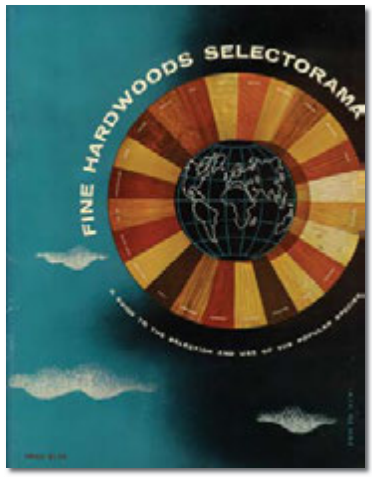
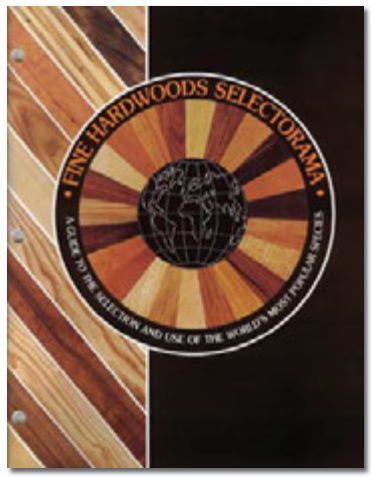
American Veneer Species Guide

HPVA

This new *American Veneer Species Guide* replaces the *Fine Hardwoods Selectorama*, which has been helping consumers select the right wood for their projects since 1953.





Credits

Photos pages 1, 2 and 8 courtesy of AHEC.
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This book is published by the Hardwood Plywood & Veneer Association (HPVA), formerly the Hardwood Plywood Manufacturers Association, an international trade association representing wood industry companies in the United States, Canada and abroad. Association members include manufacturers of hardwood plywood, veneer and engineered hardwood flooring, hardwood plywood prefinishers, distributors of hardwood plywood products and suppliers to the industry. HPVA's mission is "to promote and support the use of high quality, environmentally sound, decorative wood products manufactured in North America." The Association offers numerous services to members, including: industry promotion, communication services, government representation and technical, laboratory and testing services.

The processes and procedures shown in this publication represent the industrial manufacture of hardwood veneer and should not be attempted by unqualified individuals.

Comments or questions regarding the content, format, use or reprinting of this publication are welcome and should be directed to the following address:

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INTRODUCTION

For more than 50 years, the Fine Hardwoods Selectorama has been an essential resource for those individuals sourcing and using fine hardwoods. Generations of users have relied on the Selectorama to help them select the right wood for their most challenging projects.

Building on that illustrious history, we are pleased to offer this new American Veneer Species Guide. More a refinement of purpose than a simple revision of the Selectorama, this new publication provides information tailored specifically to the discriminating veneer user. Rather than attempting to provide comprehensive information on every commercial wood species, we have chosen to focus instead on the 44 species commercially available in North America in veneer form. By limiting the scope of this work to commercially available veneer species, we hope to increase the usefulness of this resource to the veneer buying public.

Helpful Hint

The term "veneer" refers only to raw sliced or peeled wood, not material further processed into faces, two ply sheet goods, panel stock, etc.

This new American Veneer Species Guide takes its place alongside our Hardwood Plywood Handbook, ANSI HP–1 Plywood Standard, videos and other books as part of a growing resource of information available to the woodworking public. We encourage readers to visit HPVA's website at www.hpva.org for additional product information and a complete listing of all of our publications. There is also information on the website on hardwood plywood and veneer producers and links to other related websites. If you have questions about sourcing or using hardwood veneer or plywood, HPVA's website should be your first stop on your quest for answers.

As you will see from this American species guide, there are many different veneer species available to meet your needs. For specific information on availability and a list of mills that can meet your product needs, we suggest you get a complimentary copy of HPVA's in–depth "Where to Buy Hardwood Plywood, Veneer and Engineered Flooring" membership directory and product guide, available on HPVA's website.

It is our hope that this publication will fill the same role as the Selectorama—that of an essential desktop reference for users of fine domestic and international veneers. As such, this publication will make identifying and comparing the various veneer species less complicated and help the designer, craftsman and consumer select the perfect wood for their needs.

GREEN BY DESIGN: RENEWABLE, DURABLE, SUSTAINABLE WOOD

Never before have consumers cared so deeply about the environmental impacts of the products they use. In these environmentally conscious times, wood products offer concerned consumers a breath of fresh air by giving them the peace of mind of knowing that they are using an environmentally friendly building material.

Wood is renewable, reusable, recyclable and completely biodegradable. The well–managed forests from which our wood is derived are natural air filters, absorbing carbon dioxide and releasing oxygen. Forests also provide us with clean water and scenic beauty and provide habitat for wildlife and plants.

Wood—The Environmentally Conscious Choice

Life cycle assessment, or LCA, is an internationally recognized analytical method that quantifies energy and material usage, emissions to the air and water and the solid waste generated at each stage of a product's life cycle. The LCA process asks some basic questions—the same questions that more and more architects, designers and consumers are asking of building products:

- How is the environment affected at each stage of the building product's life cycle—from resource extraction through manufacturing, transportation, installation and eventual disposal?
- How can the impacts on the environment be compared for one material choice over another?

LCA is becoming the world standard for dealing with these complex environmental issues and objectively improving environmentally based decision making. When examined under the LCA framework, wood is clearly superior to alternate building materials. Metal, masonry and plastics are originally extracted from fixed, non–renewable sources and in all cases, take more fossil fuel energy to process and manufacture (see chart). Wood can be easily reused or recycled throughout its life cycle and when no longer needed, is completely biodegradable. Try saying that about metal, concrete or plastics!

Life Cycle Assessment of the Environmental Impacts of a House Built from Wood, Sheet Metal, and Concrete

	Wood	Sheet Metal	Concrete
Global Warming Potential (CO_2 equivalent kg)	62,183	76,453	93,573
Air Toxicity (critical volume measurement)	3,236	5,628	6,971
Water Toxicity (critical volume measurement)	407,787	1,413,784	876,189
Weighted Resource Use (kg)	121,804	138,501	234,996

Source: Canadian Wood Council, Technical Bulletin No. 5, *Life Cycle Analysis for Residential Buildings*, www.cwc.ca

Responsibly Meeting a Growing Demand

HPVA members are committed to the integration of the science of sustainable harvest and production with the conservation of soil air, and water quality that preserves wildlife and fish habitat and promotes healthy forests. Our policy statement on Sound Forestry and Utilization Practices is available online at www.hpva.org.

