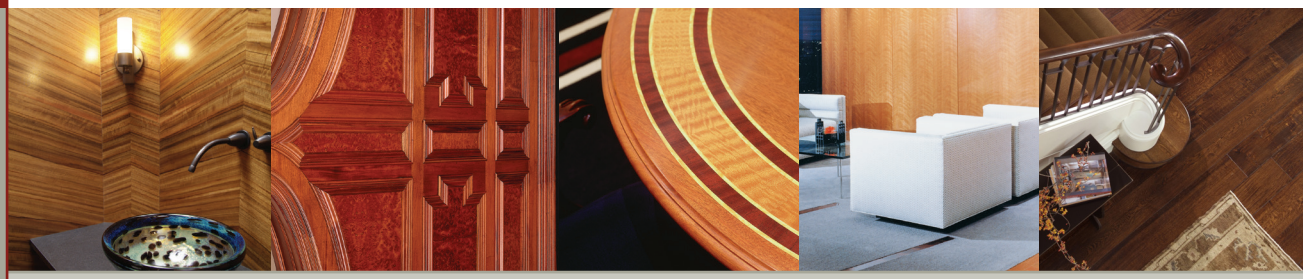
VENEER AND ARCHITECTURAL PANELS TECHNICAL REFERENCE GUIDE



Connecting People to the World's Most Renewable Natural Resource

Hardwoods of TENNESSEE

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Hardwoods of Tennessee is a member of the following trade associations:

Architectural Woodwork Institute, AWI
Hardwood Plywood & Veneer Association, HPVA
North American Building Material Distribution Association, NBMDA

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Welcome to Hardwoods of Tennessee

EXPERIENCE THE FASHION OF WOOD VENEERS

We invite you to explore our veneer catalogue and technical reference guide. We hope you find these resources valuable. The texture, color and grain patterns featured offer endless possibilities for architectural and artistic uses. We trust designers, builders, architects, and all those interested in the production and usage of veneer, will find this guide useful.

Of the more than 70,000 different woods known to man, only approximately 200 species are available commercially as veneers. However, endless possibilities exist when you consider grain, texture, flitch cut, and special characteristics unique to each species. Our catalogue highlights more than 75 natural veneers and reconstituted veneers. We invite you to check with your sales representative for samples.

Atlanta Hardwood Corporation, AHC Hardwood Group and Hardwoods of Tennessee and its affiliates have been leaders in the forest products industry in the Southeast for more than 70 years. Our technical and design consultants can help you select veneers from the finest woods that nature offers. In addition to veneer, we distribute hardwood lumber, plywood, moulding, and specialty flooring.

Aside from the practical uses of veneers, we hope you are captivated, as we are, by the natural, intrinsic beauty of wood veneers. The elements of style and fashion that wood veneer offers to every design opportunity fascinate us over and over again. As a renewable resource we believe *"wood is fashion"* and an environmentally responsible choice. The endless variety of colors, texture and grain delights us. We hope you agree and we look forward to working with you on your next project.

James W. Howard
Chief Executive Officer

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ARCHITECTURAL PANELS AND VENEER PRODUCT SUMMARY

We offer architectural-grade veneer and panels for the most demanding applications. Whether your project requires one panel, a large sequenced-matched set, or a blueprint-matched set, our technical staff can assist you. It is our goal to do whatever we can to help you achieve great results with our veneer products. Our architectural grade veneer and panel product includes:

- Ready-to-ship natural and reconstituted wood veneer sheets
- Ready-to-ship hardwood plywood on different cores and in different sizes
- Ready-to-ship architectural grade hardwood plywood sequenced matched and numbered
- Custom lay-up veneer and panels with short lead time
- Blueprint-matched veneers and panels with short lead time (custom lay-up)
- Sustainable hardwood panels. Many of these products can be manufactured to meet standards that qualify toward the U.S. Green Building Council's LEED™ green building program, as well as CARB certified hardwood plywood.

Natural and Reconstituted Wood Veneers

Hardwoods of Tennessee stocks a large inventory of natural wood veneer sheets. From the most exclusive "AA" grade, to "A" and "B" grade veneers from various domestic vendors. The most commonly requested natural veneer species are included in the charts on page six.

