

**Graham**<sup>TM</sup>  
wood doors  
**ASSA ABLOY**

## Natural Solutions



ASSA ABLOY, the global leader  
in door opening solutions



# More Than Just a Pretty Face

Design challenges in today's commercial construction market cover a broad range of elements. We must be aware of the environmental impact of the materials we specify while being sure to provide the performance and elegance expected of wood products. From the dramatic impact of black walnut to the more subtle nuances of birch, GRAHAM decorative wood finishes provide natural solutions to your design challenges.

*Environmental awareness* has influenced the GRAHAM breakthrough approach to the interior finish needs of design professionals. Our unique factory finish systems combine the use of non-solvent based acrylic stains and finish topcoats. Understanding the design community requirements for solutions that provide *beauty, durability and reliability* made possible the technological advances allowing application of the GRAHAM finish materials.

*Decorative wood pigments* are applied to the wood door surface utilizing the GRAHAM five step automated process. We have created a spectrum of colors influenced by nature using *pigmented modified acrylic stains*. These water-borne high solids materials provide lucid, richly colored finishes.

An eight step automated process is employed to apply GRAHAM water-clear finish topcoats to pigmented or natural wood door surfaces. GRAHAM creates its high performance protective finish using *modified acrylic urethanes*. The vitreous nature of the one hundred per cent solids, ultra violet cured materials performs exceptionally well in high traffic areas. The successful integration of stain and topcoat application systems results in architectural wood doors with the appearance of fine furniture.

*Uncompromising elegance* equally suited to contemporary or traditional interiors with performance characteristics that withstand the heavy use areas of educational facilities, hospitals or office complexes make GRAHAM decorative wood finishes the natural solution to your design challenges.

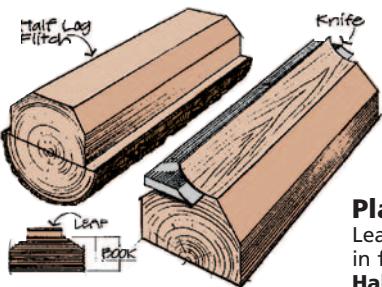
Experience the convenience and reliability of factory finished wood doors by GRAHAM.

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# Veneer Cuts

## Plain Slicing (or Flat Slicing)



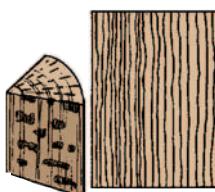
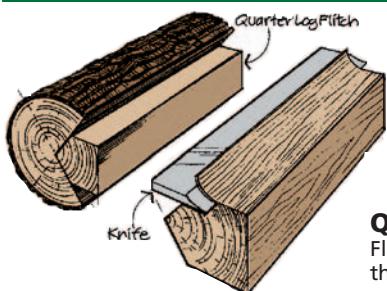
Cathedral Pattern

**Plain Sliced or Flat Sliced (slicer)**  
Leaf width depends on log size and placement in flitch.

**Half Round:** A somewhat similar pattern is achieved by turning a half log flitch on a lathe.

This is the slicing method most often used to produce veneers for high quality architectural woodworking. Slicing is done parallel to a line through the center of the log. A combination of cathedral and straight grain patterns result, with a natural progression of pattern from leaf to leaf.

## Quarter Slicing (or Quarter Cut)

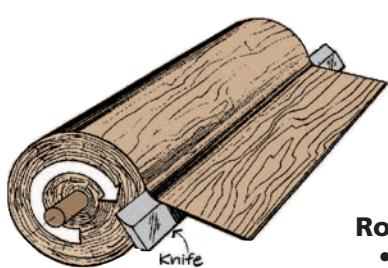


Narrow Striped Pattern

**Quarter Slicing (or Quarter Cut)**  
Flake pattern is produced when slicing through Medullary Rays in some species, principally oak.

Quarter slicing simulates the quarter sawing process of solid lumber, roughly parallel to a radius line through the log segment. In many species the individual leaves are narrow as a result. A series of stripes is produced, varying in density and thickness from species to species. "Flake" is a characteristic of this slicing method in red and white oak.

## Rotary

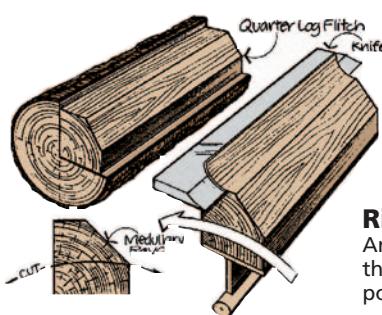


Very Broad Pattern

**Rotary (lathe)**  
• Wide Sheets      • Broad pattern  
• Difficult Matching

The log is center mounted on a lathe and "peeled" along the general path of the growth rings like unwinding a roll of paper, providing a generally bold random appearance. Rotary cut veneers may vary in width and matching at veneer joints is extremely difficult. Almost all softwood veneers are cut this way.

## Rift Slicing (or Rift Cut)



Narrow Striped Pattern

**Rift Cut (lathe)**  
Angle of cut is 15° to the radial to minimize the ray flake effect in oak. Comb Grain is the portion which has **VERY** tight and straight grain.

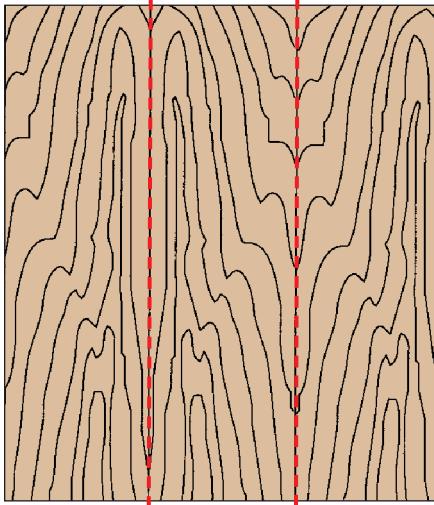
Rift veneers are produced most often in red and white oak, rarely in other species. Note that rift veneers and rift sawn solid lumber are produced so differently that a "match" between rift veneers and rift sawn solid lumber is highly unlikely. In both cases the cutting is done slightly off the radius lines minimizing the "flake" associated with Quarter Slicing.

The individual pieces of veneer sliced or peeled from a log are called "leaves". They are kept in the same order they were cut from the log. This allows natural grain progression when faces are assembled. All the veneer leaves cut from one log is called a "flitch". Specific groups of leaves within a flitch are called "books". The slicing method and handling of the veneer leaves will determine the appearance of the door face.

# Face Assembly

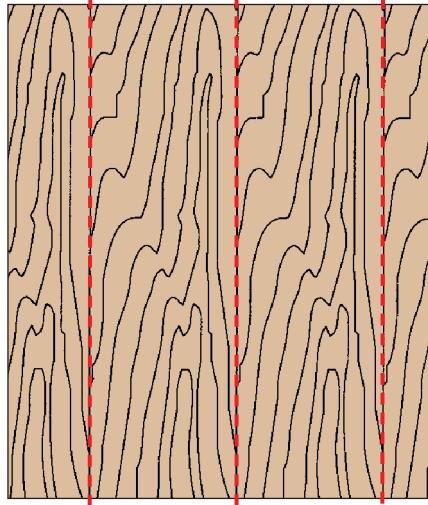
## Matching Between Adjacent Veneer Leaves

It is possible to achieve certain visual effects by the manner in which the leaves are arranged. As noted, rotary cut veneers are difficult to match, therefore most matching is done with sliced veneer. The more common types are:



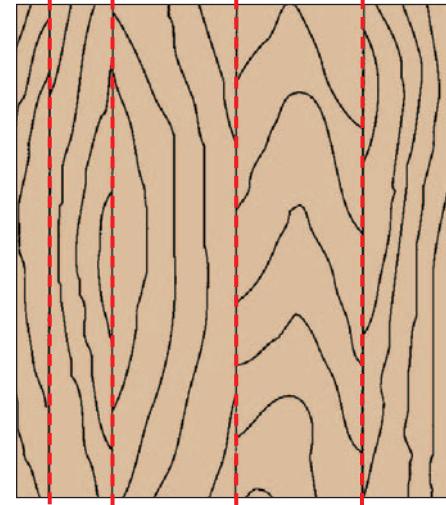
**Book Match**

The most commonly used match in the industry. Every other piece of veneer is turned over so adjacent pieces (leaves) are "opened" like the pages of a book. The faces alternate in adjacent pieces of veneer. This may yield a noticeable color variation called barber poling. Barber poling may be minimized through proper sanding and finishing techniques.