Worldwide, there are a number of forest certification programs that strive to meet consumer and manufacturer demands for greater environmental accountability by documenting and improving forestry practices. HPVA members fully support the fundamental concepts of forest certification and actively participate in the two major certification initiatives in the US: the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI). Information on those and other forest certification programs and the companies that manufacture to certification standards is available on our website: www.hpva.org and in our "Where to Buy" membership directory.

Internationally, recent attention has focused on the problem of illegal logging and the subsequent trade in illegal wood products. HPVA members support international efforts to ensure that all countries have the resources necessary to monitor and sustainably manage their forest resource. Individually, our member companies encourage the proper stewardship of our international forest resource by supporting community activities that promote natural resource education and policies that enhance forest health and vigor.

Forest Facts:

- There are 737 million acres of forest land in the U.S.
- The U.S. hardwood resource has grown by 91% since 1952.
- Tree growth exceeds harvest in all areas of the U.S.
- 5.4 million trees are planted *every day* in the U.S.

Stewardship in Action

A great example of that stewardship in action is the hardwood tree planting initiatives coordinated and sponsored each year by the Hardwood Forestry Fund. The Fund, created by the HPVA membership in 1990 to educate the public about the importance of active forest management, works closely with natural resource professionals to fund the planting of hardwood trees on public sites.

The Hardwood Forestry Fund's proactive mission has received broad–based support from the forest products industry, conservation–focused foundations and environmentally concerned individuals. Since 1990, the Fund has planted more than 2.5 million trees through 190 planting projects in 22 states and 4 foreign countries.

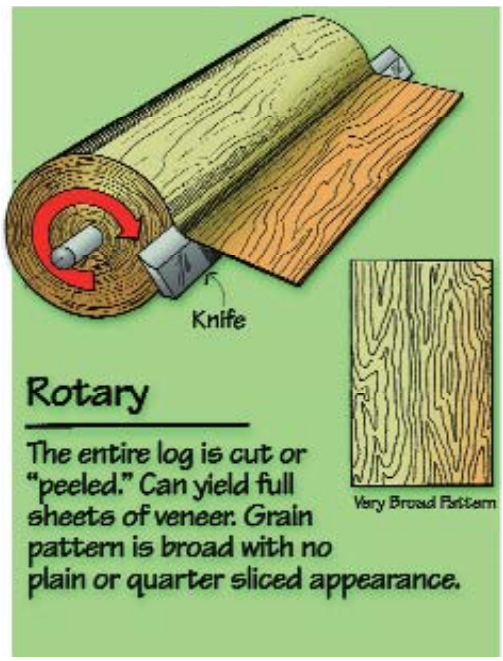
The Hardwood Forestry Fund is a growing program that helps companies and individuals that do not own forestland have a hand in the establishment and management of future forests. The Fund and its members replace the trees used today and create healthy hardwood forests for future generations. You could say our future is growing every day. We invite you to learn more about how you can help by visiting our website at www.hardwoodforestryfund.org.

VENEER CUTTING METHODS

Rotary:

Helpful Hint

Rotary is the only cutting method that is capable of producing whole piece faces.

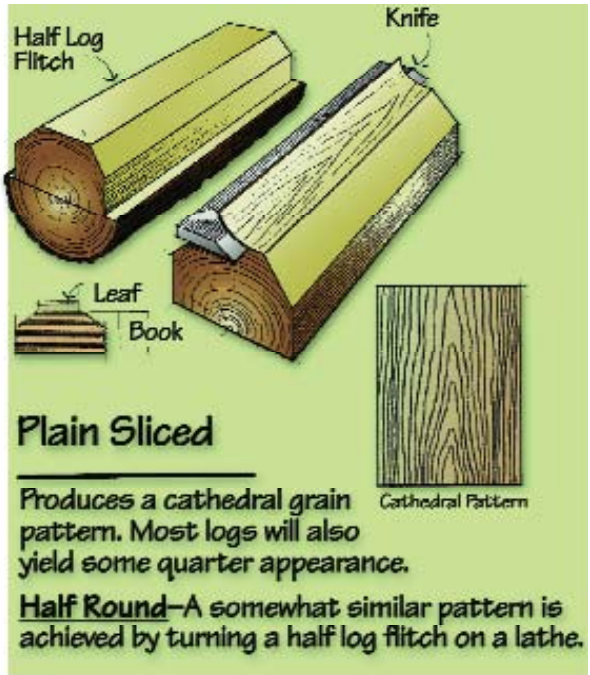


- Used in the majority of stock panels produced in North America
- Produces a broad, variegated pattern
- Yields the most veneer per log
- Can produce a limited amount of full–sized whole piece faces
- Generally, rotary cut veneer is less expensive than sliced veneer

Rotary Birch

Rotary Red Oak

Plain Sliced:



- Most common slicing method
- Veneer cut along the growth rings
- Frequently results in a combination of familiar "cathedral" pattern and straight grain patterns
- Because plain slicing offers the highest yield of the slicing methods, it is generally the least expensive

Helpful Hint

Both plain slicing and half round slicing produce the familiar cathedral appearance.

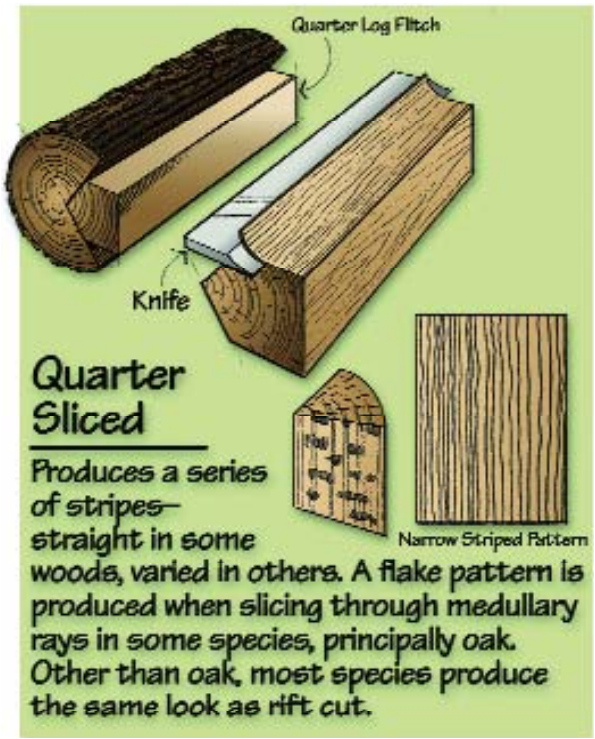
Plain Sliced Cherry

Plain Sliced Red Elm

Quarter Sliced:

Helpful Hint

Quartered oak veneer will contain flake. If you do not want flake in your oak veneer, you should consider specifying rift cut oak.

