

American Hardwoods

Choosing the right wood for your project

Hardwood vs. Softwood

Hardwood

Definition Comes from [angiosperm](#) trees that are not [monocots](#); trees are usually broad-leaved. Has vessel elements that transport water throughout the wood; under a microscope, these elements appear as pores.

Softwood

Softwood

Comes from [gymnosperm](#) trees which usually have needles and cones. Medullary rays and tracheids transport water and produce sap. When viewed under a microscope, softwoods have no visible pores because of tracheids.

Examples

Examples	Examples of hardwood trees include alder, balsa, beech, hickory, mahogany, maple, oak, teak, and walnut.	Examples of softwood trees are cedar, Douglas fir, juniper, pine, redwood, spruce, and yew.
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Marketing terms

	Is Not	Really Is
“Chilean cherry”	cherry	lenga
“Brazilian cherry”	cherry	jatoba
“Brazilian maple”	maple	pau marfin
“Patagonian maple”	maple	pau marfin
“Tasmanian oak”	oak	eucalyptus
“Australian Heritage oak”	oak	eucalyptus
“Malaysian oak”	oak	rubberwood
“Rose River gum “	gum	eucalyptus
“Australian cypress”	cypress	pine

Common uses

Uses hardwoods are more likely to be found in high-quality furniture, decks, [flooring](#), and construction that needs to last.

About 80% of all timber comes from softwood.

Softwoods have a wide range of applications and are found in building components (e.g., windows, doors), furniture, medium-density fiberboard (MDF), paper, Christmas trees, and much more.

Hardwood vs. Softwood Density

- The denser a wood is, the harder, stronger, and more durable it is. Most hardwoods have a higher density than most softwoods. The chart below shows the density of some commonly used woods.

Density

Wood	Density (lb/ft³)
Alder (Hardwood)	26-42
Aspen (Hardwood)	26
Balsa (Hardwood)	7-9
Beech (Hardwood)	32-56
Cedar (Softwood)	23
Douglas Fir (Softwood)	33
Hickory (Hardwood)	37-58
Juniper (Softwood)	35
Magnolia (Hardwood)	35
Mahogany (Hardwood)	31-53
Maple (Hardwood)	39-47
Oak (Hardwood)	37-56
Pine (Softwood)	22-35
Poplar (Hardwood)	22-31
Redwood (Softwood)	28-55
Spruce (Softwood)	25-44
Teak (Hardwood)	41-61
Walnut (Hardwood)	40-43
Yew (Softwood)	42

Janka Rating System

pressure in pounds to mar

Species	Pressure To Mar
(Kiln-dried)	(in pounds)
Hickory, Pecan	1,820
Hard Maple	1,450
White Oak	1,360
Beech	1,300
Red Oak	1,290
Yellow Birch	1,260
Green Ash	1,200
Black Walnut	1,010
Soft Maple	950
Cherry	950
Hackberry	880
Gum	850
Elm	830
Sycamore	770
Alder	590
Yellow Poplar	540
Cottonwood	430
Basswood	410
Aspen	350

Characteristics of Hardwoods Compared

Comparison of Common Hardwood Characteristics						
Type of Wood	Machining	Nailing	Screwing	Gluing	Finishing	Total
Hard Maple	1	1	1	3	3	13
Poplar	4	1	3	3	4	15
White Oak	4	3	3	2	4	15
Red Oak	4	3	3	3	4	17
Ash	3	3	3	3	4	16
Pecan/Hickory	1	1	1	1	2	6
Cherry	4	3	3	3	4	17
Black Walnut	4	3	3	3	4	17
Beech	4	3	3	1	4	15
Cypress	3	4	4	3	4	18
Maximum possible score for each category is 4. i.e. 3 would be 3 out of 4						

How do we choose?

- Often simply by availability
 - We are fortunate to have good local sources.
- Cost
 - Sometimes free or cheap is not a good idea.
- By what tools we have available to us
- The intended use of the end product
- The appearance
 - Color, grain pattern,

How do we choose?

- Will it be stained or painted?
- Will it be exposed to the weather?
- Do we need plywood to match the hardwood?
 - Most of the hardwoods have matching plywood available from our local suppliers.
- Don't overlook common building lumber.
 - Southern Yellow Pine found in larger 2x lumber is very strong and good looking
 - 2x4's and 6's can be jointed and planed to make very attractive small projects

HARD MAPLE

Hard Maple ①

Where It Grows

Eastern U.S., principally Mid-Atlantic and Lake states. A cold weather tree favoring a more northerly climate, its average height is 130 feet.

Main uses

Flooring, furniture, paneling, ballroom and gymnasium floors, kitchen cabinets, worktops, table tops, butchers blocks, toys, kitchenware and millwork: stairs, handrails, mouldings, and doors.

Relative Abundance

4 percent of U.S. hardwoods commercially available.

Did You Know?

A single sugar maple tree produces up to 12 gallons of sap a year.

General Description

The sapwood is creamy white with a slight reddish brown tinge and the heartwood varies from light to dark reddish brown. The amount of darker brown heartwood can vary significantly according to growing region. Both sapwood and heartwood can contain pith fleck. The wood has a close fine, uniform texture and is generally straight-grained, but it can also occur as "curly," "fiddleback," and "birds-eye" figure.

