be prepared to consider alternatives to what you had in mind. The sales counter is going to have access to privileged information that can help you. Most wood yards have something discounted that they need to shift, excess from a canceled order or an unexpected bargain. Sometimes they'll even be perverse pricing that is to your advantage (like 5/4 that is cheaper than 4/4).

Some wood yards welcome amateur woodworkers as cherished customers - others see them as a nuisance. Don't be alarmed by this - you are much more likely to deal with someone that really wants to help you than someone who doesn't.

Some places will be perfectly happy for you to use your block plane to more closely examine a board. Others will not allow it and it could get you thrown out. Ask!

If you are planning to check the moisture content of a board - which you should most certainly do if there is any doubt about whether the wood is suitable for immediate use - no-one is ever going to object to a pin-less meter. If you start hammering a moisture meter pin into a board without checking it is OK to do so you are going to get into trouble.

If you are permitted to look through a large stack of lumber and choose the pieces you want you should always do so. You may be charged a bit more for picking pieces out in this way but you will probably save money overall because your wastage allowance will be smaller.

If you have un-stacked a pile you must re-stack it neatly - even if it was a mess to begin with. Make sure to stagger wider and narrower boards so the gaps between them overlap (like building a brick wall). If you don't do this the pile may be dangerously unstable.

Most wood merchants will deliver for a fee - but if you're planning to transport it yourself don't buy it without knowing how you are going to get it home! You're almost certainly going to need a pick up truck, van or roof bars and quality tie downs for your car. If you have never tied wood to your roof before practice first! Wood is heavy and unwieldy and a poorly secured load can cause a serious accident.

If your load wood onto your vehicle that sticks out the back you should always put a red flag on the end of the longest piece. The law requires this if it sticks out 4 feet or more but it is strongly advisable to do so at any length. Most wood yards will give you a red flag if you ask for one (often a piece of red plastic advertising the yard) and will have a staple gun to attach them with.

Once you have left the wood yard and driven a short distance you should pull over and check that your load is still secure. Heavy loads shift in transit and can present a serious safety hazard. If you are driving a long way you should stop and check your load at regular intervals.

Softwood sizing and pricing

Softwoods that are sold at hardwood merchants (like cypress, cedar and fir) are normally priced in much the same way as the other wood they sell.

The differences come when you are buying softwood or dimensional lumber at a hardware or big box store (Lowe's, Home Depot, etc).

Softwood at a hardware store is normally priced per piece. This makes it very easy to know what something costs.

Sometimes pieces are priced per lineal foot but this normally open happens where they are prepared to cut something down and sell you a shorter section of it (like for mouldings, baseboard, etc).

Example: Pine door trim costs \$2.00 a lineal foot. If you want 8 feet it will cost you $\$2.00 \times 8 = \16.00 .

Be aware that most hardware stores will have minimum lengths (typically 6-8 feet). They do this to avoid being stuck with multiple short pieces that they can't sell.

Dimensional lumber

Dimensional lumber (think 2 x 4's) is priced, measured and graded differently to other woods. In California it's normally either Douglas Fir, White Fir, Ponderosa Pine, Western Red Cedar or Redwood but other species are sometimes available.

The longer the piece the more expensive it is going to be per foot. This seems counter intuitive - perhaps because a big box of cornflakes is cheaper per ounce than a small box! But it's because the longer pieces need to come from bigger trees and are harder to ship and handle at all stages of their production. If you need 16 feet of dimensional lumber but you're going to cut it up into 4 foot lengths it's cheaper to buy 2 pieces that are 8' long than 1 piece that is 16' long.

2x2, 4x4, etc is the nominal size (i.e. in the rough before it was dimensioned) - the actual size of each piece will be as follows:

Nominal size (Sold as)	Actual dimensions
2 x 2	1 - 1/2" x 1 - 1/2"
2 x 4	1 - 1/2" x 3 - 1/2"
2 x 6	1 - 1/2" x 5 - 1/2"
2 x 8	1 - 1/2" x 7 - 1/4"
2 x 10	1 - 1/2" x 9 - 1/4"
2 x 12	1 - 1/2" x 11 - 1/4"
4 x 4	3 - 1/2" x 3 - 1/2"
6 x 6	3 - 1/2" x 5 - 1/2"
General rules:	<p>Expect every 2", 3", 4" & 6" to be 1/2" thinner/narrower.</p> <p>Expect everything 8" and above to be 3/4" narrower.</p> <p>You need make no allowance for length - nominal lengths and actual lengths are the same. Dimensional lumber always comes in standard lengths.</p>

Moisture content (MC) of soft woods

This is likely to be the most relevant section to you when buying dimensional lumber. Many a novice has accidentally bought green (i.e. un-dried) lumber by mistake and regretted it later. There are 3 standard moisture contents:

Commonly called	Allowable moisture content (and notes)
MC 15 or KD-15	<p>Stands for "Moisture content 15" or "Kiln Dried 15".</p> <p>Both of these mean that that it has a moisture content of 15% or less.</p>
KD (Kiln dried) or S-DRY (Surface-Dry or Shipping-Dry)	19% or less. S-DRY is dried only to the extent that it prevents mold and stain in transit.
S-GRN (Green)	This wood is unseasoned and has not been dried, normally has MC above 19%. The majority of dimensional lumber sold has this designation. It can bleed water when you cut it, is very heavy and shrinks in use.
<p>Of course, if the wood has been sitting around for some time the moisture content could be less than these numbers. However - softwood number yards normally have high turnover and these numbers are normally pretty accurate.</p>	

Dimensional lumber grading

The grading of dimensional lumber is important mostly for engineering and structural reasons. It's more a grading for strength than appearance (though it can be both). For example, knots in the middle of a piece of dimensional lumber have little effect on it's grading. But a large knot on the edge of a board has a significant effect on it's grade because that piece is now so much weaker.

Stress grading of dimensional lumber is mostly done by sophisticated computer technology at the mill.

Grade	Main use	Notes
CONST - Construction STAND - Standard UTIL - Utility	Light framing	Used where high strength is not required
SEL STR - Select Structural #1 & BTR - #1 and Better #1 #2 #3	Structural light framing, structural joists and planks	Used for high strength situations and as joists and rafters
STUD	Studs	This is a separate grade where the pieces are always 10' long or less. It's suitable for load bearing walls.