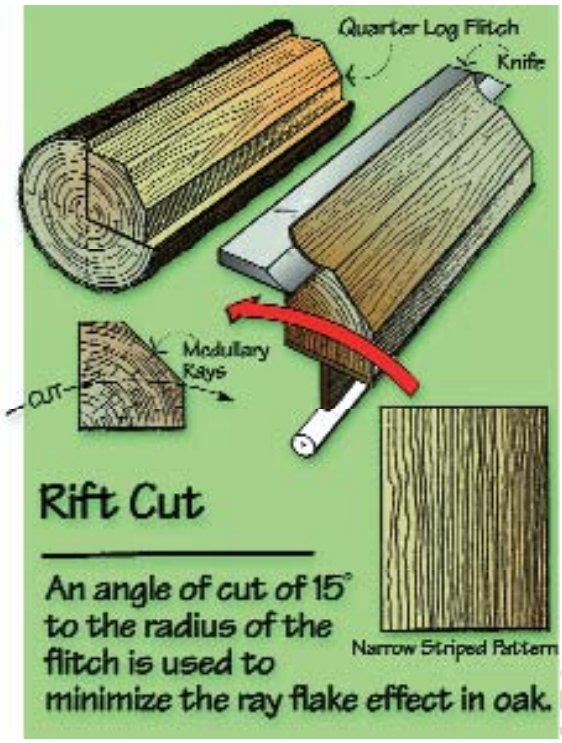


- Cut is perpendicular to the growth rings
- Produces a straight grain appearance
- May produce ray flake in red and white oak
- Produces narrower components than plain slicing
- Because quarter slicing yields less veneer per log than plain slicing, it is generally more expensive than plain slicing

Quater Sliced Mahogany

Quarter Sliced Oak

Rift Cut:



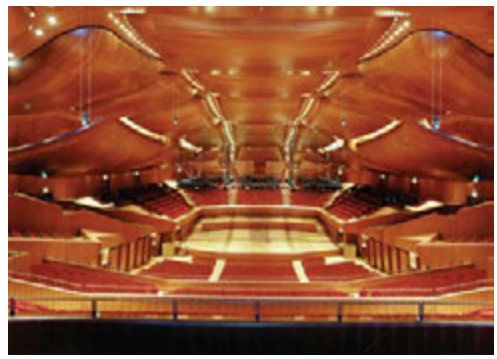
- Red and white oak are generally the only species that are rift cut
- Produces straight grain appearance in oak with minimal flake
- Produces the narrowest components of the slicing methods
- Because rift cutting yields the least veneer per log, it is generally the most expensive slicing method

Rift Cut Red Oak

Rift Cut White Oak

SPECIFYING VENEER

For many people, the process of properly specifying veneer is a challenge. The wide selection of available veneer species, cutting methods and natural figure types and characteristics combine to confront the potential specifier with a dizzying array of possibilities. Add to that mix the fact that there are no set veneer grades upon which a specifier can rely and the process of specifying veneer can seem overwhelming.



Helpful Hint

Don't be confused by the existence of the ANSI HP–1 Hardwood Plywood Standard. The HP–1 grades apply only to hardwood plywood panels, not raw veneer.

However, the process need not be confusing or complicated. With a little preparation and forethought, you'll have no trouble finding the perfect veneer for your project. The key to the entire process is effective communication. To get the right veneer, you need to have a complete understanding of what it is you need and you have to be able to communicate those needs to your supplier.

Although there is no set veneer standard to refer to, there are some basic questions that any veneer supplier will want answered when taking your order. By having answers to those questions ready before you pick up the phone to call, you'll have much of the information your veneer supplier needs ready at your fingertips.

Helpful Hint

As the product specifications become more restrictive, the amount of material available to meet your specifications decreases and the cost of your veneer will increase.

When selecting your veneer, however, please give some thought to the cut, appearance and grade of the veneer you specify. Many busy specifiers go straight to a request for a high quality veneer because they view it as the easiest way to get an acceptable product that will do the ţ b. However, they may be doing themselves a disservice by not considering alternate veneers that would work ţ st fine in their application. As the accompanying graphic shows, the typical hardwood veneer log produces only a very small amount of AA panel grade veneer. If you insist on only high grade veneer, you may not only be paying too much for your veneer, but you are also putting an unnecessary strain on our valuable hardwood resource.

Your veneer supplier has a wide range of underutilized cuts, appearances and species available to meet your needs at an affordable price. By discussing your needs with an educated veneer supplier, they may be able to suggest a product you hadn't considered that would fulfill your needs and possibly even save you money.

To facilitate effective communication between you and your veneer supplier, we offer the following list of veneer specifying considerations. While not exhaustive, these questions cover much of the basic information your veneer supplier needs to know to get you the proper veneer:

Basic Customer Questions:
Your veneer supplier will need this fundamental information to get a frame of reference for your expectations and needs.

- Where are you calling from?
- What are you making?
- How are you going to use the veneer?

Basic Veneer Questions:
This basic veneer information will form the basis of your discussions with your veneer supplier.

- What wood species do you want?
- What veneer cut do you want?
  - If you are requesting plain sliced veneer, what percentage of crown bundles are you expecting?
- Do you want to buy veneer priced per individual flitch or priced per graded pallet?

Veneer Specifications:
The dimensions and amount of veneer you need are critical considerations, as the availability of certain types of veneer may be limited.

- What are your length and width requirements?
  - Are all the required lengths the same, or are various lengths required?
- How many square feet of veneer do you need?
- What are your thickness requirements?
- Are large sequential runs required?