Working Properties

Hard maple dries slowly with high shrinkage, so it can be susceptible to movement in performance. Pre-boring is recommended when nailing and screwing. With care it machines well, turns well, glues satisfactorily, and can be stained to an outstanding finish. Polishes well and is suitable for enamel finishes and brown tones.

Physical Properties

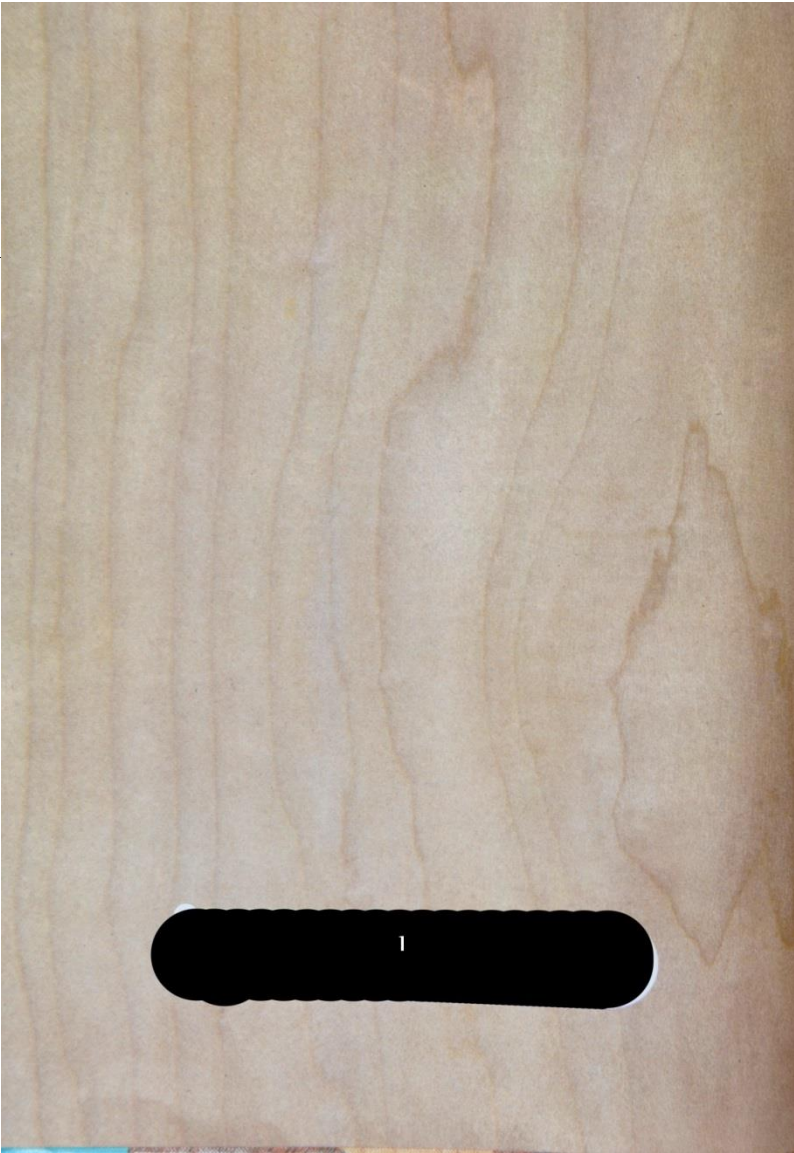
The wood is hard and heavy with good strength properties, in particular its high resistance to abrasion and wear. It also has good steam-bending properties.

Availability

Widely available. The higher quality grades of lumber are available selected for white color (sapwood) although this can limit availability. Figured maple (birds-eye, curly, fiddleback) is generally only available in commercial volumes as veneer.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
3/4	1/4	1/4	3/4	3/4



Poplar

Poplar (2)

Where It Grows

Widespread throughout Eastern U.S. Tree heights can reach 150 feet.

Main uses

Light construction, furniture, kitchen cabinets, doors, musical instruments, exterior trim and siding, paneling, mouldings and millwork, edge-glued panels, turnings and carvings.

Relative Abundance

11.2 percent of total U.S. hardwoods commercially available.

Did You Know?

The poplar tree is rarely attacked by parasites.

General Description

The sapwood is creamy white and may be streaked, with the heartwood varying from pale yellowish brown to olive green. The green color in the heartwood will tend to darken on exposure to light and turn brown. The wood has a medium to fine texture and is straight-grained; has a comparatively uniform texture.

Working Properties

A versatile wood that is easy to machine, plane, turn, glue and bore. It dries easily with minimal movement in performance and has little tendency to split when nailed. It takes and holds paint, enamel and stain exceptionally well.

Physical Properties

A medium density wood with low bending, shock resistance, stiffness and compression values, with a medium steam-bending classification. Excellent strength and stability.

Availability

Very widely available.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
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Poor	Poor	Poor	Poor	Poor
Good	Good	Good	Good	Good
4/4	1/4	3/4	3/4	4/4



White Oak

White Oak 3

Where It Grows

Widespread throughout the Eastern U.S. The white oak group comprises many species, of which about eight are commercial. The trees prefer rich well drained soil, and average height is 60 to 80 feet.

Main uses

Furniture, flooring, architectural millwork, mouldings, doors, kitchen cabinets, paneling, barrel staves (tight cooperage) and caskets.

Relative Abundance

15.1 percent of total U.S. hardwoods commercially available.

Did You Know?

Native Americans and early settlers would boil and eat white oak acorns.