Grade stamps on dimensional lumber

There are 6 different associations in the USA responsible for the information on grade stamps so there is some variation.



Dimensional lumber should always be stamped to show you:

- The **name of the grading authority** that certified the wood (In this case WWP for Western Wood Products).
- A **mill identification number** (In this case 12. To interpret this you'd have to look up the mill on the database of the grading authority. This one is a fake number.)
- A **grade designation** (In this case STAND & BTR for Standard grade and better).
- **Species:** (In this case D FIR for Douglas Fir)
- Seasoning information (**how dry it is**): In this case it is S-Dry meaning it has a maximum moisture content of 19%.

Common species abbreviations you may see and what they mean:

Abbreviation	Meaning
S-P-F	Spruce - Pine-Fir (but they're not telling you which one it is! It could be any of these).
DF-L	Douglas Fir or Larch (it could be either)
Hem-fir	Western Hemlock and other true firs.
D Fir	Douglas Fir
PP	Ponderosa Pine

Other terms you may come across when buying soft woods

Some of these terms occasionally arise when you are buying hardwoods too.

Term	Meaning
All Heart	Contains heartwood only (no sapwood). Normally the best grade available.
Clear Heart	Pieces where at least one face is heartwood only (no sapwood). Note that there can still be sap wood in the board as long as one face is sap free.
VG	Vertical Grain (means that it is either rift or quarter sawn with a straight grain appearance - no cathedrals).
Rustic	A lower grade intended mostly for exterior use. Not necessarily poor quality - it may show mill marks intended to be used as a feature.
Knotty	It has knots! (You'll also see designations like "Select knotty" or "Quality knotty" to reference how many knots there can be, what size they are and how sound they are.
Running foot	Another term for "lineal foot" where they charge per foot of length regardless of how wide or thick it is.
Boxed heart	A piece of lumber where the center of tree (also called the pith) is enclosed on all 4 sides.
Finger jointed	A machining trick that joins lots of short pieces into one longer piece using interlocking 'fingers'.
MC	Moisture content
RWL	Random widths and lengths

Hardwood Grading

In the USA, Hardwood Grading is the responsibility of the National Hardwood Lumber Association. It's a technical and complicated affair and this handout is not an attempt to list all their rules. The grades listed here are the ones you need to know. Note that not all wood species will have all these grades.

You can download a free copy of their rules for the measurement & inspection of hardwood (and cypress!) at <https://www.nhla.com/nhla-services/hardwood-industry-rules/>

Be warned - if you dig too deeply into the mechanics of hardwood grading you will see that the gradings refer to the number of "cutting units" available in a board and makes distinction between "clear face cuttings" and "sound cuttings". This information is beyond the scope of this handout and the average wood buyer.

Common gradings (in order of what's normally most expensive to least expensive):

Grade	Meaning
First and Seconds (FAS)	Generally the nicest, cleanest and most defect free boards. Must be at least 6" wide Must be between 8' and 16' long Serious defects (like unstable knots) generally only tolerated if they are within 1 foot of the ends of the board. Board must be mostly clear wood.
First and Seconds - One Face (F1F)	Same as FAS except that the reverse side of the board only needs to meet the criteria for #1 Common.
Select (or Selects) (SEL)	Must be at least 4" wide. Must be between 6' and 16' long. Otherwise very similar to F1F, but normally allows a bit more waney edge on one side.
#1 Common	For quality woodwork this is the lowest grade you should consider buying. Must be at least 3" wide (but only 5% of the boards in a stack can actually be this narrow) Must be between 4' and 16' long.
#2 Common	Sometimes you'll see references to 2A and 2B Common but for the average wood buyer the distinctions are too minor to consider. Allows more defects than #1 Common.
#3 Common	Sometimes you'll see references to 3A and 3B Common but for the average wood buyer the distinctions are too minor to consider. Allows more defects than #2 Common.
Below grade	Wood that is so poor that it doesn't even count as #3 Common.

You may sometimes be offered wood that is classified as such-and-such grade **and better**. This occurs when they don't want to have too many grades available for sale or know that some of the delivery has been under-graded. A common example of this is "Selects and better".

Some wood vendors have their own grading systems in addition to the NHLA system. You won't know unless you ask. For example, one local wood supplier sometimes offers walnut in a "Prime" or "Super prime" grade which they have selected to have little to no sapwood.

Wastage

Before you buy wood for a project you're going to need to know how much you need. Even for a small project this calculation can often be a daunting task.

Once you have worked out how much you need your calculation probably assumes a perfect world where all the boards are exactly the sizes you needed and of fully usable wood. Sadly, this is almost never the case.

Wastage refers to the fact that you will be buying extra wood in the knowledge that you might need it.

You might need more wood because you screw something up. Or because there is a defect in a board that renders a section unusable. Or just because you prefer one piece to another. Whatever the reason - you should factor a wastage percentage of between **20% and 100%**.

Small projects normally need a larger wastage allowance - because if you only have a few pieces to begin with the chances that some of them might not make the grade is very high.

Obviously, the more expensive the wood, the more you may be tempted to reduce the wastage allowance.

What impacts a wastage decision?

There are several things that affect your decision on how much wastage to allow for. These include (but are certainly not limited to):

- How big is the project? (Smaller projects may need more wastage)
- How likely are you to use any leftover wood on a future project?
- What is the species? Some woods need a higher wastage allowance to account for the existence of likely defects or undesirable sections (like sapwood in cherry or walnut).
- What grade of wood are you buying? The lower the grade of wood that you buy the higher your wastage is going to be.
- If your project needs lots of small pieces you may need a very low wastage allowance - since small pieces are easy to find from larger boards.
- If you are going to need long pieces or almost the full length of a board you will need at

- least a 50% to 100% wastage allowance.
- If you buy wood sight unseen your wastage allowance needs to be higher.