We offer the exclusive line of Brookside Veneers, LTD reconstituted wood veneers. Reconstituted veneers are defect-free, easy to work with and are unparalleled for consistency in grain and color. Crafted exclusively from fast-growing hardwood trees from managed forests in Africa, reconstituted veneers offer a unique opportunity to preserve the environment. Some reconstituted wood veneers are available pre-finished. Please call your sales rep for further information or to order samples. You can also visit Brookside Veneers, LTD., at www.veneers.com/composite.htm to view the entire line of reconstituted wood veneers.

Many of our natural wood veneers, and a growing number of reconstituted wood veneers are available as FSC-certified or as controlled woods.

Stock Sizes: 4' x 8', 4' x 11', 2' x 8', 2' x 11'

Stock Backers: 10 mil paper, wood back and phenolic back

Please turn to page 17 for more information on available backer options or call your local sales or spec rep for samples or quotes that satisfy your custom requirements.

Hardwood Plywood

Hardwoods of Tennessee stocks a wide selection of exotic and domestic hardwood plywood with a variety of cores. From “A” through “D” and shop grade plywood, our inventory is ideally suited to meet the needs of cabinet, furniture and fixture manufacturers. Some hardwood plywood panels are available pre-finished one or two sides. We stock FSC-Certified cores, including hardwood plywood panels. Check with your sales representative for availability!

Stock Sizes: 4' x 8', 4' x 10', 5’ x 5’

Stock Cores: MDF, NAUF MDF, CARB II MDF, FSC MDF, FSC NAUF MDF Veneer Core (VC), NAUF VC, CARB II VC, FSC VC, FSC NAUF VC Particle Board Core (PB), NAUF PB, CARB II PB, FSC PB, FSC NAUF PB

Please turn to page 15 for more information on available core options or call your sales or spec rep for samples or quotes that satisfy your custom requirements.

Architectural Grade Hardwood Plywood, Sequenced Matched and Numbered

We stock a selection of architectural grade hardwood panels all sequenced-matched and numbered, including; quartered figured anigre, cherry, African mahogany, maple and walnut.

Stock Sizes: 4' x 8', 4' x 10'

Stock Cores: MDF, Veneer Core (VC)

Not what you are looking for – call us for quotes on custom lay-up panels.

Custom Lay-Up and Blueprint Matched Panels

Hardwoods of Tennessee has partnered with a select number of custom architectural lay-up houses, all offering short lead times and the highest quality workmanship. Whether your project requires one panel or a large, sequenced blueprint-matched set from a select flitch, our technical and design team can assist you.

TAP OUR KNOWLEDGE!

We’re happy to share our knowledge. Our sales representatives and technical support staff are available and ready to assist you with your next customized veneer project. Please call 800 476-5393 or e-mail us at veneer-dist@hardwoodweb.com.

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SPECIFYING VENEER*(see footnote on page 30)

Why Is Specifying Veneer Faces and Veneer Panels Important?

Creative vision may inspire the evolution of extraordinary furnishings, fixtures and rooms, but knowledge is key to a successful interpretation of that vision. Understanding the attributes, characteristics, costs and availability of the product is an integral component of design. In every project there are design and cost components that need to be controlled to achieve the best results. An architect or a design professional can create a certain atmosphere and a unique design through careful veneer selection. Specifications provide the control criteria for quality and design. In order to bring to life what was conceived in the beginning and guarantee customer satisfaction, the design professional must then be able to communicate ideas and intent correctly.

Specifying veneer and veneer panels for use in furniture, architectural woodwork and cabinetry can be a challenge. It is recommended that samples be reviewed with finishes applied before finalizing your decision. Accurate technical specifications will assist in determining the best possible yield from the log, which determines pricing. Accurate specifications also help prevent budget over-runs and surprises.

The following technical information is provided to guide you in the challenging process of specifying veneer and veneer panels. Comprehensive veneer specifications must include the following five steps:

1. **Selection of Veneer Species and Face Grades**
2. **Selection of Veneer Cut**
3. **Selection of Veneer Matching**
4. **Selection of Panel Core (Substrate)**
5. **Selection of Veneer Backer**

It is recommended that the specification information be either on the drawings or in the written specifications, but not in both locations. Many problems can arise when specifications are not updated after the drawings have been revised. It is not unusual to find specifications calling for rift red oak, when the drawings indicate another species, such as walnut.

Sampling

Viewing samples is extremely important in making veneer selections. Samples allow you to explore differences in color and appearance of veneers. While type samples are an excellent starting point, larger samples should be requested for large or complex jobs. Architects and designers are encouraged to request sample panels in larger sizes with actual finishes applied to get an accurate reflection of how the finished job may appear using the specified veneer. It is highly recommended that flitch samples be requested before making the final decision when specifying for very large jobs. Toward the final stages of specifying complex jobs, live flitch samples should be viewed, and it is practical to consider inspecting veneer bundle by bundle.

