

Hardwood Lumber and Veneer Series



Hard or Sugar Maple

FNR-287-W

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EXPERT
REVIEWED

Hard or sugar maple (*Acer saccharum* Marsh.) is one of our hardest, smoothest, most beautiful and valuable species. Its hardness and ability to take a high polish and smooth finish and the white color of the sapwood has resulted in many specialty uses. The species is also appreciated for the rich and flavor intense syrup and candy that is made from the sap in the early spring. However, due to color issues, white maple is probably one of the most difficult types of lumber that can be produced. There is also a black maple (*Acer nigrum* Michx.f.) species, but it is seldom differentiated in the log and lumber business.

Hard maple ranges from New Brunswick across southern Quebec and Ontario to Minnesota and south to Missouri and Tennessee and back up the Appalachian Mountains and through the entire Northeast. Hard maple is generally thought of as a northern and northeastern species.

The species makes its best development on moist, rich, well-drained soil, but it will persist on poor sites. In the north, it is often associated with beech, birch, red spruce, and eastern white pine. In the central states, it is often found with basswood, white oak, yellow-poplar, hickory, and oaks. Sugar maple is very shade tolerant and exists in the understory. In the central states, substantial concern exists, as this species is often able to replace oak when the over story trees are removed.

The species can develop into a large forest tree, and it is long-lived. The largest sugar maple reported is about 7¼ feet in diameter at 4½ feet above the ground. Mills often cut smaller logs which typically contain a higher portion of white sapwood.



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Dan Cassens and sugar maple tree

Wood Color and Texture

Hard maple is a diffuse porous wood with the very small pores being the same diameter from the beginning to the end of the growth ring. The pores are so small that they cannot be seen with the naked eye. The small pores coupled with the high density of the species results in a very dense, hard surface which takes a fine polish. Care must be exercised so

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that the wood is not over-sanded and thus difficult to stain. There is a flattening of the cells toward the end of the growth ring which often results in irregular lines on flat sawn and surfaced lumber.

The wood will show small but numerous ray flecks on a perfectly quartered surface.

White hard maple sapwood is preferred and commands a premium price. Young vigorous trees will have a sapwood several inches wide, and a few trees will be sapwood nearly all of the way to the heart.

Maple is a wide-ranging species, and as a result, the intensity of “whiteness” of the sapwood can vary. Processing techniques can also affect the “whiteness.” Northern regions are often thought to produce the whitest wood while southern locations tend to produce more yellowish or cream colored wood. Color in maple is a very subjective characteristic and difficult to judge.

The sapwood is subject to oxidation stain or graying during warm summer months. Sticker stain or “burn” from oxidation stain or fungal infestation also develops easily. Therefore, the lightest colored wood, free of stain is usually produced during the cold winter months. A drying stick with spirally grooved ridges has been developed and reported to help prevent sticker marks on lumber. Only the ridges on the stick contact the board surface so stain is less likely to develop. Furthermore, the wood will darken or sometimes become pinkish during kiln drying. Special low temperature kiln schedules have been developed for “white maple.”

The heartwood is a light to sometimes darker brown with some red color. The heartwood is usually stained a dark color or painted. It is reported that with the correct staining techniques, it can be substituted for cherry.

Hard maple is also unique in that it can develop two relatively common forms of figure. The first is tiger or fiddle back maple. The wood shows a narrow stripe across the width of the piece which appear like the stripes on a tiger. The more stripes per foot of length the higher the value. Tiger or curly maple is most often found in Pennsylvania, but it can develop anywhere.

Birds eye maple is another example of figure.



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Millions of hardwood pallets are produced each year consuming about 40 to 50 percent of all hardwood lumber produced. This is the most significant market for low-grade hardwood lumber.

In this case, the wood appears to have small “birds eyes” present. The more birds eye per square foot of surface and the more uniformly distributed, the higher the value. Birds eye maple often comes from the Upper Peninsula in Michigan. Both forms of figure are probably of genetic origins.

Quilted maple is also possible, and even rarer than the tiger or birds eye figure. Lastly, maple can become spalted. Spalted wood has dark zone lines caused by a fungus or decay. The wood will also have several different colors ranging from bright white to dull white and grays, which result from the activity of the fungus. It is mostly a matter of chance to catch maple in a form where it is still firm and solid but decayed enough to produce the decorative figure desired.