Veneer Color and Figure Requirements:
Veneer is an infinitely variable natural product, so it is important for you to clearly explain your expectations for color, natural figure and natural characteristics.

- Do you have any color restrictions?
- Do you want figured or non–figured veneer?
  - If figured, which type of natural figure do you want?
  - If figured, do you want heavy, medium, or light figure?
- How many natural characteristics will you accept?
- Are open defects allowable?

Packaging Requirements:
In addition to the veneer specifications your veneer supplier will need to know what you want done with the veneer once it has been cut.

- Do you want clipped and bundled veneer stock or unclipped (flitch stock) veneer?
  - If you want clipped veneer, do you require a measurement list and tally by bundle?
  - How many sheets of veneer per bundle are you expecting?
- How are the veneers to be crated? Unitized or palletized?

Additional Considerations:
Your veneer supplier can supply you with additional information or documentation if required.

- Is the veneer being consumed or exported? If it is to be exported, do you need a certificate of origin?
- Are you aware that woods such as mansonia, afromosia, Santos rosewood, makore, etc. may present health concerns (dermatitis, breathing irritant, etc.)?

Additional Information:
You should provide your veneer supplier with any additional information you can to help them understand your veneer request.

- Can you send digital photos or samples of the look that you want?

Helpful Hints
In clipped and bundled veneer, some quartered bundles typically accompany the crown bundles.

Verify sufficient availability of your veneer in the early planning stages of your project.

Typically, veneers thicker than 1/42nd inch are special order items.

Any color, figure or other special requirements must be explicitly communicated to your supplier when placing an order.

INTRODUCTION TO THE SPECIES LISTINGS

The species descriptions on the following pages provide basic information on the 44 veneer species commercially available in North America. The species are listed alphabetically by their most commonly used commercial trade name.

Each species is presented with a photo of the wood (or multiple photos if there are particular characteristics or appearances that warrant highlighting) and the following information, which is identified in the sample listing shown on the next page:

- Trade Name: The species are listed alphabetically by common trade names. If a group of woods are generally sold together under a single trade name (such as *hard maple* or *spruce*), those woods are collected together under that single broad trade name. If a wood has become known by a trade name that is botanically incorrect (such as "Tasmanian oak," which is not a true oak), it will be listed in quotations to indicate the name may be misleading.

Helpful Hint

To avoid confusion, the scientific name of the veneer species should always be used when discussing or specifying veneer.

- Scientific Name: The scientific name for each species is provided. Because trade and other common names are often misleading (or unintentionally used incorrectly), all discussions about a particular wood species must be based on the scientific name of the species. The importance of using scientific names for clarity cannot be overemphasized. Even when used correctly, common names are often confusing. This often cited example from William Lincoln's "World Woods in Color" demonstrates how confusing wood names can be:

  > The wood known as "Australian silky oak" (*Cardwellia sublimis*) in the UK is known as lacewood in America. Lacewood (*Platanus acerifolia*) in the UK is known as sycamore in America, while sycamore (*Acer pseudoplatanus*) in the UK is known as maple in America.

- Common Names: Other frequently used common names are listed. As with the trade names, any botanically misleading common names are identified with quotations. If a collection of woods is grouped together under a single trade name, the individual woods in that group are identified here in the common names text.

Helpful Hint

Political and social situations in the source country can change and affect the availability of logs and veneer.

- Species Information: For each species, the source region of the world from which the wood comes, the typical color of the wood, the grain patterns and descriptive characteristics are provided.

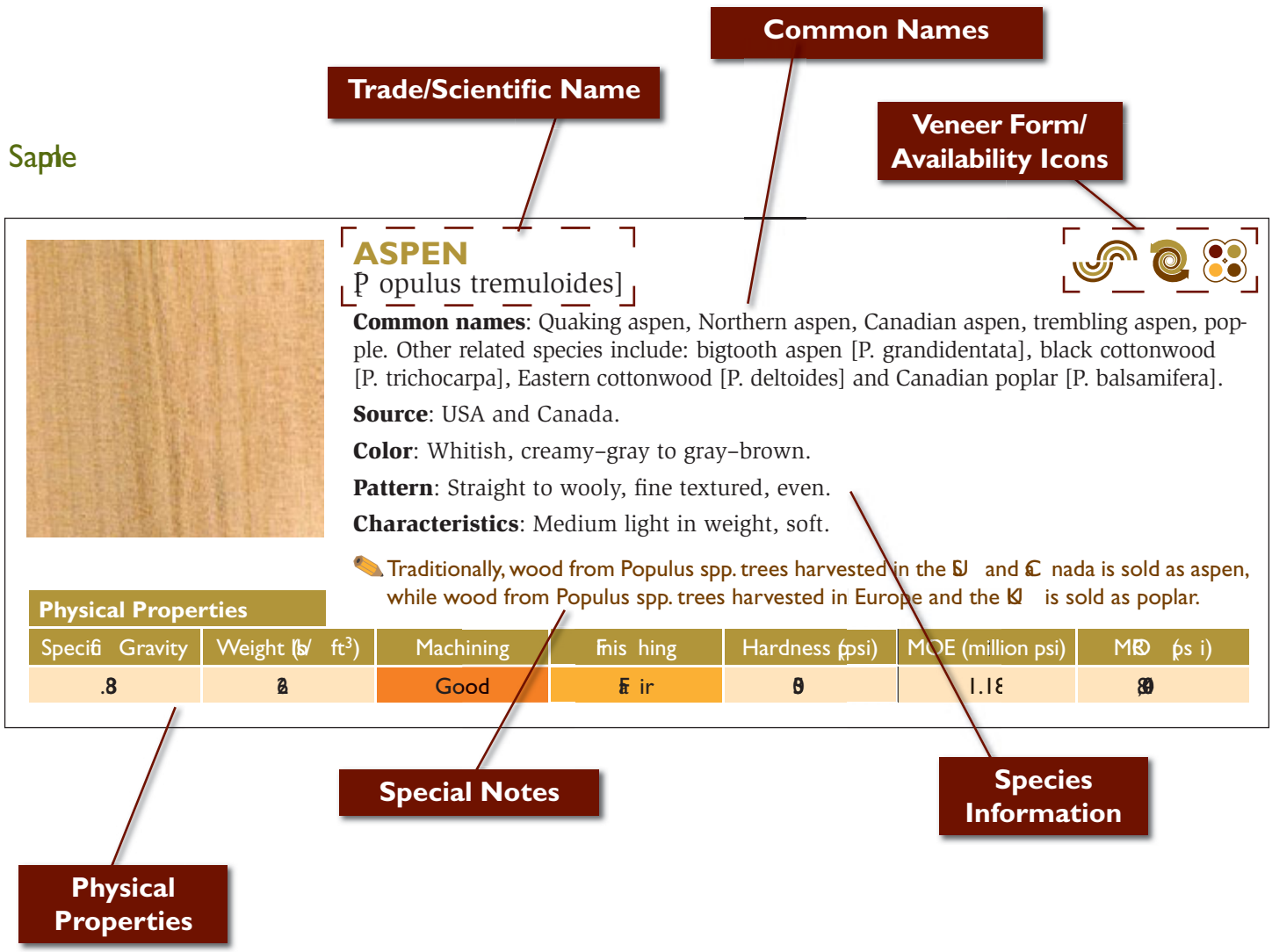
- Special Notes: For some species, additional informational notes have been offered that describe unusual appearances or characteristics specific to that species.