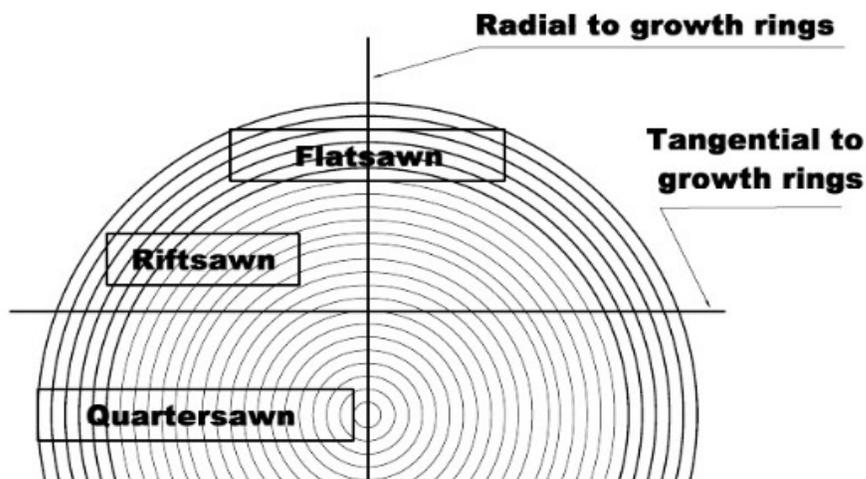
Milling method and terminology

When buying wood you will sometimes find that the boards have been divided into 3 main types - Flat sawn (also called plain sawn), Rift sawn and Quarter sawn.

The true definitions of these terms relate to how the board was actually milled by the sawyer. But when buying wood you will find that the terms relate to how the grain is aligned on the board regardless of the milling process. Even the "flat sawn" milling method produces "Quarter" sawn looking pieces in the center of the board.



The sorting into these categories is normally species dependent. If you're buying paint-grade utility woods like poplar you may not be offered a choice. But if you're buying oak or walnut most wood vendors will have all three. Don't be afraid to ask!



Flat sawn

Flat sawn lumber is also sometimes called **plain sawn** or **flat grained**. It is normally the cheapest cut and the most commonly found.

Flat sawn boards normally show a pronounced "cathedral" of growth rings on the face of the board.

In technical terms a flat sawn board has the face of the board tangential to the growth rings.

If no specification is given the board will be likely be flat sawn. Note, of course, that the wider a board is the more likely it is for it to contain rift or quartered lumber towards the outside edges. You can sometimes use this to your advantage if you wanted to use the flat cut center and the quartered outside of the same board for different parts of your project.

Quarter sawn and rift sawn

Quarter sawn, (also called **quartered** or **quarter cut**) lumber has the face of the board mostly radial to the growth rings. We say 'mostly' because there are in fact grading rules about what the angle of the growth rings to the face should be. In practice knowing these rules is of little use and boards sold as "rift" often appear to be substantially "quartered" - and vice versa.

Rift sawn lumber has the face of the board both radial and tangential to the growth rings. You'll see this as about a 40 to 60 degrees angled growth ring on the end grain.

The key feature of a rift sawn board is that you should have straight grain on the face and edge of the board.

You will always pay a premium for quarter sawn or rift sawn boards.

A perfectly quartered board has a straight grained face - but hold the board on edge and you'll realize that it also has a flat grained edge! The same is true of a flat grained board - if the face is perfectly flat grained then the edge of the same board must by definition appear to be quartered! **You can use this knowledge to your advantage to save money when buying wood.** Let's suppose you want a total of 4 quarter sawn pieces that are 1-1/2" wide x 1 1/2" thick x 7' long. You're going to need a board that is 1 - 3/4" to 2" thick (remember this is sold as 7/4 (seven quarter) or 8/4 (eight quarter), 7-8" wide and x 8' long to mill up - but there is no need to buy a quarter sawn board! You could just buy a flat sawn board instead and have the show side be the edge instead of the face.

How hardwood is priced

It is up to each wood merchant to decide how to price their wood. Most commonly, hardwood is priced by the **board foot**. (More on that below).

It can also be priced:

- per lineal foot
- by weight (for certain exotic and tropical hardwoods)
- by piece (it may just have the price written on the board)
- anyway the seller chooses!

You will always pay more for:

- Especially wide boards (in most species anything over 9" wide may be separated out and more expensive)
- Thicker boards
- Figured woods (unless they are hiding in a pile with non-figured woods - which is actually quite common)
- Burls (they can get very expensive and the best ones are normally turned into veneer.

You will sometimes be able to get a bulk discount if you are buying a large enough quantity.

At smaller independent wood yards you may be able to negotiate pricing, especially if you are buying more than a few boards or you're looking at something they have been hoping to sell for a long time.

Some wood merchants publish their price lists. But mostly you'll have to call or visit to find out board foot pricing.

Professional woodworker's with frequent purchases will almost always pay less than you - that's just the way it is. They also have access to sales reps who can get the best rates and offer great advice.

Calculating board feet

One board foot is 12" wide by 1 foot long by 1" thick.

Examples: These are all exactly one board foot:

A board that is 12" wide x 1 foot long x 1" thick
A board that is 6" wide x 2 feet long x 1" thick
A board that is 8" wide x 18" long x 1" thick
A board that is 6" wide x 1 foot long x 8/4.

Technically speaking, board feet is measured as follows:

"Surface measure" (i.e. the width times the length) X Thickness

Dividing by 12 or 144 - what's that all about!?

Remember - to calculate board feet you are first multiplying the width in inches by the thickness in inches by the length.

If you include the length in feet you then need to divide by 12 to get the board footage. (There are 12 inches in a foot)

If you include the length in inches you then need to divide by 144 to get the board footage (Because there are 144 square inches in a square foot)

Example where length is in feet:

A board is 8" wide x 10' long x 5/4 thick.

5/4 means $1 - 1/4" = 1.25"$

$8 \times 10 \times 1.25 = 100$

100 divided by 12 = 8.33 board feet.

Example where length is in inches:

A board is 8" wide x 120" long x 5/4 thick

5/4 means $1 - 1/4" = 1.25"$

$8 \times 120 \times 1.25 = 1200$

1200 Divided by 144 = 8.33 board feet.

Important things to know about how vendors calculate board feet

Thicknesses less than 1" are almost always measured as 1". For example, if the board is 13/16 thick this will almost always be sold as if it is 1" thick - (called "4 Quarter"). Therefore, for boards like this the "board footage" is equal to the "surface measure" (since multiplying by 1 gives the same result).

Thicknesses are always stated in quarter inch increments. The most common thicknesses are shown overleaf.