If you should need assistance with samples, or in determining the specifications for your project, our trained staff is ready to assist you. For further assistance, or for veneer samples, please call us at 800 476-5393. You can also reach us at www.ahchardwood.com or write us at veneer-dist@hardwoodweb.com.

1. Selecting Veneer Species and Face Grades

Veneer specification is influenced by appearance and grade implications. Veneer selection is part of the design formula that creates the distinctive look that defines a formal English library, or alternatively, a Scandinavian hotel lobby.

Color very much determines the style and atmosphere of a space. When choosing a veneer, it is best to begin with color, i.e. -- light, medium, dark -- and review samples in this color range. Appearance evaluations and the associated grade classifications will differ somewhat from mill to mill and species to species. All are based generally on the standards set by the Hardwood, Plywood & Veneer Association (HPVA).

HPVA standards list “AA” as the highest grade of hardwood veneer. Most veneer mills have established an “architectural” grade to accommodate flitches that are virtually defect-free and have exceptional dimensions. Also, “select,” or uniform veneers, which are cut from the heartwood, are usually more expensive than their sapwood counterparts, since the heartwood represents the smallest portion of the tree.

Voluntary grading standards have been adopted within the hardwood veneer industry. The industry grades of face veneers as established by the HPVA and, in general, are accepted industry-wide by organizations such as AWI. The most uniform colors and grains are at the top of the scale for face grades and include:

Front Face Grade	
AA	Architectural grade. The best quality face grade for high-end uses, such as architectural paneling, doors and cabinets, case goods and quality furniture. Generally available by special order.
A	Where AA is not required, but excellent appearance is very important, as in cabinets and furniture. Select grade veneer for quality and color. A select veneer is composed of entirely heartwood or sapwood and is matched for both grain pattern and color. If spliced, leaves must be spliced and book-matched for a pleasing effect of color and grain. Minor infrequent burls, pin knots and inconspicuous small patches are allowed. Frequency of defects depends on species.
B	Where the natural characteristics and appearance of the species are desirable. B grade is composed entirely of heartwood or sapwood, but is matched for color only. Similar to A grade, but allows more numerous and larger burls, pin knots and color streaks.

Panel back grades are designated by numbers: 1, 2, 3 and 4. Requirements for grade 1 are most restrictive, with grades 2, 3, and 4 being progressively less restrictive. For wall panel application, the back grade is not as critical. It is necessary only to balance the panel, therefore a grade 4 back is sufficient. For two-sided panels, i.e. doors, the veneer will be visible, and in this case, an A1 grade is recommended.

Back Face Grade	
1	Allows color variation, no large sound knots, tight knots cannot exceed 3/8" in diameter. Core laps are not permitted. Worm holes and splits are required to be filled.
2	Color is not a consideration. Sound knots cannot exceed 3/4" in diameter. Repaired core laps and repaired knots permitted.
3	Knot holes of 1" in diameter are permitted.
4	Reject back grade not sound. Allows many open defects.

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2. Selecting Veneer Cuts

The manner in which a log is cut with relation to the annual growth rings will determine the appearance of the veneer. When sliced, the individual pieces of veneer, referred to as “leaves,” are kept in the order in which they are sliced, thus permitting a natural grain progression when assembled as veneer faces. The group of leaves from one slicing is called a “flitch” and is usually identified by a flitch number and the number of gross square feet of veneer it contains.

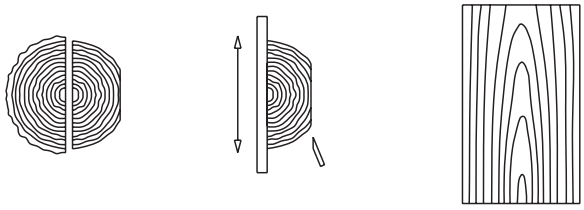
In veneer manufacturing, five principle methods of cutting (or slicing) are used:

- Plain Sliced (PS) / Flat Cut (FC)
- Half-Round Slicing
- Quarter Cut (QTR)
- Rift Cut
- Rotary Cut (RC)

Note that most architectural jobs specify flat-cut or quarter-cut veneers. Certain cuts and figures are only available in select veneers.