**Slip Match**

Often used with quarter sliced and rift sliced veneers. Adjoining leaves are placed (slipped out) in sequence without turning, resulting in all the same face sides being exposed. Barber poling is not characteristic of slip matching.

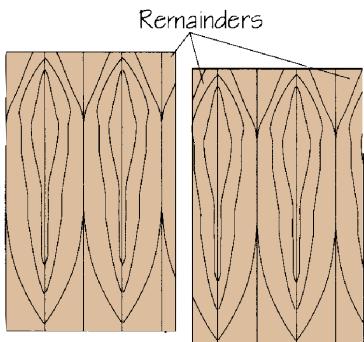


**Random Match**

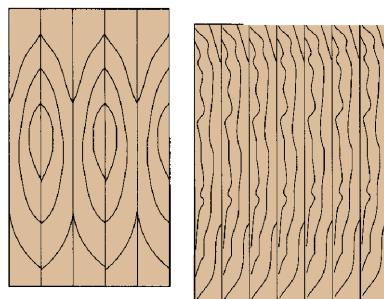
Veneer leaves are placed next to each other in a random order and orientation, producing a "board-by-board" effect in many species. Color and grain may vary greatly from veneer leaf to veneer leaf.

## Matching Within Panel Face

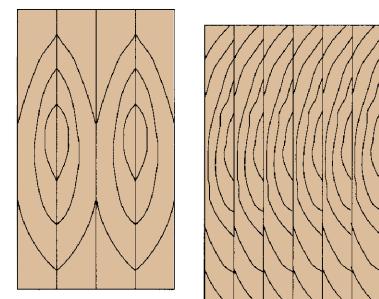
The individual leaves of veneer in a sliced flitch increase or decrease in width as the slicing progresses. Thus, if a number of panels are manufactured from a particular flitch, the number of veneer leaves per panel face will change as the flitch is utilized. The manner in which these leaves are "laid-up" within the panel requires specification, and are classified as follows:



**Running Match**



**Balance Match**



**Balance/Center Match**

# Natural Birch

## ROTARY

The important species of birch are yellow birch, sweet birch and paper birch. They grow principally in the Northeastern and Lake States. Yellow and sweet birch also grow along the Appalachian Mountains to northern Georgia. They are the source of most birch lumber and veneer.

Yellow birch has white sapwood and light reddish-brown heartwood. Sweet birch has light-colored sapwood and dark brown heartwood tinged with red. The wood is fine and consistent in texture.

Birch veneer is classified by coloration into three basic groups: natural, select white and select dark. Natural birch contains unlimited amounts of heartwood and sapwood. Select white birch contains only light-colored sapwood. Select dark birch contains only red or brown heartwood.

Yellow and sweet birch lumber and veneer are used principally in the manufacture of furniture, baskets, cooperage, interior finish and doors. Birch veneer is processed into plywood used for flush doors, paneling, cabinetry and other specialty products.



### ROTARY NATURAL BIRCH

Rotary cut natural birch veneer displays fine wood texture and a very irregular grain pattern. The grain pattern is accentuated by the presence of light-colored sapwood invaded by much darker heartwood. The extreme coloration differences may be highlighted or subdued when the door face veneer is stained and topcoat finished. These extreme coloration differences should be considered before specifying natural birch.

Cut	Rotary	Rotary
Grade Description	AA	A
Color and Match	Natural	Natural
Sapwood	Yes	Yes
Heartwood	Yes	Yes
Color Streaks	Slight	Yes
Color Variation	Yes	Yes
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Rotary	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	Slight	Slight
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		

Reference WDMA I.S.1-A



Shown above are cut samples of this specie. **Top Half**-unfinished   **Bottom Half**-#100 Clear



#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Rotary Natural Birch**  
  
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# White Birch

## ROTARY SELECT

The important species of birch are yellow birch, sweet birch and paper birch. They grow principally in the Northeastern and Lake States. Yellow and sweet birch also grow along the Appalachian Mountains to northern Georgia. They are the source of most birch lumber and veneer.

Yellow birch has white sapwood and light reddish-brown heartwood. Sweet birch has light-colored sapwood and dark brown heartwood tinged with red. The wood is fine and consistent in texture.

Birch veneer is classified by coloration into three basic groups natural, select white and select dark. Natural birch contains unlimited amounts of heartwood and sapwood. Select white birch contains only light-colored sapwood. Select dark birch contains only red or brown heartwood.

Yellow and sweet birch lumber and veneer are used principally in the manufacture of furniture, baskets, cooperage, interior finish and doors. Birch veneer is processed into plywood used for flush doors, paneling, cabinetry and other specialty products.



### ROTARY SELECT WHITE BIRCH

Rotary cut select white birch veneer exhibits characteristic smooth texture and a very subtle irregular grain pattern. The grain pattern is subdued by the sole use of sapwood presenting a very consistent creamy coloration throughout the door face. The grain pattern may be muted or highlighted by the color of stain chosen to finish the door face veneer.

Cut	Rotary	Rotary
Grade Description	AA	A
Color and Match	White	White
Sapwood	Yes	Yes
Heartwood	No	No
Color Streaks	Slight	Slight
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Rotary	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	Slight	Slight
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		

Reference WDMA I.S.1-A



Shown above are cut samples of this specie. **Top Half**-unfinished   **Bottom Half**-#100 Clear



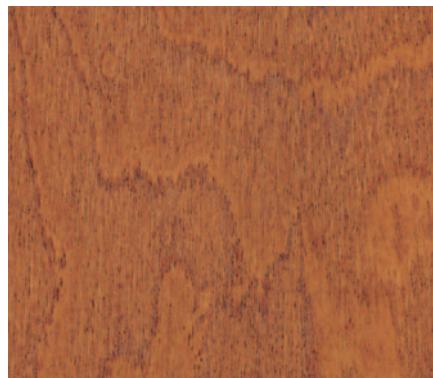
#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Rotary Select White Birch**  
  
*Actual colors and door face  
veneers may vary from those in  
this brochure. Wood is a natural  
material. Its growth patterns are  
uncontrolled by man. There are  
also color variations which may  
have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Natural Birch

## PLAIN SLICED

The important species of birch are yellow birch, sweet birch and paper birch. They grow principally in the Northeastern and Lake States. Yellow and sweet birch also grow along the Appalachian Mountains to northern Georgia. They are the source of most birch lumber and veneer.

Yellow birch has white sapwood and light reddish-brown heartwood. Sweet birch has light-colored sapwood and dark brown heartwood tinged with red. The wood is fine and consistent in texture.

Birch veneer is classified by coloration into three basic groups natural, select white and select dark. Natural birch contains unlimited amounts of heartwood and sapwood. Select white birch contains only light-colored sapwood. Select dark birch contains only red or brown heartwood.

Yellow and sweet birch lumber and veneer are used principally in the manufacture of furniture, baskets, cooperage, interior finish and doors. Birch veneer is processed into plywood used for flush doors, paneling, cabinetry and other specialty products.



### PLAIN SLICED NATURAL BIRCH

Plain sliced natural birch veneer presents close grained delicate wood texture with a lineal grain pattern. The grain pattern is accentuated by the presence of light-colored sapwood invaded by much darker heartwood. The extreme coloration differences may be highlighted or subdued when the door face is stained and topcoat finished. These extreme coloration differences should be considered before specifying natural birch.