- Physical Properties: The physical properties of the wood and the ease of machining and finishing are provided. Physical properties are given for wood at 12% moisture content. The hardness of the wood is the force needed to embed a 0.444–inch ball to one–half its diameter in the wood.

- Veneer Form: Graphical icons are used to show whether the species is commonly available in sliced veneer form, rotary veneer form, or both forms. Wood that

is indicated as being readily available in one form may often be obtained in the other form, although it may be a special order item and might delay delivery or increase the cost of the veneer.

- Face Availability: If this icon is present in the listing, it indicates that that veneer species is readily available as a face that can be used to make hardwood plywood panels. For species without this icon, the veneer may be more difficult to find in face form or may only be available for specialized uses.



ALDER, RED

Aln us rubra]

Common names: Alder, western alder.

Source: USA Pacific Coast to Canada.

Color: White to pinkish–brown.

Pattern: Subdued to not distinct; fine texture.

Characteristics: G od working properties.

Physical Properties

Specifi Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MR (ps i)
.4	8	E ellent	E ellent	0	.B	9

ASH, BLACK

F raxinus nigra]

Source: Lk e states, Southern Canada, New England.

Color: Whitish to light brown sapwood, dull, grayish–brown to brown heartwood.

Pattern: Straight grain; coarse, even texture.

Characteristics: Medium to lightweight, soft.

Brown ash refers to la ck ash grown in certain locations in Michigan, Wisconsin and Minnesota that exhibit s a uniform warm b own heartwood with narrow lighte own sapwood.

Physical Properties

Specifi Gravity	Weight (lb/ ft^3)	Machining	Finis hing	Hardness (psi)	MOE (million psi)	MR (ps i)
.5	3	Good	E ellent	,0	.0	,3

ASH, WHITE

F raxinus americana]

Common names: American ash.

Source: G eat Plains, Eastern USA, Southeastern Canada.

Color: Somewhat lustrous; sapwood nearly white, wide; heartwood grayish brown to light brown to pale yellow streaked with brown.

Pattern: Straight grain; coarse, even texture.

Characteristics: Heavy in weight, hard, strong, stiff, high shock resistance, excellent bending qualities.

Veneer from O egon ash [Fa inus latifolia] and green ash [Fa inus pennsylvania] is not distinguished from white ash.

Physical Properties

Specifi Gravity	Weight (lb/ ft^3)	Machining	Finis hing	Hardness (ps i)	MOE (million psi)	MR (ps i)
.0	4	Good	E ellent	,0	.7	5 0

ASPEN
[Populus tremuloides]

Common names: Quaking aspen, Northern aspen, Canadian aspen, trembling aspen, popple. Other related species include: bigtooth aspen [P. grandidentata], black cottonwood [P. trichocarpa], Eastern cottonwood [P. deltoides] and Canadian poplar [P. balsamifera].

Source: USA and Canada.

Color: Whitish, creamy–gray to gray–brown.

Pattern: Straight to wooly, fine textured, even.

Characteristics: Medium light in weight, soft.

Traditionally, wood from Populus spp. trees harvested in the US and Canada is sold as aspen, while wood from Populus spp. trees harvested in Europe and the UK is sold as poplar.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.38	24	Good	Fair	610	1.3	8,900

BALDCYPRESS
[Taxodium distichum]

Common names: Bald–cypress, southern–cypress.

Source: Southeastern USA.

Color: Yellowish red to salmon–colored.

Pattern: Distinct, leafy grain; attractive crotch figure.

Characteristics: Soft springwood, hard summerwood; moderately strong, light, durable.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.46	28	Excellent	Excellent	910	1.4	10,600

BASSWOOD, AMERICAN
[Tilia americana]

Common names: American linden, American lime.

Source: Northern USA and Canada.

Color: Creamy white.

Pattern: Fine grain, not distinct.

Characteristics: Very light in weight, fairly soft.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.37	23	Excellent	Excellent	410	1.6	8,700

BEECH, AMERICAN
[Fagus grandifolia]

Source: USA and Canada.

Color: White sapwood; heartwood white to pinkish to reddish–brown.

Pattern: Straight to interlocked, close–grained; fine texture.

Characteristics: Hard, strong, stiff.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MRD (psi)
.64	45	Excellent	Excellent	1,300	1.7	7,400

Natural birch shown

BIRCH
[Betula spp.]

The birch group is comprised of paper birch [Betula papyrifera] (white birch), sweet birch [Betula lenta] (black birch, cherry birch) and yellow birch [Betula alleghaniensis] (grey birch, silver birch). The veneer from paper, sweet and yellow birch is indistinguishable in the marketplace and is sold simply as birch.

Source: USA and Canada.

Color: Light brown to yellow sapwood; heartwood brown tinged with red.

Pattern: Straight, close grained; fine, uniform texture.

Characteristics: Heavy, hard, strong.

✎ Birch veneer is sold as sap, heart or natural.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MRD (psi)
.72	44	Good	Excellent	1,720	2.0	9,600

BUTTERNUT
[Juglans cinerea]

Common names: White walnut.

Source: USA and Canada, but limited because of disease.

Color: Warm medium–brown.

Pattern: Straight grained; coarse, soft texture.