Workability

Hard maple is rated about intermediate for planing and turning, and as one of the best woods for shaping and boring. The grain tends to chip when planned with traditional machines. However, newer machines with inserted helical cutterheads are reported to do a much better job. Because of its hardness, the wood was not preferred by most early cabinet makers using hand tools. With today’s equipment, machining is not an issue.



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Hard or sugar maple log showing desirable wide, white sapwood. The reddish brown color occurs on the surface of cut wood, particularly in the spring.

Strength

At 12 percent moisture content, the wood weighs about 44 pounds per cubic foot making it comparable to the oaks and just somewhat less dense than hickory and pecan. The wood is also one of the strongest, again comparable to the oaks.

Steam Bending

The wood is not a particularly desirable species for bending.

Drying

Proper drying is important and a mild kiln schedule is recommended. Special schedules, many of them proprietary, are used to keep the wood as white as possible.

Shrinkage

As a dense wood, the species has a relatively high shrinkage.

Decay Resistance

The wood has no resistance to decay.

Commercial Use, Grading, and Value

White hard maple is one of the most valuable woods, and it is difficult to produce without discoloration. Its common application includes high-end cabinets, furniture, architectural millwork, paneling, and face veneer. Because of its hardness and uniform grain characteristics, it is commonly used for industrial, gym, and residential flooring as well as the front part of bowling alleys where the ball typically drops. It is also commonly used for athletic equipment such as bowling pins, billiard cues, croquet mallets, and balls. It is also used in piano frames, and tiger or curly stock is often preferred for the back of violins and some gun stocks. Other common uses include woodenware and novelties, shutters, spools, spindles, bobbins, turned items, butcher blocks, skewers, dowels, and even toothpicks.

Hard maple lumber is priced and sold on the *Northern and Appalachian Market Report*. It is a complicated species to price and grade due to the

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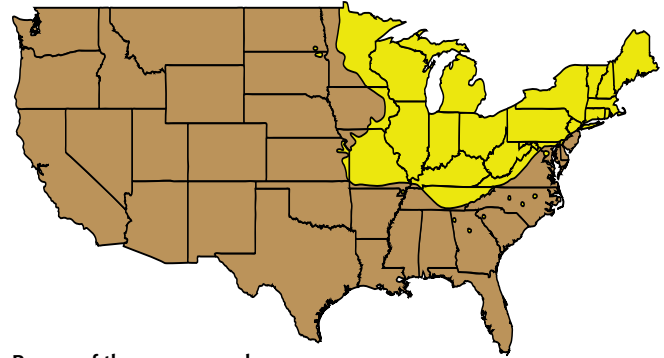
presence of white sapwood and a reddish brown heartwood. The lumber can be sold “unselected” which means it is graded mostly standard with no consideration for color. It is also sold as No. 1 and 2 white hard maple. This is a designation for each of the standard grades of FAS, FIF, Select, No. 1 Common and No. 2A Common. Thus, there is a No. 1 and 2 White FAS grade, a No. 1 and 2 White FIF grade, and so on.

In No. 2 white maple one face and both edges of the required cuttings are sapwood and the reverse side of the cuttings are not less than 50 percent sapwood. The minimum width for the FAS grade is dropped from the standard 6 inches to 4 inches wide. Pieces 4 inch and 5 inch wide are required to be clear.

To further complicate the grading situation, some mills will use another grade designation called sap hard maple. In this case, each required cutting is required to have one clear sapwood face. Boards in the FAS grade can be a minimum of 5 inches wide

compared to the standard 6 inch width. Those pieces with just 3 and 4 feet of surface measure must be clear and those with 5 to 7 feet of surface measure must be 11/12 clear.

The price of hard maple varies substantially depending on geographic location and whether it is selected for the amount of sapwood. White hard maple is one of our most valuable woods.