Cut	Plain Sliced	Plain Sliced
Grade Description	AA	A
Color and Match	Natural	Natural
Sapwood	Yes	Yes
Heartwood	Yes	Yes
Color Streaks	Slight	Yes
Color Variation	Yes	Yes
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Plain Sliced	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	Slight	Slight
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		

Reference WDMA I.S.1-A



Shown above are cut samples of this species. *Top Half*-unfinished   *Bottom Half*-#100 Clear



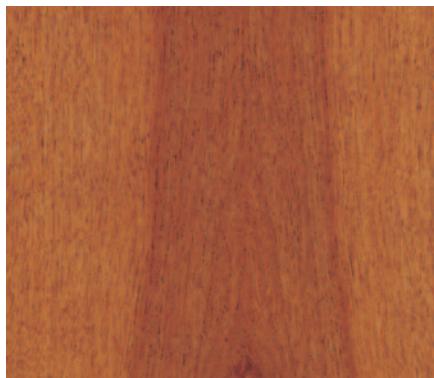
#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Plain Sliced Natural Birch**  
  
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



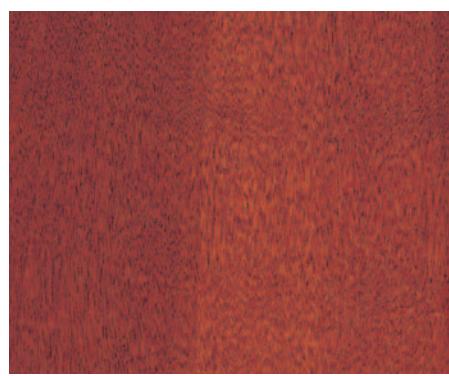
#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# White Birch

## PLAIN SLICED SELECT

The important species of birch are yellow birch, sweet birch and paper birch. They grow principally in the Northeastern and Lake States. Yellow and sweet birch also grow along the Appalachian Mountains to northern Georgia. They are the source of most birch lumber and veneer.

Yellow birch has white sapwood and light reddish-brown heartwood. Sweet birch has light-colored sapwood and dark brown heartwood tinged with red. The wood is fine and consistent in texture.

Birch veneer is classified by coloration into three basic groups: natural, select white and select dark. Natural birch contains unlimited amounts of heartwood and sapwood. Select white birch contains only light-colored sapwood. Select dark birch contains only red or brown heartwood.

Yellow and sweet birch lumber and veneer are used principally in the manufacture of furniture, baskets, cooperage, interior finish and doors. Birch veneer is processed into plywood used for flush doors, paneling, cabinetry and other specialty products.



### PLAIN SLICED SELECT WHITE BIRCH

Plain sliced select white birch veneer bears fine wood texture combined with lineal grain features. The grain pattern is muted by the sole use of sapwood exhibiting a consistent fresh coloration throughout the door face. The grain pattern may be masked or amplified by the color of stain chosen to finish the door face veneer.

Cut	Plain Sliced	Plain Sliced
Grade Description	AA	A
Color and Match	White	White
Sapwood	Yes	Yes
Heartwood	No	No
Color Streaks	Slight	Yes
Color Variation	Slight	Yes
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Plain Sliced	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	Slight	Slight
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		

Reference WDMA I.S.1-A



Shown above are cut samples of this specie. **Top Half**-unfinished   **Bottom Half**-#100 Clear



#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
*applied to*  
**Plain Sliced Select White Birch**  
  
*Actual colors and door face  
veneers may vary from those in  
this brochure. Wood is a natural  
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uncontrolled by man. There are  
also color variations which may  
have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# White Maple

## PLAIN SLICED SELECT

Commercial species of maple in the United States include sugar maple, black maple, silver maple, red maple, boxelder and bigleaf maple. These species are also known by many other names. Maple lumber and veneer originate from the Middle Atlantic and Lake States accounting for nearly two-thirds of the production.

The wood of sugar maple and black maple is known as hard maple; that of silver maple, red maple and boxelder as soft maple. The sapwood of maples is commonly white with a slight reddish brown tinge. Heartwood is usually light reddish brown, but sometimes is considerably darker.

Hard maples have a fine, uniform grain texture and are generally straight grained. Sugar maple may also occur as "birdseye", "curly" and "fiddleback" grain. Soft maple is not as heavy as hard maple, but has been substituted for hard maple in the better grades for furniture.

Maple is used primarily for lumber, veneer and pulpwood. The lumber and veneer are then remanufactured to produce flooring, furniture, woodenware and flush doors.



### PLAIN SLICED SELECT WHITE MAPLE

Plain sliced select white maple veneer has characteristics very similar to select white birch. The wood texture is smooth and fine with a linear grain pattern. The tranquil grain pattern is complemented by the even coloration displayed by utilizing only sapwood veneer. The grain pattern and coloration may be amplified or masked by the color of stain chosen to finish the door face.

Cut	Plain Sliced	Plain Sliced
Grade Description	AA	A
Color and Match	White	White
Sapwood	Yes	Yes
Heartwood	No	No
Color Streaks	Slight	Yes
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Plain Sliced	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	Slight	Slight
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32"x3"	(2) 1/16"x6"
Blended Repairs	Very Small	Small
Special Characteristics		

Reference WDMA I.S.1-A



Shown above are cut samples of this specie. *Top Half*-unfinished   *Bottom Half*-#100 Clear



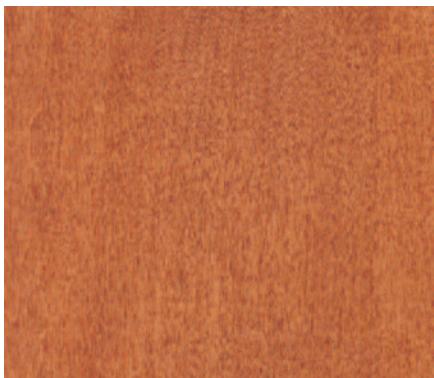
#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Plain Sliced Select White Maple**  
  
*Actual colors and door face  
veneers may vary from those in  
this brochure. Wood is a natural  
material. Its growth patterns are  
uncontrolled by man. There are  
also color variations which may  
have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Red Oak

## ROTARY

Most red oak comes from the Southern States, southern mountain regions, Atlantic Coastal Plains and the Central States. The primary species are: northern red oak, black oak and southern red oak. They are the source for most red oak lumber and veneer.

The sapwood is nearly white and usually only one to two inches thick immediately under the bark. The heartwood is brown with a tinge of red and is used for the production of red oak lumber and veneer.

The wood of red oak is heavy with a distinctive open grain texture. Rapidly grown second growth oak is generally harder than finer textured old-growth timber. The red oaks can reveal many pronounced grain designs depending on the sawing or veneer cutting method specified.

Red oak is largely cut into lumber, veneer and fuel wood. Lumber is then processed into flooring, furniture and general millwork. Veneer is remanufactured into plywood for use in furniture, flush doors and paneling.



### ROTARY RED OAK

Rotary cut red oak exhibits a coarse open grain texture and irregular grain pattern that cascades across the surface of the door. The irregular grain shapes are characterized by broad bands of less dense early season growth and more highly dense late season growth wood structures. The open grain texture lends itself easily to staining while providing an unfilled texture for topcoats.