General Description

The sapwood is light-colored and the heartwood is light to dark brown. White oak is mostly straight-grained with a medium to coarse texture, with longer rays than red oak. White oak therefore has more figure.

Working Properties

White oak machines well, nails and screws well although pre-boring is advised. Since it reacts with iron, galvanized nails are recommended. Its adhesive properties are variable, but it stains to a good finish. Can be stained with a wide range of finish tones. The wood dries slowly.

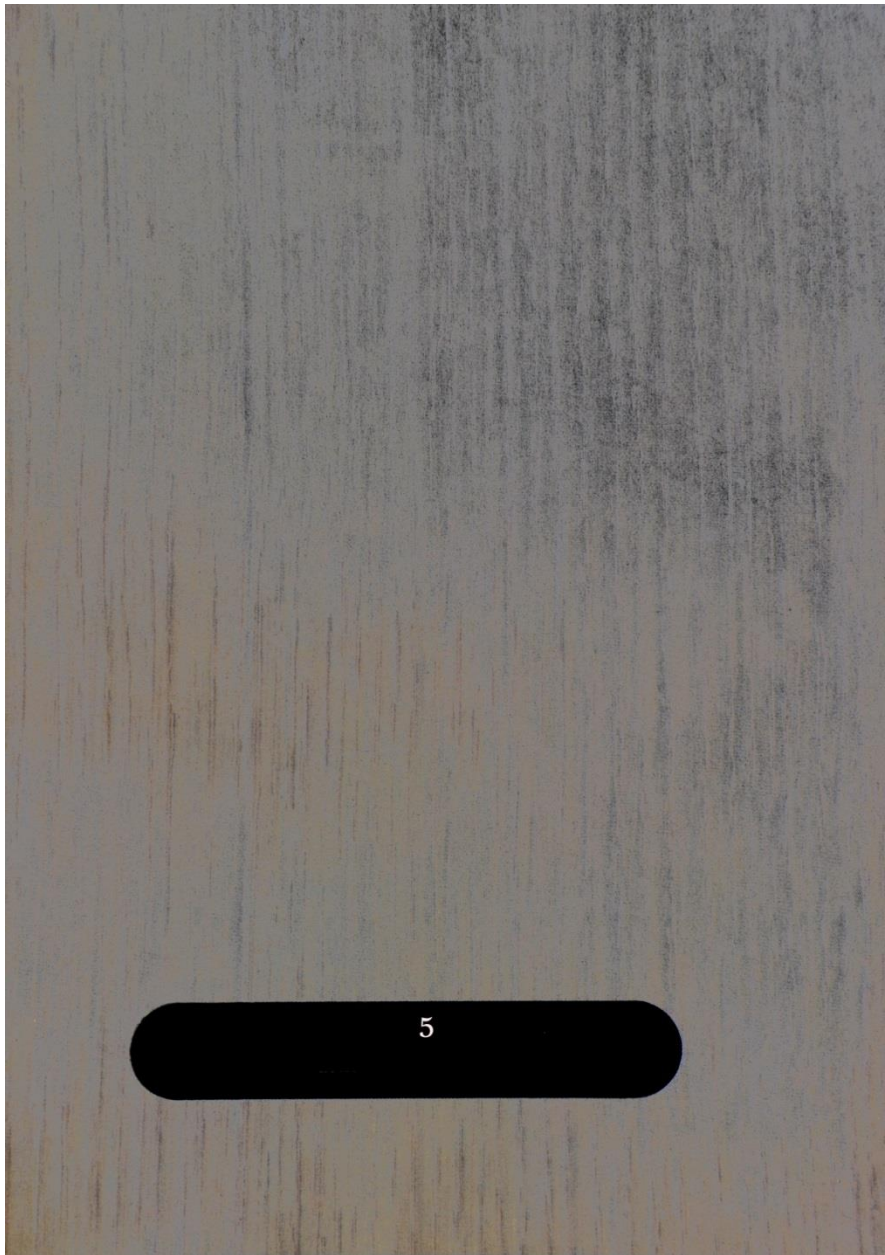
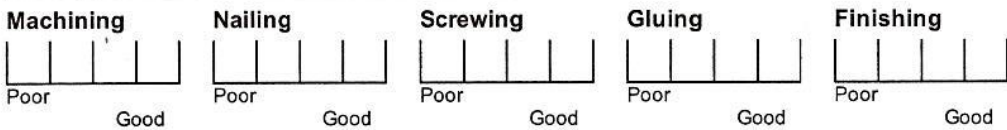
Physical Properties

A hard and heavy wood with medium bending and crushing strength, low in stiffness, but very good in steam bending. Great wear-resistance.

Availability

Readily available but not as abundant as red oak.

Working Properties



Red Oak

Red Oak 4

Where It Grows

Widespread throughout Eastern U.S. The oaks are by far the most abundant species group growing in the Eastern hardwood forests. Red oaks grow more abundantly than the white oaks. The red oak group comprises many species, of which about eight are commercial. Average tree height is 60 to 80 feet.

Main uses

Furniture, flooring, architectural millwork and mouldings, doors, kitchen cabinets, paneling and caskets.

Relative Abundance

36.6 percent of total U.S. hardwoods commercially available.

Did You Know?

The bark from oak trees is rich in tannin.