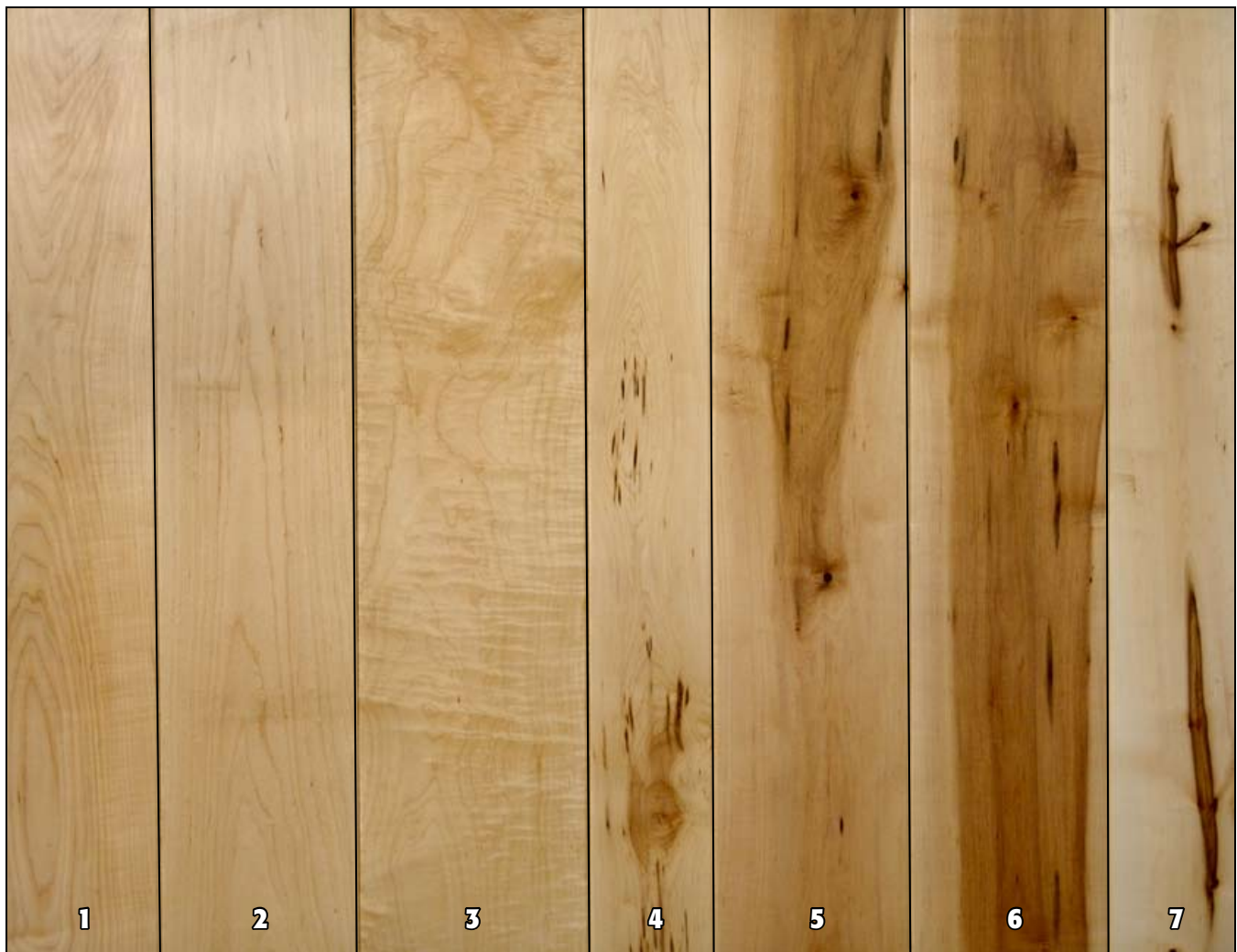


Range of the sugar maple



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The reason why tiger or fiddle-back maple (left) features form is unknown, but the wood is highly prized by wood workers, gun smiths, and others. It can also develop in soft maple and other species. The reason for the development of bird's eye maple (right) is also unknown. It too is also highly prized.



Chip Morrison

Hard maple is one of our hardest, most uniformed grained and valuable species. The species usually has wide, white sapwood and darker brown heartwood. The white sapwood is the valuable material which also discolors easily.

Boards 1 and 2 are characteristics of flat sawn, white stock. Board 2 shows several pith flecks near the top of the board.

Board 3 shows some curly pattern. Maple can be curly or fiddle back, have a bird's-eye pattern or occasionally be quilted. Heavy figured is very

desirable but just slight figure can be a problem in some stock items as it distracts from maples typical uniform pattern.

Board 4 shows excess dark mineral streaks.

Boards 5 and 6 show numerous defects and the dark reddish brown heartwood.

Board 7 is cut from the center of the log or quarter sawn. The pith is in the center of the dark streak, and some ray fleck can be seen near the center and on the left edge of the piece.

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