Characteristics: Light to medium weight, easy to work.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MRD (psi)
.38	24	Excellent	Excellent	490	1.1	5,300

"CEDAR, RED"
[Juniperus virginiana]

Common names: "Aromatic red cedar," "eastern red cedar," "redcedar," "Tennessee red cedar."

Source: Eastern USA.

Color: Sapwood nearly white; heartwood purplish to rose–red, matures to dull red or reddish–brown.

Pattern: Straight grained; fine textured.

Characteristics: Characteristic pencil–cedar odor, moderately heavy, hard.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.53	33	Excellent	Good	900	1.5	7,800

"CEDAR, WESTERN RED"
[Thuja plicata]

Common names: Giant arborvitae.

Source: Western Canada and USA.

Color: Sapwood nearly white; heartwood reddish-brown, loses red tinge on exposure.

Pattern: Straight grained, course texture.

Characteristics: Light, easily worked, aromatic scent; extremely resistant to moisture.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.32	22	Excellent	Excellent	690	1.1	7,500

CHERRY, AMERICAN
[Prunus serotina]

Common names: Black cherry.

Source: Eastern USA.

Color: Sapwood nearly white; heartwood light pinkish–brown to dark reddish–brown.

Pattern: Fine, straight, close–grained.

Characteristics: Light, strong, hard.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.60	35	Excellent	Excellent	950	1.94	10,300

COFFEETREE, KENTUCKY

[Gymnocladus dioicus]

Common names: Coffeenut, American coffeebean.

Source: Eastern USA.

Color: Sapwood creamy–white; heartwood rich, light pinkish–brown.

Pattern: Coarse grained.

Characteristics: Heavy, although not hard, strong.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.60	39	Good	Fair	1,22	1.47	7,65

DOUGLAS–FIR

[Pseudotsuga menziesii]

Common names: Douglas–fir veneer is sold under the trade name “Oregon pine.”

Source: Northwestern USA, Southwestern Canada.

Color: Yellowish to orange–red to light red, with narrow band of white sapwood.

Pattern: Generally straight grained; medium to coarse textured.

Characteristics: Moderately light and hard.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.48	30	Poor	Good	710	1.9	7,30

ELM, AMERICAN

[Ulmus americana]

Common names: White elm, gray elm; sold as soft elm.

Source: USA and Canada. Supplies are limited because of Dutch Elm disease.

Color: Sapwood grayish–white to light brown; heartwood light–brown to brown with reddish tinge.

Pattern: Straight grain, sometimes interlocked; coarse textured.

Characteristics: Moderately heavy, moderately hard, weak.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.55	35	Good	Good	1,02	1.80	7,30

ELM, RED
[Ulmus rubra]

Common names: Slippery elm; also sold as soft elm.

Source: USA and Canada. Supplies limited because of Dutch Elm disease.

Color: Sapwood grayish–white to light brown; heartwood brown to dark–brown, with shades of red.

Pattern: Straight grain, sometimes interlocked; coarse textured.

Characteristics: Moderately heavy, moderately hard, weak.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.53	37	Fair	Excellent	810	1.29	10,100

HACKBERRY
[Celtis occidentalis]

Common names: Sugarberry.

Source: Eastern USA and Southern Canada. A member of the Elm family.

Color: Yellow–gray to light brown with yellow streaks.

Pattern: Straight to irregular grain; fine textured.

Characteristics: Moderately heavy, moderately hard; good bending qualities.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.53	37	Good	Good	810	1.29	10,100

HEMLOCK, WESTERN
[Tsuga heterophylla]

Source: Western Canada and USA.

Color: Sapwood nearly white; heartwood light yellow–brown.

Pattern: Straight grained, fine texture.

Characteristics: Wood is lightweight and works easily; has similar workability characteristics to pine.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.45	28	Excellent	Excellent	690	1.13	9,100

HICKORY

[Carya spp.]

Common names: The six commercial hickories are: shagbark, shellbark, pecan, mock-ernut, pignut and bitternut.

Source: Eastern USA.

Color: Sapwood nearly white; Heartwood creamy to pinkish–brown, with dark streaks.

Pattern: Straight, close–grained; fine textured.

Characteristics: Moderately heavy, moderately hard, extremely tough and resilient.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Poor	Fair	[illegible]	[illegible]	[illegible]

HOLLY, AMERICAN

[Ilex opaca]

Source: Eastern coast of USA to Gulf and Mississippi valley.

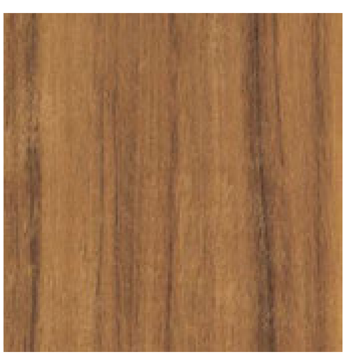
Color: White to ivory–white, with bluish streaks.

Pattern: Fine textured.

Characteristics: Hard, moderately strong.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Excellent	Excellent	[illegible]	[illegible]	[illegible]



KOA

[Acacia koa]

Source: Hawaii.

Color: Golden reddish–brown with dark–brown streaks and zones.

Pattern: Interlocked to wavy or curly; medium textured; lustrous.

Characteristics: Moderately heavy, moderately hard.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Excellent	Excellent	[illegible]	[illegible]	[illegible]

Inset Photo: Madrona Burl

MADRONA

[Arbu tus menziesii]

Common names: Manzanita, Pacific madrone.

Source: Pacific Coast of USA and Canada.

Color: Pale reddish–brown.

Pattern: Straight grained to irregular; smooth, even textured.

Characteristics: Heavy, compact, tough.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.80	49	Good	Excellent	2,282	2.02	19,089

MAPLE, HARD

[A cer spp.]

Common names: The hard maple group is comprised of sugar maple [A cer saccharum] and black maple [A cer nigrum] (rock maple, hard rock maple).

Source: Eastern USA and Canada.

Color: Sapwood white to creamy–white; heartwood creamy–white to pinkish tinge to light reddish–brown.

Pattern: Straight, close grained; sometimes wavy or curly; fine textured; can be highly figured.

Characteristics: Heavy, hard, tough.

Select hard maple logs produce the familiar bird's–eye maple figure type.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.63	43	Good	Excellent	1,450	1.83	15,800

MAPLE, SOFT

[A cer spp.]