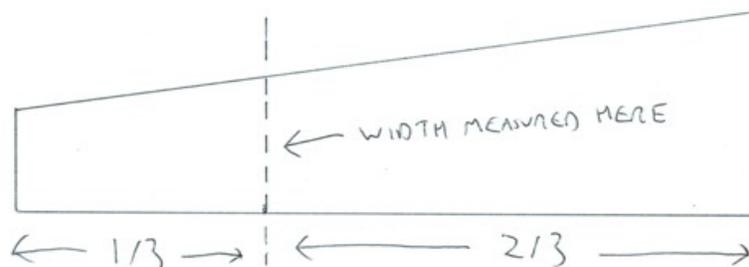
Stated Thickness	Nominal thickness (remember that the actual thickness will be less if the board has been surfaced)
4/4	1"
5/4	1 - 1/4"
6/4	1 - 1/2"
7/4	1 - 3/4"
8/4	2"
10/4	2 - 1/2"
12/4	3"

Note: When ordering you would ask for "Four Quarter" (4/4), "Eight Quarter" (8/4), etc.

When measuring length, fractions of a foot are almost always rounded up or down to the nearest foot. For example, a board that is 10' 2" long will almost certainly be sold as a 10' (120" long) board and not a 122" long board. Similarly a board that is 10' 8" (130") will normally be sold as an 11' long board.

Boards that are a standard length plus exactly a half foot (for example 8' 6") can sometimes be rounded up and sometimes down - if there are several boards like this your supplier is supposed to alternative between rounding up and down for each board.

Some boards taper (i.e. they are wider at one end than the other). In these cases there is a special method for calculating "surface area" - you measure the width at 1/3 the length of the board from the narrowest end.



Boards will either be sold in **stock widths** or **random widths**. Make sure you ask which. If widths are random you may still be able to pull the minimum widths you need - just be prepared to pay a little more for the privilege if you're taking a disproportionate amount of wider boards.

Most vendors round widths to the nearest inch (exact half inches should be alternately rounded up, then down, then up, etc). If you are buying a stack of lumber you may see them take one long measurement of width across all boards using their fingers and thumb as a stop.

Worked example

You are buying rift sawn white oak. It costs \$8.60 a b/f for the 4/4 and \$10.90 a b/f for the 8/4.

You are buying 4 different boards:

Board 1: 13" wide x 10' long by 4/4
Board 2: 10" wide x 10' long x 4/4
Board 3: 6 7/8" wide x 8' long x 8/4
Board 4: 5 3/8 wide x 8' long x 8/4

We have to calculate the 4/4 and 8/4 boards separately.

Price for the 4/4 boards

23" (total width of both 4/4 boards combined) X 10' length X 1" = 230

230 divided by 12 = 19.17 board feet.

19.17 board feet x \$8.60 a board foot = \$164.86

Price for the 8/4 boards

The wider one will likely be rounded up to 7". The narrower one will likely be rounded down to 5". The total width is therefore 12".

12" (total width of both 8/4 boards combined) X 8' length X 2" = 192

192 divided by 12 = 16 board feet.

16 board feet x \$10.90 a board foot = \$174.40

Total price for these 4 boards is \$164.86 + \$174.40 = \$339.26 (plus tax)

Pitfalls, defects and things to look out for

Seasonal checking (on the face of a board)

Seasonal checks or "checking" are thin cracks in the board. In all grades of lumber seasonal checking is acceptable as long as it is likely to be removed when milled flat to standard surface thickness.

In the lower grades seasonal checking is still generally considered acceptable as long as it doesn't present a structural weakness.

Checking (normally at the ends of the board)

Checking (also commonly called splitting) is a separation between growth rings. You normally find it at the ends of boards. Excessive checking is a sign that the wood may have been dried too fast and boards with this defect should be avoided. Checking in the center of a board is a massive red flag that the board is going to give you problems. Light checking that does not extend too far is found in almost almost all boards. Therefore, you should always buy pieces longer than your needed final lengths in the expectation that you will have to cut the ends off at least a few inches. Be aware that "hidden checks" are very real - these are checks that you don't see at all till you start milling the board and it falls apart on you. It is also common for checks that you can see to extend much further than you realize.

Shake is similar to checking but generally much more serious. It is a lengthwise grain separation of the fibres. It was long believed to be caused by the tree 'shaking' - normally in high winds as it grew - but more recent research has suggested that bacteria may be top blame. It can also happen when the tree hits the ground too hard when being felled.

Sapwood and Heartwood

Sapwood is the lighter colored part of a board that was on the outer portion of the tree when it was cut down. When a tree grows it produces new sapwood which, over time, will turn into heartwood (the darker inner section). Once the tree has been felled this process stops and the sapwood will remain. You will find some sapwood in almost all species that you purchase.

In many species the presence of sapwood may not be noticed or problematic. You may even like the appearance. But many a woodworker has purchased walnut or cherry only to be disappointed then the rich red or choc-lately brown they were anticipating is overwhelmed by light colored sapwood. In other species, like white oak, sapwood may be almost invisible when you first mill the board but appear later over time.

For furniture making we often mill boards and discover a significant amount of sapwood - you can sometimes feel cheated by it. Sadly, almost all grades of hardwood allow for unlimited sapwood. Therefore, if the absence of sapwood is critical to your project, you must specify this before purchasing . Some suppliers DO have grades of certain species that have either

no sapwood or a maximum specified percentage.

You should not reject a board just because it contains sapwood. Often times sapwood will be entirely removed in the milling process of a rough board - either from the edge, face or both.

Sticker stain

When wood is dried and stored it is "stickered" to allow air to move freely around the stack. Stickered is an essential part of wood drying - but sometimes it goes wrong! "Sticker stain" is the term for when the board shows clear evidence of where the stickers were even after the board is milled.



The exact causes of sticker stain are not fully understood - it can occur even at well run wood yards. Moisture, species, fungus and sticker type seem to all play some part.