Cut	Rotary	Rotary
Grade Description	AA	A
Color and Match		
Sapwood	No	5%
Heartwood	Yes	Yes
Color Streaks	Yes	Yes
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Rotary	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 4 sq. ft.	3 per 8 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 3 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	No	No
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32"x3"	(2) 1/16"x6"
Blended Repairs	Very Small	Small
Special Characteristics		

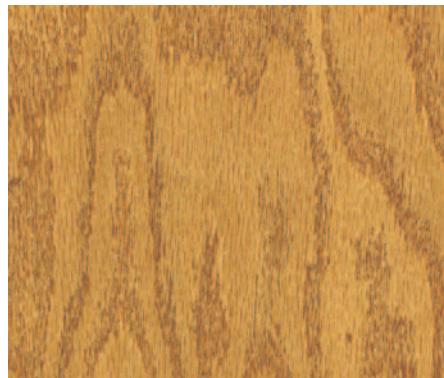
Reference WDMA I.S.1-A



Shown above are cut samples of this specie. *Top Half*-unfinished   *Bottom Half*-#100 Clear



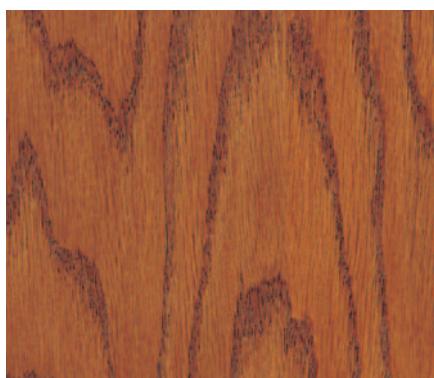
#200 Spiced Walnut



#300 Medium Brown



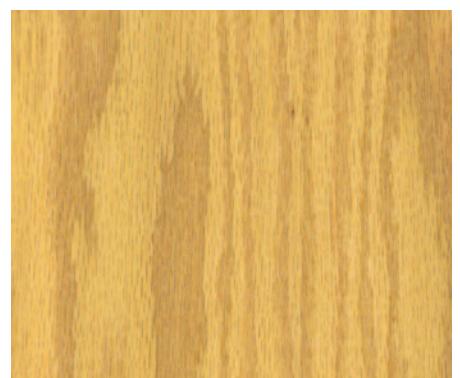
#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Rotary Red Oak**

*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Red Oak

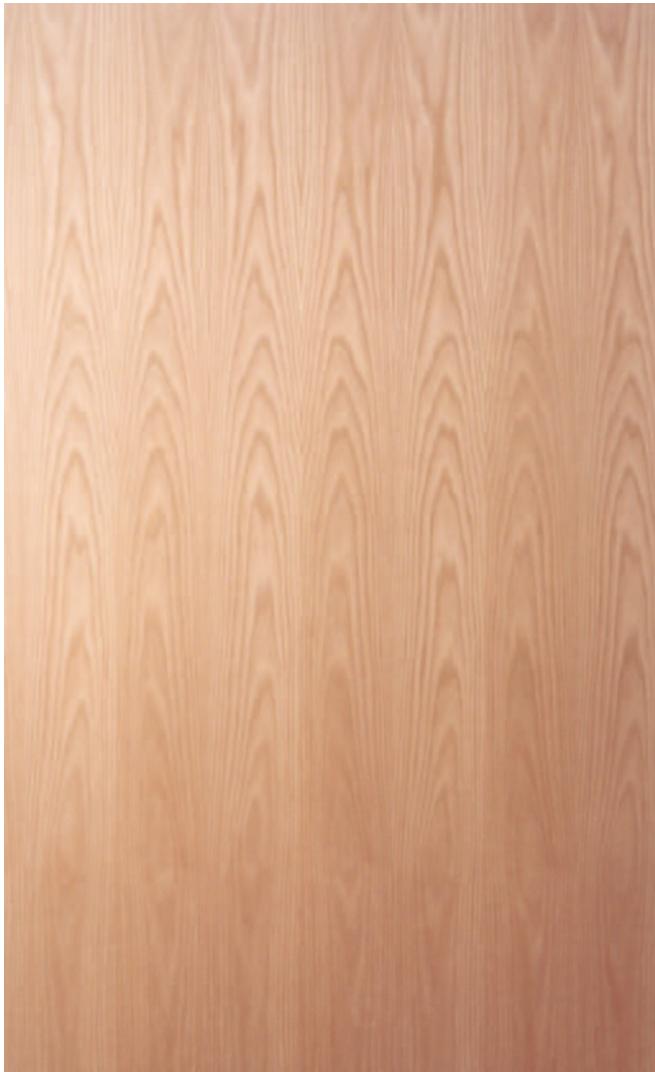
## PLAIN SLICED

Most red oak comes from the Southern States, southern mountain regions, Atlantic Coastal Plains and the Central States. The primary species are: northern red oak, black oak and southern red oak. They are the source for most red oak lumber and veneer.

The sapwood is nearly white and usually only one to two inches thick immediately under the bark. The heartwood is brown with a tinge of red and is used for the production of red oak lumber and veneer.

The wood of red oak is heavy with a distinctive open grain texture. Rapidly grown second growth oak is generally harder than finer textured old-growth timber. The red oaks can reveal many pronounced grain designs depending on the sawing or veneer cutting method specified.

Red oak is largely cut into lumber, veneer and fuel wood. Lumber is then processed into flooring, furniture and general millwork. Veneer is remanufactured into plywood for use in furniture, flush doors and paneling.



### PLAIN SLICED RED OAK

Plain sliced red oak displays a coarse open grain texture and expresses a very strong "cathedral" grain effect. This is a regular pattern with peaked bands of less dense early season growth and more highly dense late season growth wood structures. The open grain texture is very receptive to stains and topcoats.

Cut	Plain Sliced	Plain Sliced
Grade Description	AA	A
Color and Match		
Sapwood	No	No
Heartwood	Yes	Yes
Color Streaks	Yes	Yes
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Plain Sliced	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 4 sq. ft.	3 per 8 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 3 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	No	No
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32"x3"	(2) 1/16"x6"
Blended Repairs	Very Small	Small
Special Characteristics		
Ray Fleck (Flake)	Slight	Slight

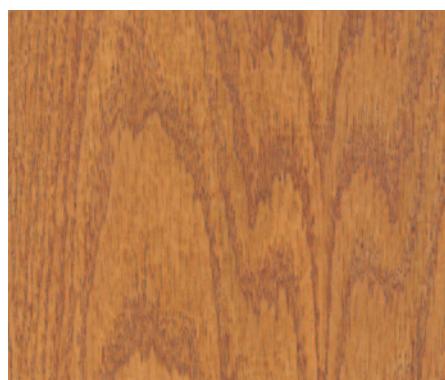
Reference WDMA I.S.1-A



Shown above are cut samples of this specie. *Top Half*-unfinished   *Bottom Half*-#100 Clear



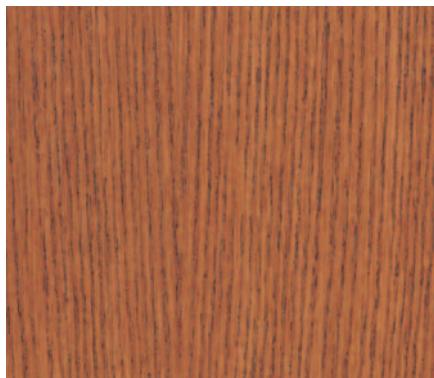
#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Plain Sliced Red Oak**  
  
*Actual colors and door face  
veneers may vary from those in  
this brochure. Wood is a natural  
material. Its growth patterns are  
uncontrolled by man. There are  
also color variations which may  
have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Red Oak