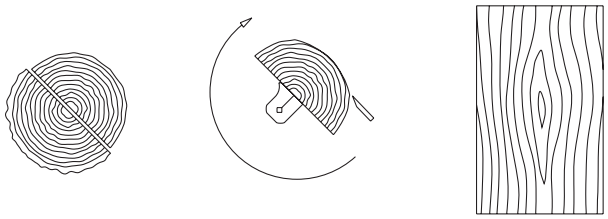
Plain Sliced (PS) / Flat Cut (FC):

This is the slicing method used most often 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 patterns from leaf to leaf. This cut of veneer is ideally suited for wall panels and furniture because of the grain consistency and the ability to match sequences of leaves in book and end matches.



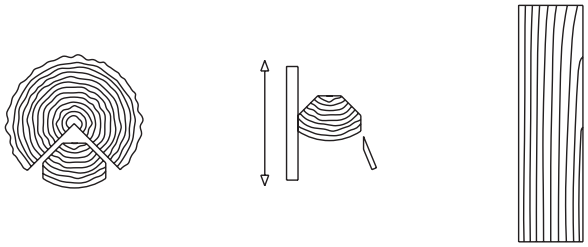
Half-Round Slicing:

Half-round cut refers to a combination of plain slicing and rotary slicing. Segments or flitches of a log are mounted off center on the lathe, resulting in a cut slightly across the annular growth rings. This produces figures characteristic of both plain sliced and rotary-sliced veneers. Half-round slicing is used primarily to accentuate the grain in various woods, such as in burls or Bird's Eye Maple, or to gain a wider width on a cathedral on small dimension logs.



Quarter Cut (QTR):

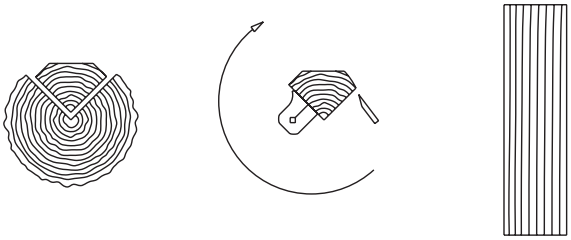
Quarter slicing simulates the quarter sawing process of solid lumber, roughly parallel to the radius line through the log segment. A series of stripes is produced, varying in density and thickness from species to species. Quartered veneer is narrower than plain-sliced veneer and typically contains a straighter grain. The cut requires the largest diameter logs, usually from tropical species. “Flake” is a characteristic of this slicing method in red and white oak. Quarter-cut veneer can be easily sequenced and matched.



Rift Cut:

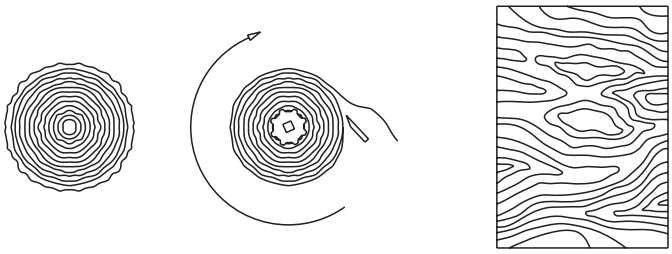
Rift veneers are produced most often in red and white oak, rarely in other species. The cutting is done slightly off the radius lines, minimizing the “flake” associated with quarter slicing. Rift slicing produces very straight grain. Note that rift-sawn solid lumber and rift veneers are produced so differently that a “match” between rift-cut veneers and rift-sawn lumber is highly unlikely.

Comb Grain: A variety of the rift cut, comb grain is limited in availability. It is a select product of the rift process distinguished by tight, straight grain along the entire length of the veneer. Slight angle in the grain is allowed. Comb grains are restricted to red and white oak veneers.



Rotary Cut (RC):

The log is center-mounted on a lathe and “peeled” along the general path of the growth rings like unwinding a roll of paper. This results in 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. Except to create a specific design effect, rotary-cut hardwood veneers are rarely used in fine architectural woodwork.



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Reconstituted Veneer Cuts

The different slicing methods mentioned before are not applicable when discussing reconstituted veneers. The wood to be used in reconstituted veneers is harvested from fast-growing trees. These veneers are sliced, dyed and then glued together in different molds to create the "grain" pattern. The way in which the reconstituted veneers are glued and re-sliced determines the grain and figures. The result gives the appearance of these slicing methods, i.e. quarter cut ash.