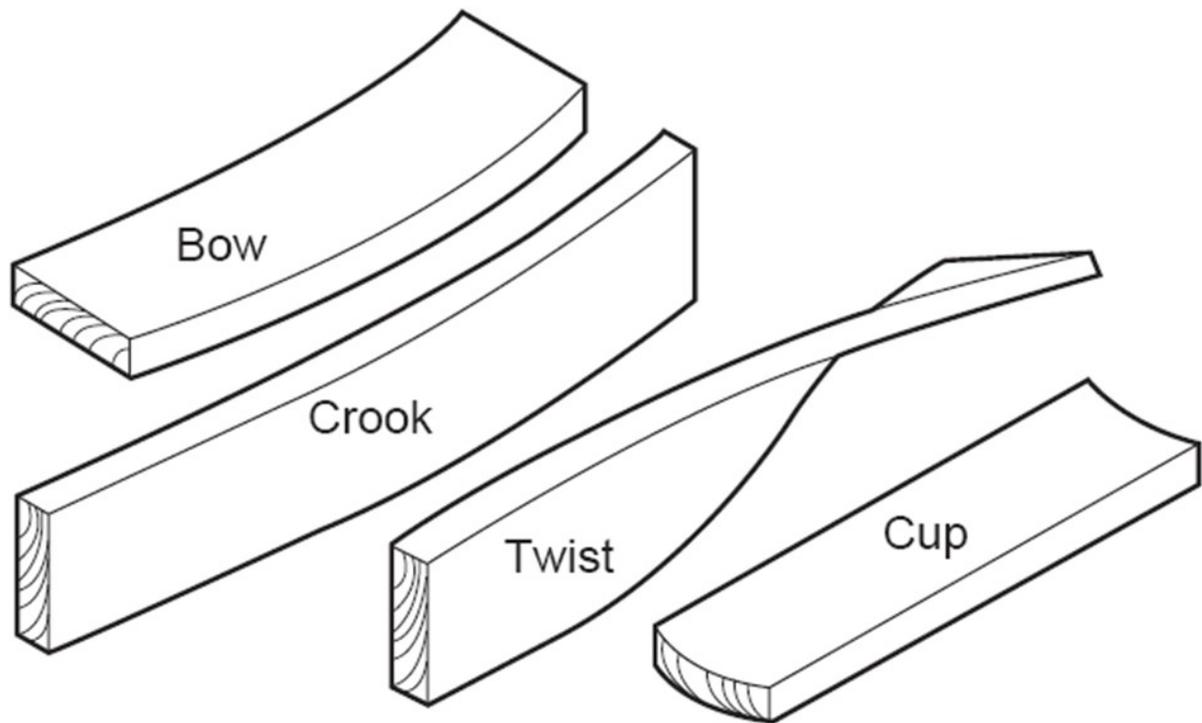
You can sometimes cut around sticker stain but when it appears it is normally fatal to the project - since the stickers are placed at fairly regular intervals even clear short lengths can be hard to find.

It is sometimes impossible to know whether the stains you see on a rough board will be removed with milling. If wood that you have already purchased and milled shows clear evidence of sticker stain you have a good case for returning the wood for a refund.

Cup, twist, bow and crook

Cup, twist, bow and crook are all different variations from a perfectly flat straight board - collectively these defects are called **warp**.

These are all expected features of wood that you buy. Nonetheless, you will of course prefer perfectly straight boards. Shop carefully!



Because of the way wood dries almost all rough boards will be **cupped**. Make sure you will be able to get the thickness and width that you need. If not, you may need the next size up (e.g. 5/4 instead of 4/4). The easiest way to do this is to place a flat edge (e.g. a steel rule) across the width of the board and see how much you will need to remove.

Boards that are **bowed** or **crooked** present a problem if you need long lengths from them. Again - almost all rough boards have some bow or crook - you may want to reject ones where it is excessive. Closing one eye and sighting right down the length of the board is often helpful.

Twisted boards are sometimes the most difficult to mill flat and will have to have the most material removed. But if you only need short lengths you may find that the twist almost disappears. The best way to measure twist (sometimes called **wind**) is to bring winding sticks with you when you are buying your wood. This is particularly relevant to the purchase of large wide slabs where then winding sticks will tell you how much thickness you will have to lose before the board is flat.



Wood boring Insects (Termites, powder post beetles, etc)

New wood that has been kiln dried almost never has wood boring insects in it - they don't survive the heat of the kilning.

Wood that is **air dried** or **reclaimed** is always prone to wood boring insects. Buyer beware!

Most air dried wood is going to show evidence of insect borers in the bark or sapwood. Do not reject a board just because it has insect holes in the sap wood.

You should be concerned if you see significant holes or tracks in the heartwood. The biggest tell, tell sign of a problem is little piles of dust or 'frass' in the wood pile. Clean holes are more likely to be old and the pest may be long gone.

Wood boring pests can attack a tree while it is growing or after it has been milled. If you are in any doubt about a board ask the vendor what they have done to treat or prevent wood borers. They may be able to reassure you or have used chemical treatments like Borax.

Surfaced lumber

If you don't have the means to mill your own boards (i.e. a planer and a jointer) you may have to buy your wood already surfaced.

The great advantage of surfaced lumber is that you can see the faces much better than on a rough board and know what you are buying. There are a few disadvantages, however:

- The wood will already be thinner than if you had purchased it rough (this could pose a problem for obtaining the thickness you need).
- You'll be paying more for it.
- Don't be fooled into thinking that surfaced lumber is perfectly flat, square and true. It may have been when it was surfaced but that doesn't mean it is now - you may have to re-mill it

If you are buying wood sight unseen make sure you specify whether you want it "rough" or "surfaced". **Skip planing** (or **Hit and Miss** planing) is very common in the industry (where they run the board through a planer, but not a jointer) to expose the true character of the board. It can be both a boon and a frustration. Sometimes you might have to order "Rough - and I mean it" to avoid being sent skip planed lumber.