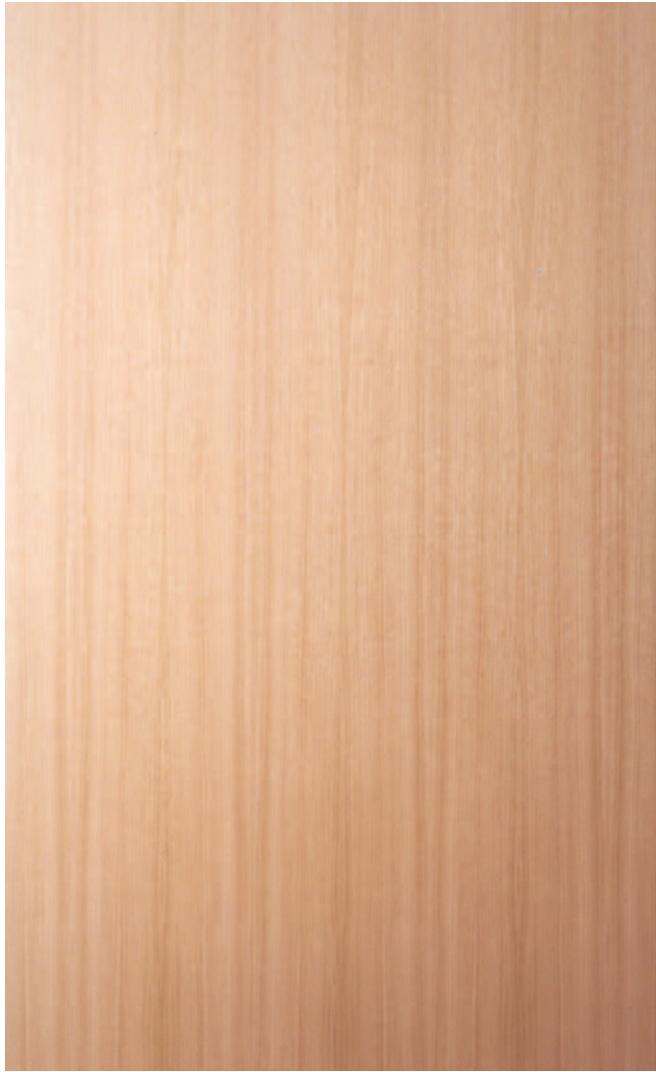
## RIFT

Most red oak comes from the Southern States, southern mountain regions, Atlantic Coastal Plains and the Central States. The primary species are: northern red oak, black oak and southern red oak. They are the source for most red oak lumber and veneer.

The sapwood is nearly white and usually only one to two inches thick immediately under the bark. The heartwood is brown with a tinge of red and is used for the production of red oak lumber and veneer.

The wood of red oak is heavy with a distinctive open grain texture. Rapidly grown second growth oak is generally harder than finer textured old-growth timber. The red oaks can reveal many pronounced grain designs depending on the sawing or veneer cutting method specified.

Red oak is largely cut into lumber, veneer and fuel wood. Lumber is then processed into flooring, furniture and general millwork. Veneer is remanufactured into plywood for use in furniture, flush doors and paneling.



### RIFT RED OAK

Rift cut red oak produces a very straight grain pattern in this open grained wood. The nearly linear grain pattern deviates very little from top to bottom of the door. This extremely straight pattern equalizes the exposure of the less dense early growth and the more dense late growth wood structures. The open grain texture readily accepts stain and the grain pattern provides a smooth surface for topcoats.

Cut	Rift	Rift
Grade Description	AA	A
Color and Match		
Sapwood	No	5%
Heartwood	Yes	Yes
Color Streaks	Yes	Yes
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Rift	3" (76mm)	3" (76mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 4 sq. ft.	3 per 8 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 3 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	No	No
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32"x3"	(2) 1/16"x6"
Blended Repairs	Very Small	Small
Special Characteristics		
Rift	Rift permits 1" (25mm) in 12" (305mm) maximum grain slope, 2-1/2" (64mm) in 12" (305mm) maximum grain sweep, not to exceed 3/8" (9.5mm) in width.	

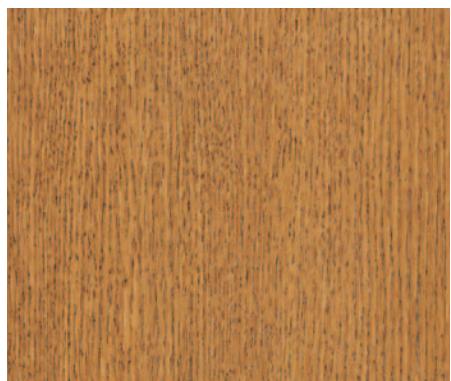
Reference WDMA I.S.1-A



Shown above are cut samples of this specie. *Top Half*-unfinished   *Bottom Half*-#100 Clear



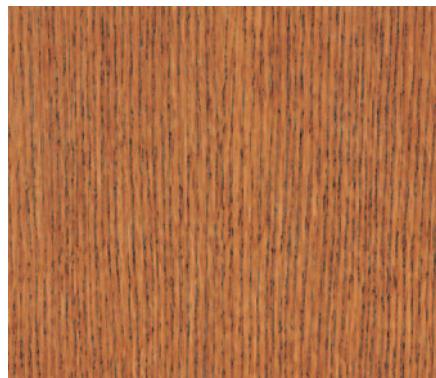
#200 Spiced Walnut



#300 Medium Brown



#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Rift Red Oak**  
  
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



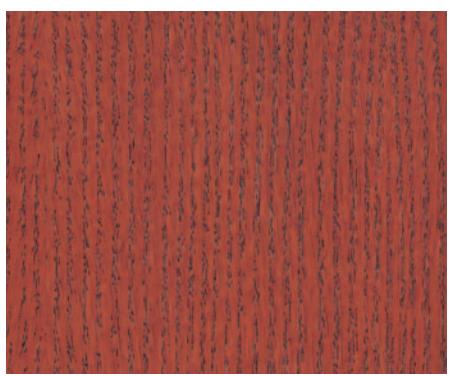
#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# White Oak

## PLAIN SLICED

White oak timber comes chiefly from the South, South Atlantic and Central States, including the southern Appalachian area. Principle species are white oak, chestnut oak, bur oak and live oak.

The heartwood of the white oaks is generally grayish brown and the sapwood is nearly white. The sapwood is only one to two inches thick directly beneath the bark. The heartwood is used to produce white oak lumber and veneer.

The wood of white oak is heavy, averaging slightly higher weights than red oak. The white oaks can reveal many pronounced grain designs depending on the sawing or veneer cutting method specified.

White oaks are used for furniture lumber, veneer and fuel wood. High-quality white oak is especially sought after for tight cooperage. The lumber and veneer is then further processed to produce flooring, furniture, interior millwork and flush doors.

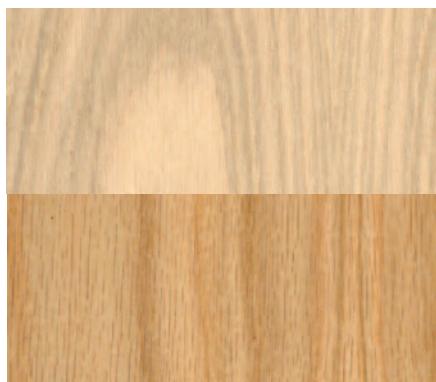


### PLAIN SLICED WHITE OAK

Plain slicing white oak veneer results in a coarse open grain texture and expresses a very strong "cathedral" grain effect. This highly figured character reveals broad bands of less dense early season growth and more dense late season growth wood structures. The open grain texture is very receptive to stains and topcoats.