General Description

The sapwood of red oak is white to light brown and the heartwood is a pinkish reddish brown. The wood is similar in general appearance to white oak, but with a slightly less pronounced figure due to the smaller rays. The wood is mostly straight-grained, with a coarse texture

Working Properties

Red oak machines well, nailing and screwing are good although pre-boring is recommended, and it can be stained to a good finish. It can be stained with a wide range of finish tones. It dries slowly.

Physical Properties

The wood is hard and heavy, with medium bending strength and stiffness and high crushing strength. It is very good for steam bending. Great wear-resistance.

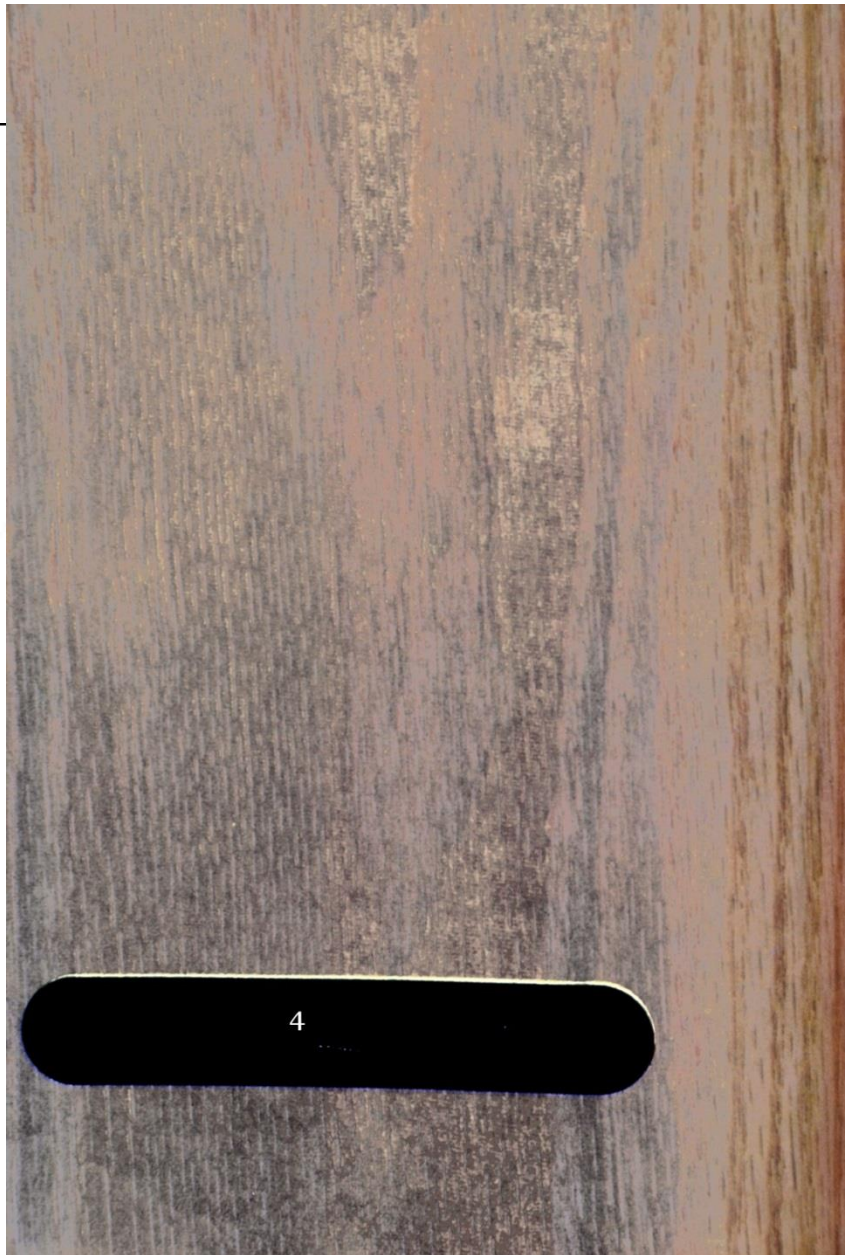
Availability

Abundant. Most widely used species.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
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Poor	Poor	Poor	Poor	Poor
Good	Good	Good	Good	Go

4/4 3/4 3/4 3/4 4/4



Ash

Ash. (9)

Where It Grows

Throughout the Eastern U.S. White ash trees range in height from 80 to 120 feet with diameter from 2 to 5 feet.

Main uses

Furniture, flooring, doors, architectural millwork and moulding, kitchen cabinets, paneling, tool handles, baseball bats, hockey sticks, skis, oars and turnings.

Relative Abundance

4.6 percent of total U.S. hardwoods commercially available.

Did You Know?

Before man-made materials took over the market, ash was the preferred wood for making tennis racquets.

General Description

The sapwood is light-colored to nearly white and the heartwood varies from greyish or light brown, to pale yellow streaked with brown. The wood is generally straight-grained with a coarse uniform texture. The degree and availability of light-colored sapwood, and other properties, will vary according to the growing regions.

Working Properties

Ash machines well, is good in nailing, screwing and gluing, and can be stained to a very good finish. It dries fairly easily with minimal degrade, and there is little movement in performance.

Physical Properties

Ash has very good overall strength properties relative to its weight. It has excellent shock resistance and is good for steam bending.

Availability

Readily available.