Common terms for surfaced wood

Designation	Meaning
S2S	<p>Surfaced on 2 sides. Both edges are still rough.</p> <p>These boards have been surfaced on both faces. Those 2 faces should be parallel to each other but don't count on it! It depends how it was done and who did it. If it's done a 2 sided molder it should be pretty good. Smaller wood yards might just put it through a planer on each side and the results will be less predictable.</p>
S3S	<p>Surfaced on 3 sides. One edge is rough.</p> <p>These are the same as S2S but they also have one edge that is straight. (See SLR1E below). In theory the edge should be at 90 degrees to the faces but don't count on it.</p>
S4S	<p>Surfaced on all 4 sides.</p> <p>These are boards that should be flat and square on all 4 edges. This is mostly done on a 4 sided moulder and is likely to be the most accurately done.</p>
SLR1E	<p>Straight line ripped on one edge. (If you were doing this yourself you'd probably be running the edge over a jointer). In commercial operations it's almost always done on a static moulding machine or a large rip saw with a conveyor feeding the wood through.</p>
S1S1E	<p>Surfaced on one side and one edges only.</p>
S1S2E	<p>Surfaced on one side and two edges only.</p>

Sheet Goods (Plywood, MDF, etc)

A detailed run-through of **sheet goods** (also called **manufactured boards**) is beyond the scope of this handout. But here is some basic terminology that you may find useful.

Material or terminology	Description
MDF	<p>Medium Density Fiber Board. Great for painted cabinetry and veneering projects.</p> <p>Particularly useful when a profile needs to be milled into the edge.</p>
Super-Refined MDF	<p>A special grade of MDF that is heavier and denser than normal MDF.</p> <p>It is commonly used for painted European style cabinetry where the exposed edges will be seen.</p>
MR-MDF or MR-50	<p>Moisture Resistant MDF.</p> <p>Standard MDF swells up and is normally ruined when it gets wet. MR-MDF can withstand prolonged contact with water and still be fine. It is particularly useful for cabinetry in damp areas (like bathrooms).</p>
Ultra-Lite MDF	<p>A special grade of MDF that is lighter than normal MDF. Used where weight is a concern and there will be no exposed edges.</p>
Plywood	<p>A board made up of several layers of wood veneer. The grain of each layer is oriented at 90 degrees to the one next to it to strengthen the sheet.</p>
Pre-Finished Plywood	<p>A plywood board that already has the a finish sprayed on. Very useful for cabinet interiors but not suitable for face gluing.</p>
Particleboard	<p>The standard material for inexpensive commercially produced cabinetry. Very little strength across it's length (think sagging shelves) and therefore almost always inferior to it's alternatives.</p>
Melamine panels	<p>Commonly used for cabinet interiors. It is a resin sprayed onto a core (normally particleboard) that has a plastic like</p>

	appearance. Normally white but other colors are available.
OSB	Oriented Strand Board. Often used for sub-floors or structural shear panels instead of plywood.
Baltic Birch	A high quality birch plywood with many layers. Often used where exposed plywood edges are considered a feature.
Apple Ply	Another high quality plywood with many layers. Often used where exposed plywood edges are considered a feature. Generally the best and most expensive plywood there is.
Platform	A board with a plywood core and thin outer MDF skins. Very useful for painted cabinetry where weight is a concern (because it is much lighter than MDF). Platform is essentially "Classic core" plywood but with no exterior veneers.
Italian Bending Poplar	Sometimes called "wobble wood". This is a type of plywood where all the veneers are laminated with the grain facing the same way. It's used as a plywood for curved work because it bends so easily.
Plyboo	This is a brand name for a type of "plywood" made from bamboo. Available in all sorts of colors and styles.

Plywood core types

When buying plywood you need to specify the core type (i.e. what's on the inside between your show veneers). Here are the main ones:

Core type	Description
Classic Core (sometimes called Combination Core)	Softwood inner veneers plus a thin MDF skin between the inner plies and the face/back veneers. Normally the best quality and smoothest panel available.
Veneer Core	Softwood inner veneers throughout.

	Cheaper and lighter than Classic Core but more likely to telegraph a rough surface to the outer veneers.
MDF Core	Not really a plywood. Core of MDF with show veneers glued on. A smooth and consistent panel but normally very heavy.

Hardwood Plywood grading

Hardwood plywood is available in dozens of species. It's normally only the front and back veneers of the board that have the species it is sold as. The core will be something else.

Every sheet of Hardwood Plywood has a grade for the **face** and a grade for the **back**.

Domestic (USA) plywood grading

Face grades run from A through D (A is the best).

Back grades run from 1 through 4 (1 is the best)

Therefore, the highest grade of plywood is A1 - which has an A face and a 1 Back.

If you are only going to see one side of the plywood select a lower grade for the back to save money.

In some species even the lower grades are perfectly nice for cabinet interiors. We regularly use maple plywood in grade C2 for cabinet interiors. For other species C2 may be too rustic for your project.

Face Grades	Back grades
A - The best. Use where appearance is everything.	1 - The best.
B - The 2nd Best. Use where the natural characteristics of the wood are desirable.	2 - The 2nd best. All openings in the veneer will be repaired.
C - Unlimited color variation allowed	3 - Some open defects allowed.
D - Will often have repairs to the veneer. The lowest grade available.	4 - The lowest grade available. Open splits and large knot holes to be expected.

Please note that imported plywood species have different grading rules depending on their country of origin. You will need to ask the vendor to explain the options to you.

List of local suppliers

Large suppliers with big stocks of domestic hardwoods and sheet goods

Moore Newton Quality Hardwoods

2115 Williams Street
San Leandro, CA 94577
(510) 317 6500

www.moorenewton.com

Mount Storm Forest Products

5700 Earhart Court
Windsor, CA 95492
(707) 838 3177

www.mountstorm.com

MacBeath Hardwood

930 Ahby Avenue
Berkeley, CA 94710

www.macbeath.com

Specialist suppliers (larger slabs, reclaimed lumber or other interesting pieces)

Arborica

Evan Shively
Marshall, CA
By appointment only

(415) 663 9126
www.arborica.com

Peroba Reclaimed

112 Ohio Avenue, Unit 1
Richmond, CA 94804

(415) 993 9055
www.perobareclaimed.com

Anderson's Alternatives

10550 Lansing Street
Mendocino, CA

(707) 937 3434
 www.andersonsalternatives.com

Heritage Salvage
 1473 Petaluma Blvd S
 Petaluma, CA 94952

(707) 762 6277
 www.heritagesalvage.com

Sturgeon's Mill
 2150 Green Hill Road
 Sebastopol, CA 95472

(707) 829 2479
 www.sturgeonsmill.com

(Note: This is a wonderful old-fashioned saw mill - their open days are highly recommended - normally only has redwood available for sale).

Approximate pricing

The prices of wood fluctuate often so don't take this table too literally. But it is a useful guide to what you can expect to pay. It is the price list from Hearne Hardwoods. They are in Pennsylvania where wood is a bit cheaper - so expect to add 10% or so to the amounts in this table.

