

Hardwood Lumber Grading

by Bob Sabistina- Grading Consultant to the American Hardwood Export Council

This month's article will continue to answer questions I receive from buyers throughout the world. If you have a question regarding the Hardwood Grading rules or any other topic you would like to see in future articles pertaining to Hardwoods from the USA, please contact me at: bshardwoods1@yahoo.com

Q. We are located outside of Delhi, India and have a few questions regarding the American hardwoods we have begun to use for our cabinet factory. We are currently buying the wood locally and plan to expand our production to buy direct from your members in America. Our main concern is the movement we are experiencing after the wood, using Red Oak now, is machined into parts and glued up. We have traditionally used Teak and this was never a problem. We are concerned that our climates here are not suitable for North American species and need some help from you. Are there some extra steps we need to take in processing the Oak? We have used European Beech bought directly from a supplier in Italy and have had good success with it. Any help you can provide will be greatly appreciated.

A. My first reaction to your question is that the Oak you are buying locally has been improperly dried and you are experiencing a moisture problem. We have shipped American hardwoods all over the world in every conceivable climate and have had continued success. First off, let me say that I have been to India many times and this is a recurring problem with American hardwoods coming over in log form and processed in country. Another point worth mentioning is that the Beech you have used coming from your Italian supplier has been kiln dried before shipping. Thirdly, Teak is one of the few woods in the world that has its own natural oils and when going thru the drying process shows very little shrinkage.

To best utilize the vast resource of the American forest, the wood needs to be properly kiln dried. It is estimated that nearly 80% of the problems associated with hardwoods destined for interior use are moisture related. Let me try to explain some of the important points with regard to hardwoods and their moisture content.

Moisture content(mc) refers to the amount of water contained in a piece of wood. When wood is allowed to dry naturally it is referred to as "air-dried". Typically this process will remove the "free" water in the wood which is not bound to the cell walls of the wood and bring the (mc) down to around 25%. This is called its fiber saturation point (fsp). To remove the trapped water from the cell walls, artificial heat needs to be introduced. When this drying process starts, water evaporation begins, bringing the wood below the (fsp), and shrinking occurs as the trapped water is removed. This shrinkage occurs along the width of the piece, not lengthwise.

This drying process continues until a suitable (mc) is reached, normally around 9%. When this dried lumber is then introduced to its final environment the wood adjusts to its surroundings. When a stable condition of both relative humidity and temperature occurs the wood will reach a constant (mc) which is referred to as the equilibrium moisture content (emc). As humidity and temperature indoors may fluctuate with the seasons, so will the emc. This fluctuation in the (emc)

is minor but can be noticeable such as temporary separations in hardwood floors in a heated winter home and having them disappear once the outside temperatures warm up. Proper drying to the suitable (mc) and consistent controls on the woods' environment will reduce the movement that will occur.

Proper kiln drying is a very technical process that can be done in several days up to several months depending on the species, thickness, and the quality of the equipment being used. Hardwood lumber dries more quickly from the ends of the pieces which is why you see most kd lumber with painted ends. This "paint" is usually wax-based and seals the ends from drying out more rapidly than the rest of the board. Typically lumber is dried lower than the targeted final (mc) and a conditioning treatment is applied where hot steam is actually introduced back into the kiln to stabilize the lumber and even out the (mc) throughout the entire board.

It is very important to take care and monitor the (mc) from the time you receive the wood to its final end use. To easily check the (mc) you need to invest in a moisture meter. While not the most exacting of methods, they are usually hand held and portable which allows the user to check freely the wood throughout the plant. They usually have two pins that you insert one-third into the thickness of the wood and a digital reading will give you the (mc). Multiple readings can be done on one piece or throughout an entire lift to give you an average of the (mc). It is vital for using any moisture meter that you follow the manufacturer's directions in setting the meter up as factors such as outside temperature and species will affect the readings.

Other factors that proper kiln drying will influence is the stability of the lumber after it is machined. High temperatures will also kill any insects and eliminate the causes for fungus or decay to occur. Proper kiln dried hardwood lumber machines more consistently and you will have successful, strong glue joints.

I hope these examples I have listed for the need of proper kiln dried lumber to be used in your plant will encourage you to continue to use American hardwoods. They are totally sustainable, traded on a standardized grading system, and there is an abundant wealth of information available to you in using them. For more information go to our website: www.americanhardwood.org

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