Working Properties

Machining

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Poor Good

3/4

Nailing

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Poor Good

3/4

Screwing

--	--	--	--	--

Poor Good

3/4

Gluing

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Poor Good

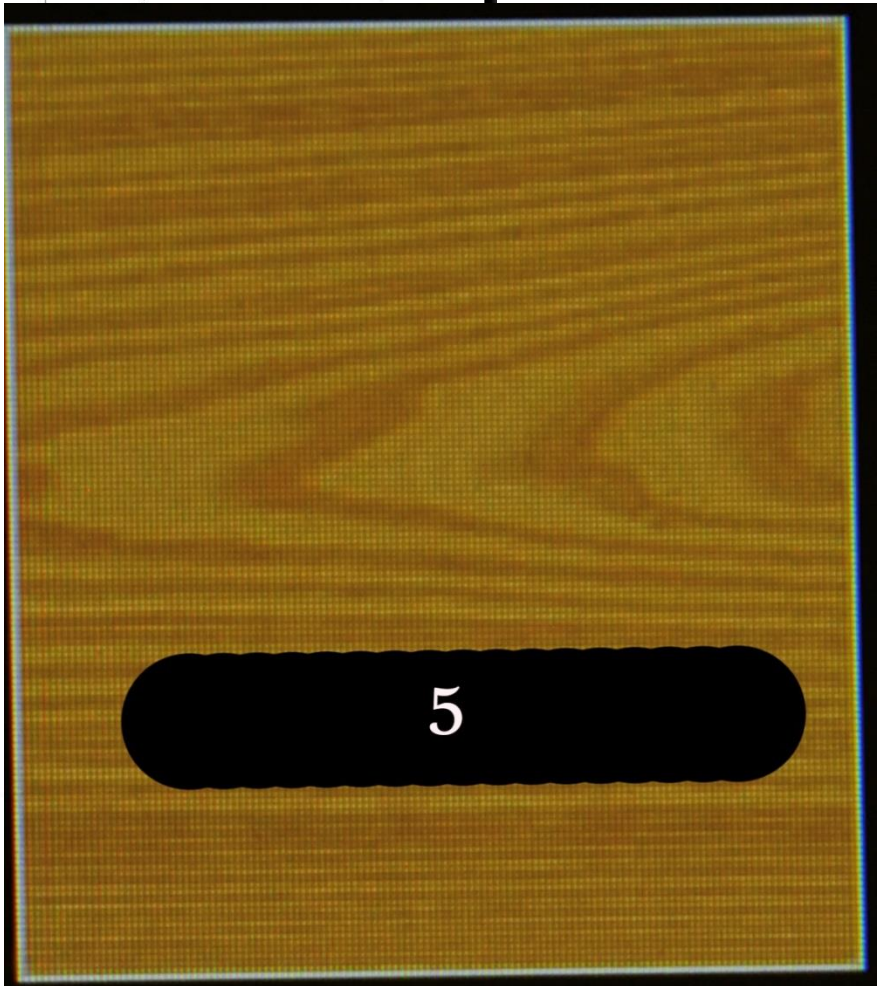
3/4

Finishing

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Poor Good

4/4



Pecan & Hickory

Pecan & Hickory 6.

Where It Grows

Eastern U.S., principal commercial areas: Central and Southern states. Tree height ranges from 60 to 120 feet. Hickories grow slowly and it is not unusual for a tree to take 200 years to mature.

Main uses

Tool handles, furniture, cabinetry, flooring, paneling, wooden ladders, dowels and sporting goods.

Relative Abundance

2.2 percent of total U.S. hardwoods commercially available.

Did You Know?

Andrew Jackson, seventh president of the U.S., was nicknamed "Old Hickory" because of his toughness during disputes.

General Description

The hickories are an important group within the Eastern hardwood forests. Botanically they are split into two groups; the true hickories, and the pecan hickories (fruit bearing). The wood is virtually the same for both and is usually sold together. Hickory is the hardest, heaviest and strongest American wood. The sapwood of hickory is white, tinged with inconspicuous fine brown lines while the heartwood is pale to reddish brown. Both are coarse-textured and the grain is fine, usually straight but can be wavy or irregular.

Working Properties

The heaviest of American hardwoods, the hickories can be difficult to machine and glue, and are very hard to work with hand tools, so care is needed. They hold nails and screws well, but there is a tendency to split so pre-boring is advised. The wood can be sanded to a good finish. The grain pattern welcomes a full range of medium-to-dark finishes and bleaching treatments. It can be difficult to dry and has high shrinkage.