Common names: The soft maple group is comprised of red maple [A cer rubrum] silver maple [A cer saccharinum] and Oregon maple [A cer macrophyllum] (bigleaf maple).

Source: USA and Canada.

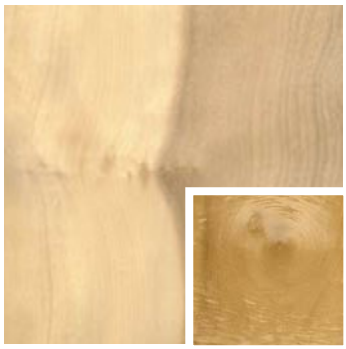
Color: Sapwood white; heartwood gray–white to pinkish tinge to light reddish–brown; some mineral streaks likely.

Pattern: Straight grained; fine textured.

Characteristics: Heavy, hard, fairly tough. Available in burl form.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.54	38	Good	Excellent	950	1.64	13,400



Inset Photo: Myrtle Burl

MYRTLE
[Umbellularia californica]

Common names: "California laurel," Pacific myrtle, Oregon myrtle, pepperwood.

Source: Oregon and California in USA.

Color: Heartwood golden–brown to greenish–yellow, with a large paler sapwood.

Pattern: Straight to wavy grain; smooth, fine textured.

Characteristics: Heavy and hard. Available in burl form.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.5	4	Excellent	Excellent	9	.8	1

OAK, RED
[Quercus spp.]

Common names: Northern red oak [Quercus rubra]. Other species which make up the eastern red oak group include: black oak [Quercus velutina], Shumard oak [Quercus shumardii], Southern red oak [Quercus falcata] (cherrybark oak, swamp red oak), pin oak [Quercus palustris] and scarlet oak [Quercus coccinea].

Source: Eastern USA and SE Canada.

Color: Sapwood grayish–white to pale reddish–brown; heartwood flesh–colored to pinkish to light reddish–brown.

Pattern: Straight grained; coarse textured.

Characteristics: Heavy, hard, strong.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.8	4	Excellent	Excellent	,0	.2	4 0

OAK, WHITE
[Quercus spp.]

Common names: White oak [Quercus alba]. Other species which make up the eastern white oak group include: bur oak [Quercus macrocarpa], overcup oak [Quercus lyrata], chinkapin oak [Quercus muehlenbergii], swamp chestnut oak [Quercus michauxii], chestnut oak [Quercus prinus], swamp white oak [Quercus bicolor], and post oak [Quercus stellata].

Source: Eastern USA and SE Canada.

Color: Sapwood whitish to light–brown; heartwood rich light–brown to dark brown.

Pattern: Straight grained; coarse textured.

Characteristics: Heavy, hard, strong.

Physical Properties

Specific Gravity	Weight (lbs/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.8	4	Excellent	Excellent	,0	.3	9

PERSIMMON
[Diospyros virginiana]

Source: Eastern USA.

Color: Large sapwood band that is straw to light brown; heartwood narrow band of dark brown or black.

Pattern: Straight grain; fine textured.

Characteristics: Heavy, hard, tough.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Fair	Fair	[illegible]	[illegible]	[illegible]

PINE, EASTERN WHITE
[Pinus strobus]

Common names: White pine.

Source: Eastern USA and Canada.

Color: Wide ring of nearly white to pale–white sapwood; heartwood, smaller portion, cream to slightly darker light to reddish brown.

Pattern: Straight grained, not contrasty; fine textured.

Characteristics: Light; moderately strong.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Excellent	Excellent	[illegible]	[illegible]	[illegible]

PINE, PONDEROSA
[Pinus ponderosa]

Common names: Western yellow pine, California white pine.

Source: Western USA and Canada.

Color: Pale yellow with deep yellow to reddish–brown heartwood.

Pattern: Straight grained; uniform texture.

Characteristics: Light; soft; works easily but resin exudation can be problematic.

Physical Properties

Specific Gravity	Weight (lb/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
[illegible]	[illegible]	Excellent	Good	[illegible]	[illegible]	[illegible]

PINE, RADIATA
[Pinus radiata]

Common names: Monterey pine.

Source: Southern California in USA. Widely planted in New Zealand, Australia, South Africa, Spain and Chile.

Color: Wide ring of pale–colored sapwood; heartwood small pinkish–brown portion.

Pattern: Fast grown, mild growth rings; medium textured.

Characteristics: Light to medium weight, hardness.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.38	30	Excellent	Good	710	1.2	8,300

PINE, SOUTHERN YELLOW
[Pinus spp.]

Common names: Four softwood species are sold under the name southern yellow pine: Longleaf pine [Pinus palustris], shortleaf pine [Pinus echinata], loblolly pine [Pinus taeda], slash pine [Pinus elliottii]. Southern yellow pine veneer, chiefly Pinus echinata and Pinus taeda, is sold under the trade name Carolina pine.

Source: Southeastern USA.

Color: Wide ring of yellowish–white sapwood; heartwood small reddish–brown portion.

Pattern: Fast grown, contrasty growth rings; coarse textured.

Characteristics: Heavy, hard, strong.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.55	34	Excellent	Excellent	690	1.7	9,300

PINE, WESTERN WHITE
[Pinus monticola]

Common names: Idaho pine. Character–marked veneer is sold under the trade name knotty pine.

Source: Western USA and Canada.

Color: Wide ring of pale–white sapwood; heartwood, smaller portion, slightly darker.

Pattern: Straight grained, not contrasty; fine textured.

Characteristics: Light; moderately strong.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.34	22	Excellent	Excellent	530	1.3	7,100

POPLAR, WHITE
[Populus alba]

Source: Europe, Western Asia, Eastern USA.

Color: Pure white to whitish–yellow or gray.

Pattern: Grain not distinct, sometimes brown–streaked; attractive crotches and swirls.

Characteristics: Soft, light, natural sheen.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.38	23	Good	Fair	270	1.5	6,800

Inset Photo: Vavona Burl

REDWOOD
[Sequoia sempervirens]

Common names: Sequoia. Redwood burl veneer is sold as vavona burl.

Source: Western USA.

Color: Sapwood nearly white; heartwood light red to deep reddish–brown.

Pattern: Straight grained; coarse textured.