Cut	Plain Sliced	Plain Sliced
Grade Description	AA	A
Color and Match		
Sapwood	No	Yes
Heartwood	Yes	Yes
Color Streaks	Yes	Yes
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Plain Sliced	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 4 sq. ft.	3 per 8 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 3 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	No	No
Vine Marks	No	Slight
Cross Bars	Slight	Slight
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		
Ray Fleck (Flake)	Slight	Slight

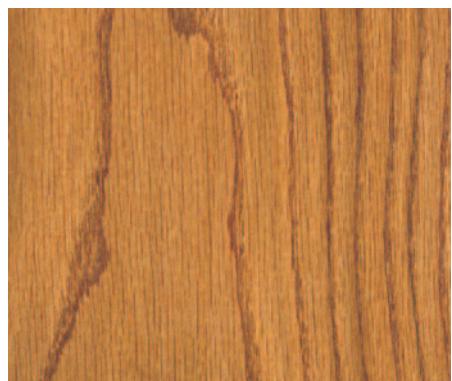
Reference WDMA I.S.1-A



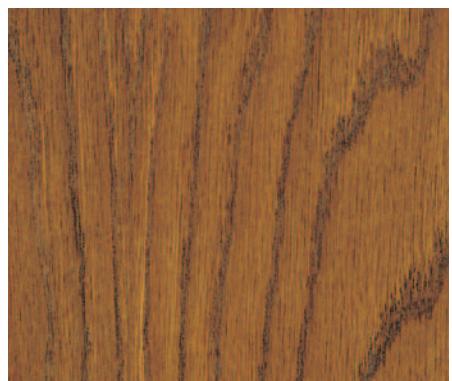
Shown above are cut samples of this species. *Top Half*-unfinished   *Bottom Half*-#100 Clear



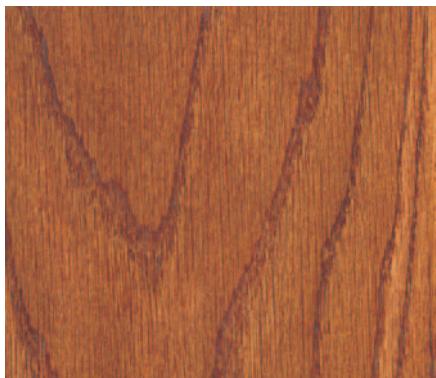
#200 Spiced Walnut



#300 Medium Brown

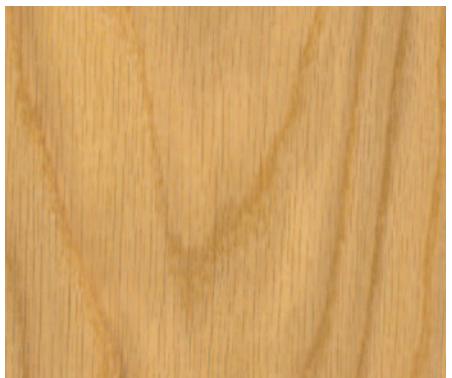


#400 Dark Walnut



#500 Medium Red

**GRAHAM Standard colors**  
applied to  
**Plain Sliced White Oak**  
  
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Mahogany

## FLAT CUT

African mahogany or American mahogany is true mahogany. It ranges from southern Mexico through Central America into South America as far south as Bolivia. Plantations have been established within its range and elsewhere throughout the tropics.

The heartwood varies from pale pink or salmon color to dark reddish brown. Mahogany produces a straight grain and fine open texture. The density of the wood is very uniform due to the nearly continuous growing seasons of its range. The wood is easy to work and slices or rotary cuts into fine veneer without difficulty.

Mahogany is used for fine furniture and cabinet making, interior trim, fancy veneers, musical instruments, paneling and flush doors.



### FLAT CUT MAHOGANY

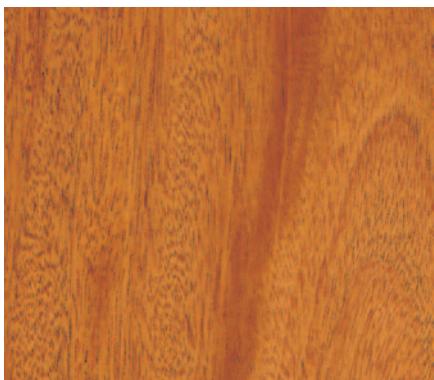
Plain slicing of Mahogany results in a smooth texture and subtle "Cathedral" grain effect that is also called "flat cut". The open grain of mahogany is very receptive to stains and topcoats.

Cut	Flat Cut	Flat Cut
Grade Description	AA	A
Color and Match		
Sapwood	No	No
Heartwood	Yes	Yes
Color Streaks	Slight	Slight
Color Variation	Slight	Slight
Sharp Joint Contrast	No	No
Matching		
Book	Yes	Yes
Slip	Specify	Specify
Veneer Piece Width		
Flat Cut	5" (127mm)	4" (102mm)
Natural Characteristics		
Burls/Pin Knots #	1 per 5 sq. ft.	1 per 3 sq. ft.
Burl Size	1/4" (6.4mm)	3/8" (9.5mm)
Pin Knots #	No	1 per 8 sq. ft.
Size	No	1/8" (3.2mm)
Total	No	1/4" (6.4mm)
Repaired Knots	No	No
Mineral Streaks	No	Slight
Bark Pockets	No	No
Worm Tracks	No	No
Vine Marks	No	Slight
Cross Bars	Occasional	Occasional
Manufacturing Characteristics		
Rough Cut	No	No
Hairline Splits	(2) 1/32" x 3"	(2) 1/16" x 6"
Blended Repairs	Very Small	Small
Special Characteristics		

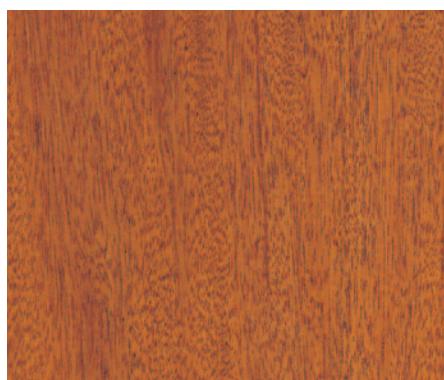
Reference WDMA I.S.1-A



Shown above are cut samples of this specie. *Top Half*-unfinished   *Bottom Half*-#100 Clear



#200 Spiced Walnut



#300 Medium Brown

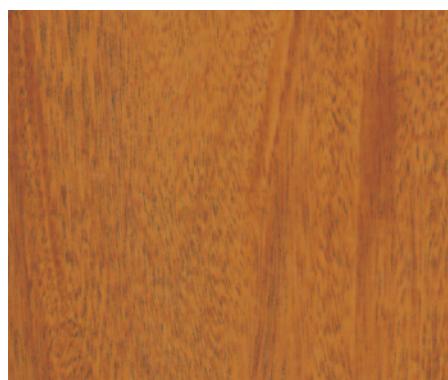


#400 Dark Walnut



#500 Medium Red

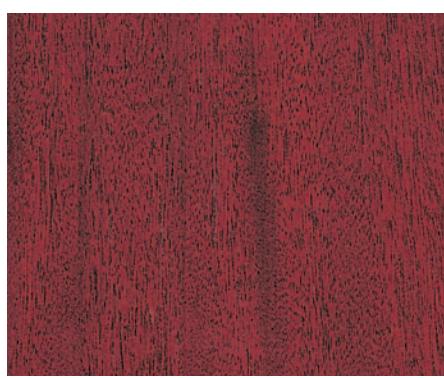
**GRAHAM Standard colors**  
applied to  
**Flat Cut Mahogany**  
  
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



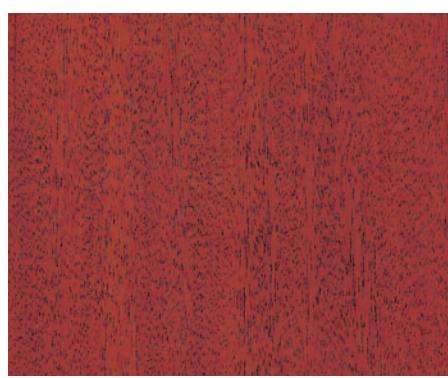
#600 Wheat



#700 Dark Brown



#800 Dark Red



#901 Burgundy

# Special Veneers

Through the ages the unique characteristics and comparative abundance of wood have made it a natural material for structural framing, furniture, tools and architectural woodwork. Today, for the same reasons, wood is prized for many uses. Among them is lumber and veneers for interior architectural wood doors.