Physical Properties

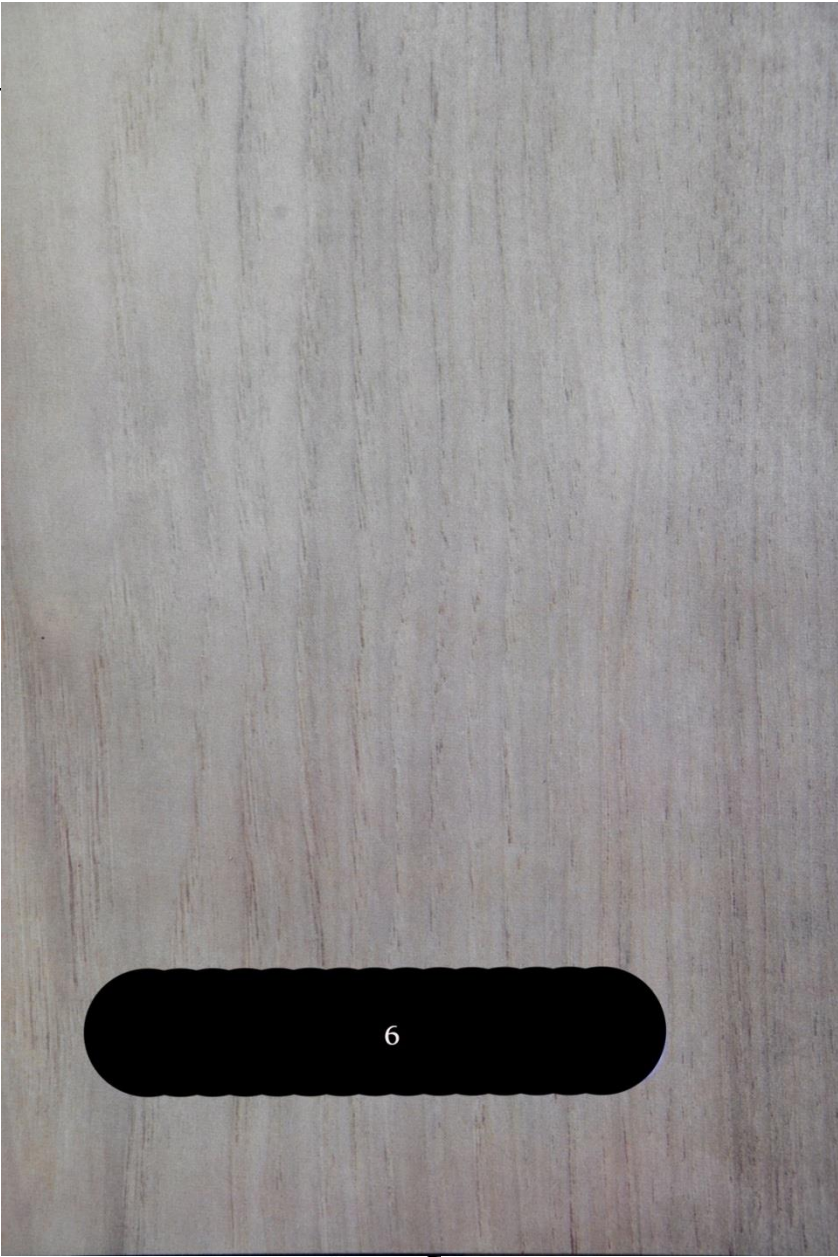
The density and strength of the hickories will vary according to the rate of growth, with the true hickories generally showing higher values than the pecan hickories. The wood is well-known for its very good strength and shock resistance and it also has excellent steam-bending properties. Extremely tough and resilient, even texture, quite hard and only moderately heavy.

Availability

Readily available, more limited if sold selected for color as either red or white hickory.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
1/4	1/4	1/4	1/4	2/4



Cherry

Cherry 7

Where It Grows

Eastern U.S., principally Northern and Lake states. The average tree is 60 to 70 feet in height.

Main uses

Fine furniture and cabinet making, mouldings and millwork, kitchen cabinets, paneling, flooring, doors, boat interiors, musical instruments, turnings and carvings.

Relative Abundance

3.9 percent of total U.S. hardwoods commercially available.

Did You Know?

Early printmakers used cherry for their engraving blocks.

General Description

The heartwood of cherry varies from rich red to reddish brown and will darken with age and on exposure to light. In contrast, the sapwood is creamy white. The wood has a fine uniform, straight grain, satiny, smooth texture, and may naturally contain brown pith flecks and small gum pockets.

Working Properties

Cherry is easy to machine, nails and glues well and when sanded and stained, it produces an excellent smooth finish. It dries fairly quickly with moderately high shrinkage, but is dimensionally stable after kiln-drying.

Physical Properties

The wood is of medium density with good bending properties, it has low stiffness and medium strength and shock resistance.