Note: ("Flitch" means they have the whole tree ungraded).

<u>Species</u>	<u>Thickness</u>	<u>Lumber Grades(s)</u>	<u>Price per BF</u>
<u>Apple (European)</u>	<u>8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$22.00 – 25.00</u>
<u>Ash (White)</u>	<u>4/4, 5/4, 8/4</u>	<u>FAS</u>	<u>\$5.50 – 7.25</u>
<u>Basswood</u>	<u>16/4</u>	<u>FAS</u>	<u>\$8.00</u>
<u>Birch (European – Masur/ Karelian)</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$70.00</u>
<u>Birch (White)</u>	<u>4/4</u>	<u>FAS</u>	<u>\$6.00 – 7.00</u>
<u>Birch (Yellow – Flame)</u>	<u>4/4</u>	<u>Figure (Unselected)</u>	<u>\$8.00+</u>
<u>Blackwood (African)</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$70.00</u>
<u>Blackwood (Tasmanian)</u>	<u>4/4, 5/4, 8/4</u>	<u>FAS</u>	<u>\$16.00 – 18.00</u>
<u>Blackwood (Tasmanian – Figured)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Figure (Unselected)</u>	<u>\$25.00 – 100.00+</u>
<u>Bloodwood</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$15.00 – 16.00</u>
<u>Bocote</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$25.00 – 26.00</u>

<u>Species</u>	<u>Thickness</u>	<u>Lumber Grades(s)</u>	<u>Price per BF</u>
<u>Bubinga</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$19.00 – 20.00</u>
<u>Butternut</u>	<u>4/4, 5/4, 8/4, 12/4, 16/4</u>	<u>Common, FAS</u>	<u>\$4.00 – 25.00</u>
<u>Canarywood</u>	<u>4/4</u>	<u>Select & Better</u>	<u>\$14.00</u>
<u>Cedar (Aromatic)</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$6.00 – 7.00</u>
<u>Cedar (Port Orford)</u>	<u>4/4, 5/4, 8/4</u>	<u>Common, Select & Better</u>	<u>\$20.00 – 30.00</u>
<u>Cedar (Spanish)</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$8.00 – 9.00</u>
<u>Chechen</u>	<u>4/4</u>	<u>FAS</u>	<u>\$14.00</u>
<u>Cherry</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4, 16/4</u>	<u>Common, FAS, Premium</u>	<u>\$3.00 – 14.75</u>
<u>Cherry</u>	<u>4/4, 8/4</u>	<u>Quartersawn</u>	<u>\$9.80 – 13.30</u>
<u>Cherry (Curly)</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4, 16/4</u>	<u>Figure (Medium, Heavy)</u>	<u>\$6.25 – 17.25+</u>
<u>Chestnut (American)</u>	<u>4/4, 5/4, 8/4</u>	<u>Reclaimed: Unselected, Wormy</u>	<u>\$16.00 – 17.00</u>
<u>Chestnut (European)</u>	<u>4/4, 5/4, 6/4, 8/4</u>	<u>Fitch (European)</u>	<u>\$9.00 – 10.00</u>
<u>Cocobolo</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$30.00 – 100.00</u>
<u>Ebony (Gabon)</u>	<u>4/4, 8/4</u>	<u>Unselected, Select & Better, Premium</u>	<u>\$100.00 – 200.00</u>
<u>Ebony (Macassar)</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$80.00</u>
<u>Goncalo Alves (Tigerwood)</u>	<u>4/4</u>	<u>Select & Better</u>	<u>\$16.00</u>
<u>Granadillo</u>	<u>4/4</u>	<u>Select & Better</u>	<u>\$20.00</u>
<u>Hickory</u>	<u>4/4</u>	<u>FAS</u>	<u>\$5.00</u>
<u>Holly</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$30.00</u>
<u>Jatoba (Brazilian Cherry)</u>	<u>4/4</u>	<u>FAS</u>	<u>\$11.00</u>
<u>Kingwood</u>	<u>4/4</u>	<u>Select & Better</u>	<u>\$100.00</u>
<u>Koa</u>	<u>4/4, 8/4</u>	<u>Unselected</u>	<u>\$42.00 – 80.00</u>
<u>Koa (Figured)</u>	<u>4/4, 8/4</u>	<u>Figure (Unselected)</u>	<u>\$60.00 -125.00+</u>
<u>Leopardwood/ Lacewood</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$18.00 – 19.00</u>
<u>Mahogany (African)</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$8.00 – 10.00</u>
<u>Mahogany (African)</u>	<u>4/4, 8/4</u>	<u>Quartersawn</u>	<u>\$9.00 – 10.00</u>
<u>Mahogany (African – Crotch)</u>	<u>4/4, 8/4, 12/4</u>	<u>Figure (Unselected)</u>	<u>\$25.00+</u>
<u>Mahogany (Genuine)</u>	<u>4/4, 5/4, 8/4, 12/4, 16/4</u>	<u>Common, FAS</u>	<u>\$6.50 – 30.00</u>
<u>Mahogany (Genuine – Crotch)</u>	<u>4/4, 5/4, 8/4, 12/4, 16/4</u>	<u>Figured (Unselected)</u>	<u>\$30.00+</u>
<u>Mahogany (Genuine –</u>	<u>4/4, 5/4, 8/4, 12/4,</u>	<u>Figure (Unselected)</u>	<u>\$50.00+</u>