Historically some woods have filled many purposes, while others that were not as readily available served only one or two needs. The tough, durable oaks are highly prized for interior finish, paneling and floors. Black cherry and walnut, valued for their rich decorative appearance, are primarily used for cabinetry and furniture.

The gradual utilization of virgin forests in the United States has reduced the available supply of large clear logs for lumber and veneer. Second growth timber, the balance of the old-growth forests and imported timber continue to fill the needs for quality wood. The factors that keep wood in the forefront of raw materials are many. The chief attribute is its availability in varied species, sizes and shapes. Wood is an aesthetically appealing material by its nature, stimulating the senses of sight, touch and smell. The visual appeal of wood may also be easily enhanced using stains and finishes due to the various grain patterns and colors.

In the United States there are more than one hundred wood groups commercially available to the design community and those wood groups may each be represented by several species. Every species having its own distinct characteristics. Over sixty of those woods are of major commercial importance. Another thirty are commonly imported in the form of logs or veneer.

The appearance of wood is influenced by a number of factors uncontrolled by man. Temperate zones affect growing seasons and influence the porosity of the wood. The presence of buds and small limbs pruned by nature are responsible for pin knots. Minerals and soil factors result in coloration difference. There are many natural processes responsible for the pure characteristics present in wood. The individuality of trees makes it impossible for any species or any tree to be completely free of those natural characteristics. That same individuality is responsible for the beauty and textures that are displayed by the examples on these pages.

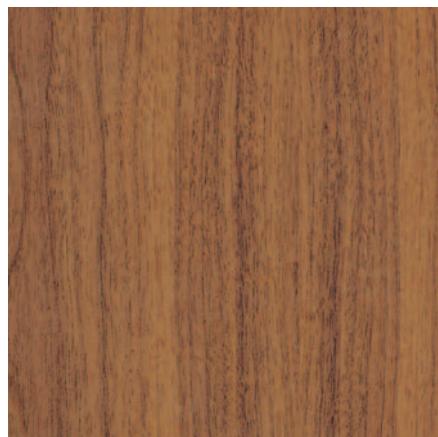
GRAHAM provides access to hundreds of commercially available species for use as architectural grade door faces. Coupled with the advanced technology, beauty and durability of GRAHAM factory finishes, we are ready to meet the performance and aesthetic needs of the commercial design community.



*Quarter Sliced Red Oak.* Characteristic of quarter sliced oak veneer, this red oak door face exhibits straight grain and ray flecking. Quarter sliced veneers permit unlimited ray flecking (flake) which may also occur in slight amounts with plain sliced or rift cut veneer.

## GRAHAM Standard Clear Topcoat for Special Veneers

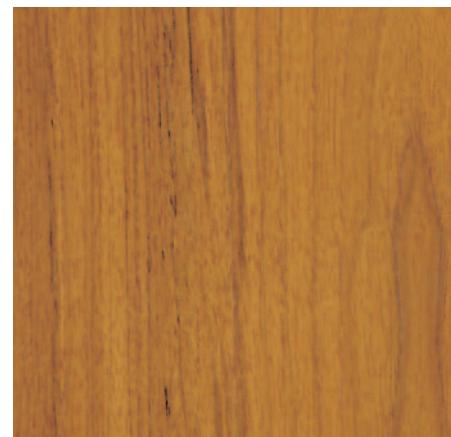
*Actual colors and door face veneers may vary from those in this brochure. Wood is a natural material. Its growth patterns are uncontrolled by man. There are also color variations which may have occurred during printing.*



Plain Sliced Black Walnut



Plain Sliced Figured Anigre



Plain Sliced Teak



Birds Eye Maple



Flat Cut Sapele



Plain Sliced Hickory



Vertical Grain Fir



Plain Sliced Ash



Plain Sliced Cherry

# Topcoat Performance

GRAHAM Factory Prefinish services include custom color matching of semi-transparent stains as well as providing a selection of popular standard colors. Submittal samples are provided representing a range of tone and color which may be present in the finished product. Approvals are for the complete set and are an acceptance of the range presented.

The semi-transparent stains used on door faces and stiles are **Pigmented Modified Acrylics**. These stains are used to formulate standard colors as well as custom colors.

The water-clear topcoat used on door faces and stiles is a 100% solids **Modified Acrylic Urethane** with low level V.O.C.'s. Application consists of flat line roll coating three separate coats of material. Each coat is cured immediately after application by exposure to ultra-violet light.

Test results show the GRAHAM topcoat system is equal in performance to the highest rated Premium grade materials.

## Color match and Uniformity

The natural coloration and grain characteristics of wood do change with only the application of "clear topcoats". This indicates that the term "color match" may be misunderstood. The color and grain of wood when exposed to a variety of stain bases, topcoat compounds and project lighting conditions combine to make exact color matching nearly impossible. GRAHAM provides a set of samples, for standard stains or custom color stains, which represent the "blend" or range of color and grain that may be expected throughout a project. A complete one stain color set should be studied when approving the factory finish. Single samples will not provide a true range of veneer color grain that may be expected to arrive at the project.

**Approvals are for the complete set and are an acceptance of the range presented.**

TEST RESULTS — PREMIUM GRADE TOPCOATS			
TEST	TR-4	TR-6	GRAHAM
Wear/Moisture Resistance	5	5	5
Print Resistance ASTM 2091	5	5	5
Abrasion Resistance ASTM 4060	4	5	5
Adhesion ASTM D3359	5	5	5
Cold Check Resist ASTM D1211	5	5	5
Impact Resistance	5	5	5
Chemical Resist ASTM D1308			
2% Caustic	5	5	5
10% Sodium Hydroxide	4	5	5
10% Tri-Sodium Phosphate	4	5	5
Glacial Acetic Acid	4	5	5
50% Sulphuric Acid	4	5	5
28% Ammonium Hydroxide	4	5	5
95% Ethyl Alcohol	4	5	5
Cooking Oil 1	5	5	
Hot Coffee	5	5	5
Orange Juice	5	5	5
Tomato Juice	5	5	5
Mustard	5	5	5
Nail Polish & Remover	4	5	5
Chemical Resist ASTM D2248			
Soap Detergent	5	5	5

5 = EXCELLENT

3 = GOOD

1 = POOR

4 = VERY GOOD

2 = FAIR

# Field Finish Guidelines

If circumstances indicate that interior flush wood doors are to be field finished away from the controlled environment of the factory, there are recommended practices that should be followed. Many manufacturers of architectural flush wood doors will not warrant the appearance or performance of doors that have not been properly sealed or field finished. For more detailed information consult the WDMA I.S. 1-A Quality Standard for Architectural Flush Wood Doors.

## A. Storage and Handling

- Store doors flat on a level surface in a dry well-ventilated building. Any covering should protect the doors from dirt, water and abuse while allowing for air circulation under and around the stack.
- Cherry, mahogany, walnut, teak and certain other species of wood will discolor if exposed to sunlight or some artificial light sources. Protect doors specified in those species by also specifying that they be covered with opaque wrap.
- Oak and some other species contain acids that react with ferrous metals producing a dark blue-black stain. Avoid the use of steel wool on the raw wood.
- Do not subject interior doors to extremes of temperature and/or humidity. Prolonged exposure may cause damage. Recommended conditions for proper storage are 30% to 50% relative humidity and 50 degrees F to 90 degrees F.
- Do not install doors in buildings with excessively dry or moist environments. HVAC systems should be operating and balanced.
- Doors should be handled with clean hands or while wearing clean gloves.
- When moving doors do not drag one across the surface of the next door. Lift and carry the door to its new location.