Availability

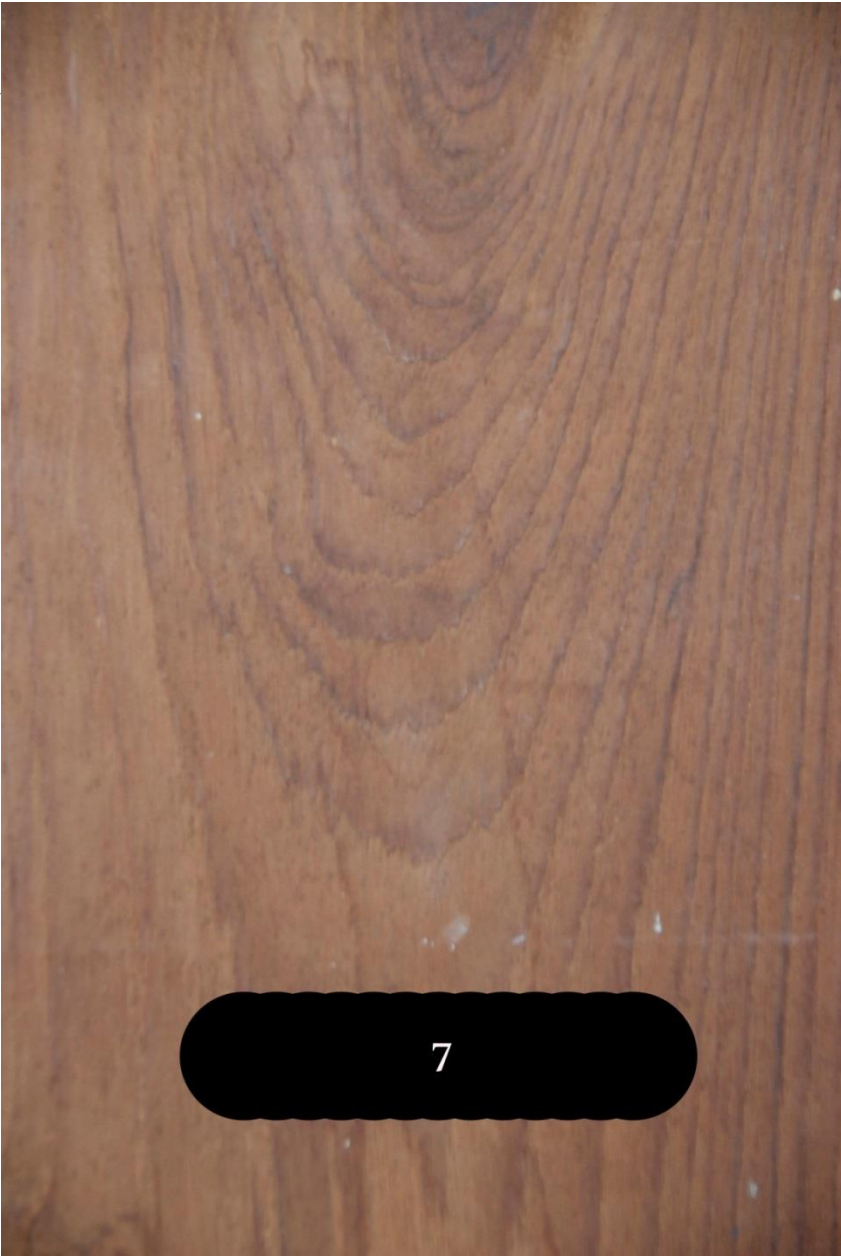
Readily available.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
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Poor	Poor	Poor	Poor	Poor
Good	Good	Good	Good	Good

4/4 3/4 3/4 3/4 4/4

Strength and Mechanical Properties (inch-pound)



Black Walnut

Black Walnut. B

Where It Grows

Throughout Eastern U.S., but principal commercial region is the Central states. Average tree height of 100 to 150 feet.

Main uses

Furniture, cabinets, architectural millwork, doors, flooring, paneling, and gun stocks. A favored wood for using in contrast with lighter-colored species.

Relative Abundance

1.9 percent of total U.S. hardwoods commercially available.

Did You Know?

Walnut is one of the few American species planted as well as naturally regenerated.

General Description

The sapwood of walnut is creamy white, while the heartwood is light brown to dark chocolate brown, occasionally with a purplish cast and darker streaks. The wood develops a rich patina that grows more lustrous with age. Walnut is usually supplied steamed, to darken sapwood. The wood is generally straight-grained, but sometimes with wavy or curly grain that produces an attractive and decorative figure. This species produces a greater variety of figure types than any other.

Working Properties

Walnut works easily with hand and machine tools, and nails, screws and glues well. It holds paint and stain very well for an exceptional finish and is readily polished. It dries slowly, and care is needed to avoid kiln degrade. Walnut has good dimensional stability.

Physical Properties

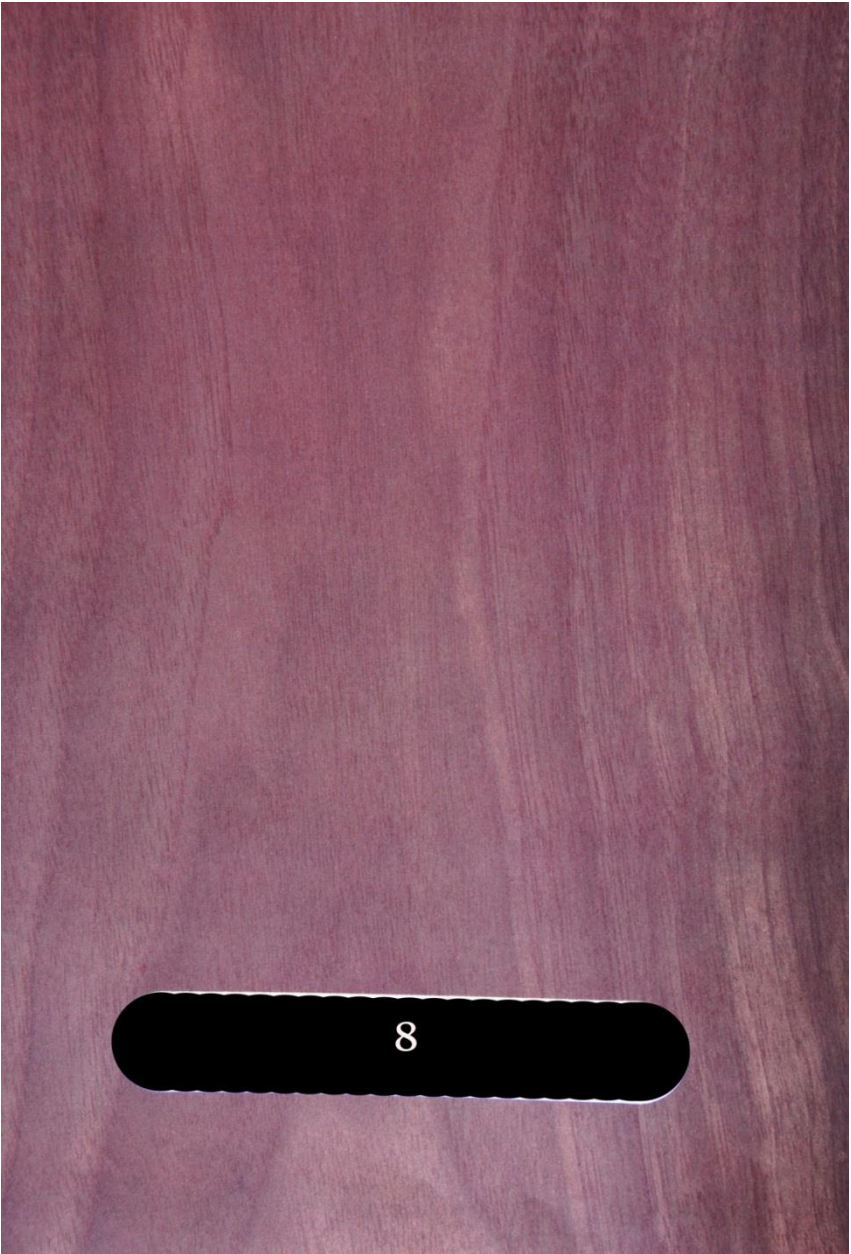
Walnut is a tough hardwood of medium density, with moderate bending and crushing strengths and low stiffness. It has a good steam-bending classification.