<u>Species</u>	<u>Thickness</u>	<u>Lumber Grades(s)</u>	<u>Price per BF</u>
<u>Quilted</u>	<u>16/4</u>		
<u>Makore</u>	<u>8/4</u>	<u>FAS</u>	<u>\$25.00</u>
<u>Maple (Big Leaf – Quilted)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Figure (Unselected)</u>	<u>\$15.00 –</u> <u>100.00+</u>
<u>Maple (Hard)</u>	<u>4/4, 5/4, 8/4, 12/4,</u> <u>16/4</u>	<u>FAS</u>	<u>\$9.00 – 16.00</u>
<u>Maple (Hard)</u>	<u>4/4, 8/4</u>	<u>Quartersawn</u>	<u>\$10.00 – 13.00</u>
<u>Maple (Hard – Birdseye)</u>	<u>4/4, 5/4, 8/4</u>	<u>Figure (Unselected)</u>	<u>\$5.50 – 35.00+</u>
<u>Maple (Hard – Curly)</u>	<u>4/4, 8/4</u>	<u>Figure (Unselected)</u>	<u>\$12.00 –</u> <u>25.00+</u>
<u>Maple (Soft)</u>	<u>4/4, 5/4, 8/4, 12/4,</u> <u>16/4</u>	<u>FAS</u>	<u>\$8.00 – 13.00</u>
<u>Maple (Soft – Ghost)</u>	<u>4/4</u>	<u>FAS</u>	<u>\$8.50+</u>
<u>Maple (Soft – Spalted)</u>	<u>4/4</u>	<u>FAS</u>	<u>\$25.00</u>
<u>Maple (Soft – Tavern)</u>	<u>4/4</u>	<u>FAS</u>	<u>\$5.00</u>
<u>Maple (Soft – Tiger)</u>	<u>4/4, 5/4, 8/4, 12/4,</u> <u>16/4</u>	<u>Figure (Unselected)</u>	<u>\$9.00 – 26.00+</u>
<u>Myrtle (Tasmanian Rose –</u> <u>Figured)</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$15.00 –</u> <u>100.00+</u>
<u>Oak (English Brown)</u>	<u>4/4, 5/4, 8/4</u>	<u>Flitch (European)</u>	<u>\$15.00 – 18.00</u>
<u>Oak (European)</u>	<u>4/4, 5/4, 8/4</u>	<u>Flitch (European)</u>	<u>\$14.00 – 17.00</u>
<u>Oak (Red)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Common, FAS</u>	<u>\$2.75 – 10.75</u>
<u>Oak (Red)</u>	<u>4/4, 5/4, 8/4</u>	<u>Quartersawn</u>	<u>\$7.75 – 9.75</u>
<u>Oak (Spessart)</u>	<u>4/4, 5/4, 8/4</u>	<u>Flitch (European)</u>	<u>\$22.00 – 25.00</u>
<u>Oak (White)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Common, FAS</u>	<u>\$5.00 – 18.50</u>
<u>Oak (White)</u>	<u>4/4, 5/4, 8/4</u>	<u>Quartersawn</u>	<u>\$10.50 – 18.00</u>
<u>Olive (Italian)</u>	<u>4/4, 5/4, 8/4</u>	<u>Flitch (European)</u>	<u>\$42.00 – 60.00</u>
<u>Padauk</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$13.00 – 14.00</u>
<u>Pear (European)</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$12.00 – 22.00</u>
<u>Pecan</u>	<u>4/4</u>	<u>FAS</u>	<u>\$4.50</u>
<u>Pine (Eastern White)</u>	<u>4/4, 5/4, 8/4</u>	<u>Unselected, Furniture Grade,</u> <u>C+</u>	<u>\$3.00 – 9.00</u>
<u>Pine (European)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$6.00 – 12.00</u>
<u>Pine (Yellow Heart)</u>	<u>4/4</u>	<u>Reclaimed</u>	<u>\$12.50</u>
<u>Plum (European)</u>	<u>4/4, 8/4</u>	<u>Flitch (European)</u>	<u>\$20.00</u>
<u>Poplar</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4,</u> <u>16/4</u>	<u>FAS</u>	<u>\$4.50 – 8.00</u>
<u>Purpleheart</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$12.00 – 13.00</u>
<u>Redheart</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$22.00 – 35.00</u>

<u>Species</u>	<u>Thickness</u>	<u>Lumber Grades(s)</u>	<u>Price per BF</u>
<u>Rosewood (Bolivian)</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$22.00 – 35.00</u>
<u>Rosewood (East Indian)</u>	<u>4/4, 8/4</u>	<u>Select & Better</u>	<u>\$42.00 – 50.00</u>
<u>Rosewood (Honduras)</u>	<u>4/4</u>	<u>Select & Better</u>	<u>\$40.00</u>
<u>Sapele</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>FAS</u>	<u>\$9.00 – 13.50</u>
<u>Satinwood (East Indian/ Ceylon)</u>	<u>8/4</u>	<u>Unselected</u>	<u>\$80.00</u>
<u>Snakewood</u>	<u>Unselected</u>	<u>Unselected</u>	<u>\$300.00</u>
<u>Spruce (European)</u>	<u>5/4</u>	<u>Unselected</u>	<u>\$10.00</u>
<u>Sycamore (American)</u>	<u>4/4, 5/4</u>	<u>Quartersawn: FAS</u>	<u>\$6.00 – 12.50</u>
<u>Sycamore (English)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$9.00 – 50.00</u>
<u>Teak (Burmese)</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$42.00 – 45.00</u>
<u>Tulipwood</u>	<u>4/4</u>	<u>Unselected</u>	<u>\$100.00</u>
<u>Walnut (Black)</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4, 16/4</u>	<u>Common, FAS, Clear Premium</u>	<u>\$4.00 – 25.00</u>
<u>Walnut (Black – Curly)</u>	<u>4/4</u>	<u>Figure (Unselected)</u>	<u>\$15.00+</u>
<u>Walnut (Black – Crotch)</u>	<u>4/4, 5/4, 8/4, 12/4</u>	<u>Figure (Crotch)</u>	<u>\$18.50+</u>
<u>Walnut (English)</u>	<u>4/4</u>	<u>Flitch (European)</u>	<u>\$15.00+</u>
<u>Walnut (European)</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$15.00 – \$18.00</u>
<u>Walnut (European – Figured)</u>	<u>4/4, 5/4, 6/4, 8/4, 12/4</u>	<u>Flitch (European)</u>	<u>\$18.00 – \$35.00+</u>
<u>Wenge</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$21.00 – 23.00</u>
<u>Wenge</u>	<u>4/4</u>	<u>Quartersawn</u>	<u>\$22.00</u>
<u>Yellowheart</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$18.00 – 19.00</u>
<u>Zebrawood</u>	<u>4/4, 8/4</u>	<u>FAS</u>	<u>\$20.00 – 21.00</u>
<u>Ziricote</u>	<u>4/4</u>	<u>Unselected, Premium</u>	<u>\$70.00 – 80.00</u>