## B. Finishing

- Wood absorbs and releases moisture readily in its surrounding environment. As a result it may change shape or warp. To assure dimensional stability seal and topcoat finish all surfaces equally.
- Wood doors should not be stained or topcoat finished before the wood surface is properly prepared. Before finishing lay the door flat and block sand all surfaces to remove all handling marks, drag marks, raised grain, scuffs, burnishes and other unwanted blemishes. Sand the surface of the door using 100 grit to 150 grit sandpaper. Always sand in the same direction as the grain to avoid cross grain scratches.
- A solution of 80% solvent and 20% sanding sealer should be applied to the complete door surface prior to staining. Allow the solution to dry which uniformly raises the wood grain and completely face sand the surface of the door. This promotes a uniform appearance and avoids blotchiness.
- Wood door finishes must be properly maintained to prevent deterioration and promote the life of the door.

# Glossary

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## **BARBER POLE**

An effect in book matching of veneers resulting from tight and loose sides of veneers having different light reflections when finished.

## **BARK POCKET**

Comparatively small area of bark around which normal wood has grown.

## **BIRD PECK**

A mark or wound in a tree or piece of wood caused by birds pecking on the growing tree in search of insects. Also, wood containing such marks.

## **BRASHNESS**

Condition of wood characterized by a low resistance to shock and by abrupt failure across the grain without splintering.

## **BURL**

A swirl, twist or distortion in the grain of the wood which usually occurs near a knot or crotch. A burl can often be associated with abrupt color variation and/or a cluster of adventitious buds.

## **BURL, BENDING**

A swirl, twist or distortion in the grain of the wood which usually occurs near a knot or crotch but does not contain a knot and does not contain abrupt color variation. A bending burl is detectable at 1.8 m to 2.4 m (6 ft to 8 ft) as a swirl or rounded.

## **CHATTER**

Lines appearing across the face at right angles to the grain giving the appearance of one or more corrugations resulting from bad setting of sanding equipment.

## **CLUSTERED**

When a defect described in the grading rule is sufficient in number and sufficiently close together to appear to be concentrated in one area.

## **CROSS BAR**

Irregularity of grain resembling a dip in the grain running at right angles, or nearly so, to the length of the veneer.

## **CROSS BREAK**

Separation (break) of the wood cells across the grain. Such breaks may be due to internal strains resulting from unequal longitudinal shrinkage, or to external forces.

## **DEAD KNOTS (OPEN KNOTS)**

Openings where a portion of the wood substance of the knot has dropped out or where cross checks have occurred to present an opening.

## **DISCOLORATIONS**

Stains in wood substances. Some common veneer stains are sap stains, blue stains, stain produced by chemical action caused by the iron in the cutting knife coming into contact with the tannic acid in the wood, and those resulting from the chemical action of the glue.

## **FACE VENEER**

The outermost exposed wood veneer surface of a veneered wood door.

## **FLAKE OR FLECK, RAY**

Portion of a ray as it appears on the quartered surface. Fleck can be a dominant appearance feature in oak and is sometimes referred to as flake.

## **GRAIN**

The direction, size, arrangement and appearance of the fibers in wood or veneer.

## **GRAIN SLOPE**

Expression of the angle of the grain to the long edges of the veneer component.

## **GRAIN SWEEP**

Expression of the angle of the grain to the long edges of the veneer component over the area extending 1/8 of the length of the piece from ends.

## **GUM POCKETS**

Well-defined openings between rings of annual growth, containing gum or evidence of prior gum accumulations.

## **GUM SPOTS & STREAKS**

Gum or resinous material of color spots caused by prior resin accumulations sometimes found on panel surfaces.

## **HEARTWOOD**

The nonactive center of a tree generally distinguishable from the outer portion (sapwood) by its darker color.

## **HOLLES, WORM**

Holes resulting from infestation by worms greater than 1/16 inch in diameter and not exceeding 5/8 inch in length.

## **INCONSPICUOUS**

Barely detectable with the naked eye at a distance of 6 feet to 8 feet.

## **JOINT**

The line of juncture between the edges or ends of two adjacent sheets of veneer.

## **JOINT, OPEN**

Joint in which two adjacent pieces of veneer do not fit tightly together.

## **KNIFE MARKS**

Very fine lines that appear across the panel that can look as though they are raised resulting from some defect in the lathe knife that cannot be removed with sanding.

## **KNOT**

Cross section of tree branch or limb with grain usually running at right angles to that of the piece of wood in which it occurs.

## **KNOTS, BLENDING PIN**

Sound knots 1/4 inch or less in diameter that do not contain dark centers. Blending pin knots are detectable at a distance of 6 feet to 8 feet and do not seriously detract from the overall appearance of the panel.

## **KNOT HOLES**

Voids produced by dropping of knots from the wood in which they were originally embedded.

## **KNOTS, OPEN**

Openings where a portion of the wood substance of the knot was dropped out, or where cross checks have occurred to present an opening.

## **KNOTS, PIN**

Sound knots 1/4 inch or less in diameter containing dark centers.

## **KNOTS, SOUND, TIGHT**

Knots that are solid across their face and fixed by growth to retain their place.

# Glossary

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## LAP

A condition where the pieces of veneer are so misplaced that one piece overlaps the other and does not make a smooth joint.

## MINERAL STAIN

Olive and greenish-black streaks believed to designate areas of abnormal concentration of mineral matter; common in hard maple, hickory, and basswood: also called "Mineral Streak".

## MINERAL STREAKS

See "Mineral Stain"

## OCCASIONAL

A small number of characteristics that are arranged somewhat diversely within the face.

## PATCHES

Matching wood pieces carefully inserted and glued into the door face after defective portions have been removed.

## PLAIN SLICED

Veneer sliced parallel to the pith of the log and approximately tangent to the growth rings to achieve flat cut veneer. Plain sliced veneer can be cut using either a horizontal or vertical slicing machine or by the half-round method using a rotary lathe.

## QUARTERED

Veneer produced by cutting in a radial direction to the pith to achieve a straight (vertical) grain pattern. In some species, principally red oak and white oak, ray fleck is produced, the amount of which may be unlimited.

## RAY

Ribbon-shaped strand of tissue extending in a radial direction across the grain, so oriented that the face of the ribbon is exposed as a fleck on the quarter surface. Also known as "Wood Ray".

## REPAIRS

A patch, shim, or filler material inserted and/or glued into veneer or a panel to achieve a sound surface.

## REPAIRS, BLENDING

Wood or filler insertions similar in color to adjacent wood so as to blend well.

## RIFT

A parallel grain pattern resulting from sawing a quartered log at right angles to the radius of the log.

## RIFT CUT

Veneer produced by cutting at a slight angle to the radial to produce a quartered appearance without excessive ray fleck.

## ROTARY CUT

Veneer produced by centering the entire log in a lathe and turning it against a broad cutting knife.

## ROUGH CUT

Irregular shaped areas of generally uneven corrugation on the surface of veneer.

## SAPWOOD

The living wood of lighter color occurring in the outer portion of a tree.

## SHAKE

A separation along the grain of wood in which the greater part occurs between the rings of annual growth.

## SHARP CONTRAST

This term means the veneer of lighter than average color should not be joined at the edges with veneer of darker than average color, and that two adjacent pieces of veneer should not be widely dissimilar in grain, figure and natural character markings.

## SKIN

The hardwood plywood (usually 3-ply), hardboard or composition panel, whether flat or configured, which are used for facings for flush wood doors.

## SLIGHT

Visible on observation, but does not interfere with the overall aesthetic appearance.

## SPLITS, HAIRLINE

A perceptible separation or absence of wood fiber running parallel with the grain.

## STILES/VERTICAL EDGES

The upright or vertical pieces of the core assembly of a wood flush door.

## VINE STREAKS (MARK)

Scars in the wood generally caused by the stems of clinging vines or by their hair-like roots which cling to the tree trunk. Live vine streaks produce sound scars. Dead vine streaks contain either dead residue of the vine, or the remaining pocket similar to bark pocket. Most vine streaks run across the grain, and therefore, all vine streaks are considered defects.

## WORM TRACK OR SCAR

The groove or resulting scar tissue in the wood caused by worms or other borers.