Characteristics: Light to moderately light, soft.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.35	22	Excellent	Excellent	420	1.0	7,900

SASSAFRAS
[Sassafras albidum]

Common names: Golden elm. Lumber sometimes mixed in with black ash.

Source: Eastern USA.

Color: Sapwood light yellow; heartwood dull grayish–brown to darkish–brown, sometimes with slight greenish cast.

Pattern: Straight grained; medium textured.

Characteristics: Moderately heavy and hard.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.46	28	Excellent	Fair	690	1.2	9,900

SPRUCE

Picea spp.

Common names: The commercial spruces include: sitka spruce (P. sitchensis), black spruce (P. mariana), red spruce (P. rubens), white spruce (P. canadensis) and Engelmann spruce (P. engelmannii). Due to the similarity of the wood, the spruces are often marketed together.

Source: USA and Canada.

Color: Creamy-white sapwood with light pink-brown heartwood.

Pattern: Very straight grain, with even medium texture.

Characteristics: High strength to weight ratio, easy to work, finishes well.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.43	27	Excellent	Excellent	564	1.46	10,553

SWEETGUM

Liquidambar styraciflua

Common names: Red gum, sap gum.

Source: SE USA.

Color: Heartwood is a dull pinkish-brown, with dark streaks; sapwood is creamy-white.

Pattern: Irregular grain; fine textured.

Characteristics: Moderately heavy, moderately hard, not exceedingly strong.

Heartwood is sold as red gum; sapwood is sold as sap gum. Supplies of figured red gum may be limited.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.52	34	Good	Excellent	850	1.64	12,500

SYCAMORE, AMERICAN

Platanus occidentalis

Common names: American plane, buttonwood.

Source: Eastern USA.

Color: Sapwood nearly white to yellowish-white to reddish-brown. Heartwood from light to dark brown or reddish-brown.

Pattern: Interlocked to irregular grain; medium to fine textured.

Characteristics: Moderately heavy and hard.

Physical Properties

Specific Gravity	Weight (lbs/ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.49	34	Good	Good	770	1.42	10,000

TULIPWOOD, AMERICAN
[Liriodendron tulipifera]

Common names: Tuliptree, yellow–poplar, poplar.

Source: Eastern USA.

Color: Sapwood nearly white; heartwood yellow to tan to greenish–brown, frequently marked with streaks of purple, dark green, blue and black.

Pattern: Straight grained; fine to medium textured.

Characteristics: Moderately heavy and hard.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.42	28	Excellent	Excellent	590	1.28	10,000

TUPELO
[Nyssa spp.]

Common names: The principal species are black tupelo [N. sylvatica] (black gum) and tupelo gum [N. aquatica].

Source: Eastern USA.

Color: Sapwood white to grayish white; heartwood greenish to brownish gray.

Pattern: Interlocked grain.

Characteristics: Moderately heavy, moderately hard and strong.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.46	33	Fair	Good	697	1.14	10,800

WALNUT, AMERICAN
[Juglans nigra]

Common names: Black walnut.

Source: Eastern USA and Southern Canada.

Color: Sapwood whitish to yellowish–brown, will darken when steamed; heartwood light gray–brown to rich chocolate–brown to deep purplish–brown.

Pattern: Straight to interlocked or curly, wavy grained; medium to coarse textured.

Characteristics: Moderately heavy, hard, strong.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.55	38	Excellent	Excellent	1,010	1.63	14,600

WILLOW, BLACK
[Salix nigra]

Source: Eastern USA, Southern Canada.

Color: Heartwood light–brown to pale reddish to grayish–brown, frequently with darker streaks.

Pattern: Straight grained; fine textured.

Characteristics: Light, moderately soft.

Physical Properties

Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.9	2	Good	Excellent	0	.10	,70

YEW, AMERICAN
[Taxus brevifolia]

Common names: Pacific yew.

Source: Northwestern USA.

Color: Sapwood light–yellow; heartwood bright orange to rose–red.

Pattern: Even grained; fine textured.

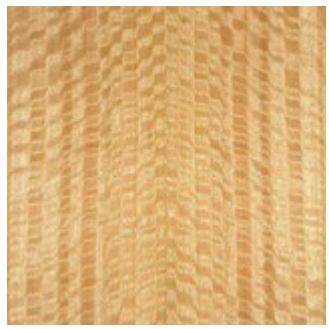
Characteristics: Heavy, hard, strong.

Physical Properties

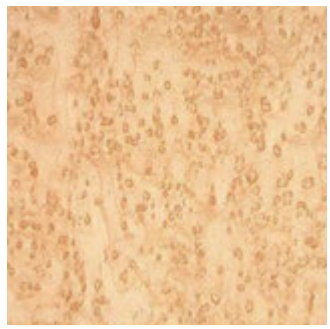
Specific Gravity	Weight (lb/ ft^3)	Machining	Finishing	Hardness (psi)	MOE (million psi)	MOR (psi)
.0	4	Good	Good	,4	.2	,7

COMMON FIGURE TYPES IN VENEER

Angel Step



Bee's Wing



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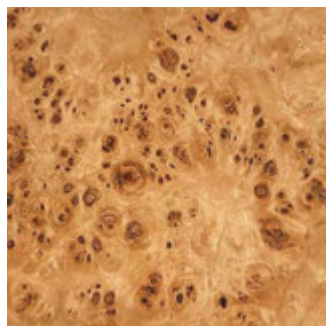
Blister

Block Mottle

Broken Fiddleback

Broken Stripe



Burl

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Chevron

Cluster

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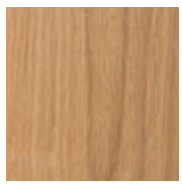
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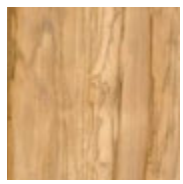
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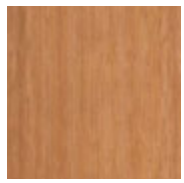
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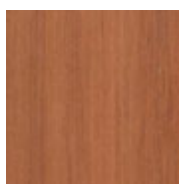
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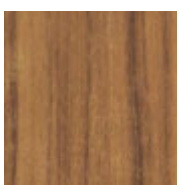
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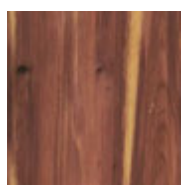
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