Availability

Reasonable availability with regional limitations.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
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Poor	Poor	Poor	Poor	Poor
Good	Good	Good	Good	Good
4/4	3/4	3/4	3/4	4/4



Beech

Birch? Beech 9

Known as "Mother of the Forest" for its nutrient-rich humus. Beech has a long, illustrious past. The Aryan Tribes of Asia, the earliest known people to use a written language, carved their messages into the soft, smooth pliable bark of the beech tree trunk. The writings, cut out of the bark and used intact, were called "boc," which eventually became "book."

Where It Grows

Throughout the Eastern U.S., commercial concentration is in the Central and Middle Atlantic states. Average tree height is 120 feet.

Main uses

Furniture, doors, flooring, millwork, paneling, brush handles, woodenware, bending stock, toys and turnings. It is particularly suitable for food and liquid containers since there is no odor or taste.

Relative Abundance

0.4 percent of total U.S. hardwoods commercially available.

Did You Know?

Beech was used to make snuff boxes as well as mortars and pestles.

General Description

The sapwood is white with a red tinge, while the heartwood is light to dark reddish brown. The wood is generally straight-grained with a close uniform texture.

Working Properties

Beech works readily with most hand and machine tools. It has good nailing and gluing properties and can be stained to a good finish. The wood dries fairly rapidly but with a strong tendency to warp, split and surface check. It is subject to a high shrinkage and moderate movement in performance.

Physical Properties

Beech is classed as heavy, hard, strong, high in resistance to shock and highly suitable for steam bending. Good resistance to abrasive wear.

Availability

Limited

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
4	3	3	1	4



Cypress

Cypress 10
Common Softwood

Where It Grows

Most cypress trees are natives of the South. They are found primarily in wet, swampy areas along the Atlantic Coastal Plain from Delaware to Florida, and west along the Gulf of Mexico to the border of Texas and Mexico. Cypress also thrives along the Mississippi Valley from the Louisiana delta to southern Indiana.

Cypress roots love water. Some trees growing on wet sites develop what are called cypress "knees" or pneumatophores. The knee-like upright growths come from the roots, helping to support the tree and also to aerate the waterlogged root system. The wood from the knees is soft and light and can be used to make vases and novelty items.

Main uses

Exterior: siding, shutters, shingles, trim, fence posts. Interior: paneling, moulding, millwork, cabinetry, flooring, furniture.

Relative Abundance

Together, aspen, basswood, cottonwood, elm, gum, hackberry, sassafras, sycamore and willow represent 12.5 percent of commercially available U.S. hardwoods.

Did You Know?

During the Middle Ages, European craftsmen carved massive cathedral doors from cypress.

General Description

The sapwood is pale yellow white with the heartwood varying in color from light to dark or reddish brown.

Working Properties

General machinability is fair, although tension wood is frequently present and can cause a fuzzy surface when cut, which in turn will require additional care when finishing. The wood glues well and has good resistance to splitting when nailing and screwing. It dries easily but may still have a tendency to warp, with slight movement in performance.

Physical Properties

The sapwood is pale yellow white with the heartwood varying in color from light to dark or reddish brown.

Availability

Readily available as lumber and veneer.

Working Properties

Machining	Nailing	Screwing	Gluing	Finishing
3/4	4/4	4/4	3/4	4/4



Local Sources

- **TAYT Hardwoods: Brian Mounts**
138 Sawdust Trail
501-276-0305 email brian.mounts@aol.com
- **CJ Horner: Richard Dawson**
Grand Ave., Hot Springs
501-617-3714 email richard.dawson@cjhornerinc.com
- **Hamel Plywood and More, Rex Hamel**
130 Rock Creek, Hot Springs, AR 71913 Off Airport
Road (off of Airport Rd, on right past the lake)
870-279-3133