Since reconstituted veneers essentially create new and unique designs or figures, it is important to specify reconstituted veneers by both brand name and manufacturer's designation. For, example, Hardwoods of Tennessee offers a quarter-cut reconstituted ash veneer, which should be specified as BROOKLINE Quartered ASH 2-323/XV. Many reconstituted veneers are also available pre-finished.

3. Selecting Veneer Matching Techniques

There is a variety of veneer matching techniques used in constructing veneer faces. Each method produces a very specific pattern, visual effect and finished appearance, ranging from the casual to the formal. In some cases, a symmetrical pattern is created, in others the pattern is random and creates the illusion that boards have been used.

Not only can veneer be matched within a single panel, it can also be matched from one panel to another so that, when installed, a visual symmetry is created around the room. Installations such as these use "blueprint-" or "sequence-" matched architectural panels. Even within these styles there is a variety from which to choose.

Veneer matching is a fine craft that, with skill, vision and experience, truly can be a form of art. It allows people to express what they imagine. The possibilities of patterns that can be created is virtually endless.

Matching may be broken down into three categories, each containing several sub-categories.

A. Matching Between Adjacent Veneer Leaves.
Deciding between book-match, slip-match, random-match, pleasing, and end- (or butt-) match.

B. Matching Within Individual Panel Faces.
Deciding between running-match, balance-match, center balance-match, and special matches.

C. Matching Between Panels (Matching Architectural Panels).
Deciding if adjacent panels are to match, and if so, to what degree.

It should be understood that these are very different considerations. Confusion can sometimes result because of the use of the single word, "matching," to describe these three considerations.

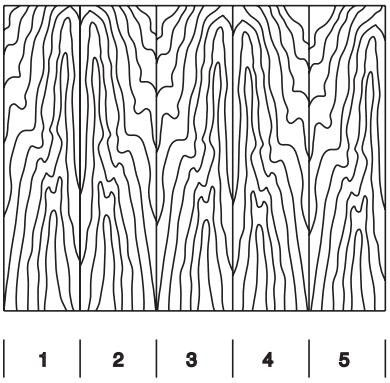
A. MATCHING BETWEEN ADJACENT LEAVES

It is possible to create interesting visual effects by the manner in which the leaves are arranged. As previously noted, rotary-cut veneers are difficult to match, therefore most matching is done with sliced veneers. The matching of adjacent veneer leaves must be specified. Special arrangements of leaves such as "diamond-" and "box-" matching are available. (See ***"Matching Within Individual Panel Faces"*** for further details).

Book Matching

In book matching, every other piece of veneer from a flitch is turned over so that adjacent leaves are "opened," like the pages of a book. Book matching is the most commonly used matching technique and may be used with plain-, quarter-, or rift-sliced veneers.

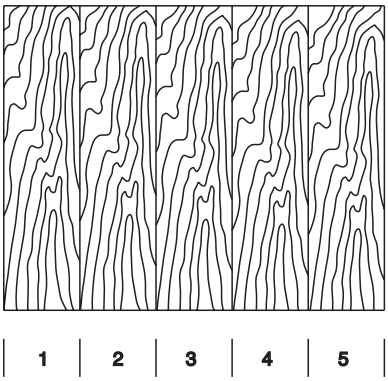
Visual Effect: Veneer joints match, creating a symmetrical pattern. Yields maximum continuity of grain. When sequenced panels are specified, prominent characteristics will ascend or descend across the match as the leaves progress from panel to panel. Because the "tight" and "loose" side faces alternate in adjacent leaves, they reflect light and accept stain differently. This may yield a noticeable color variation in some species or flitches.



Slip-Matching

Adjoining leaves are placed (slipped out) in sequence without turning, resulting in all the same face sides being exposed. The joint may not be noticeable if grain is straight. Slip-matching is often used with quarter-sliced and rift-sliced veneers.

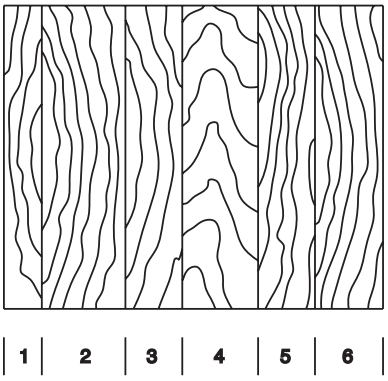
Visual Effect: Figure repeats but grain does not match at joints. The lack of grain match at the joints can be desirable. Provides enhanced color uniformity because all faces have similar light reflections.



Random (or Mismatch)

Veneer leaves are placed next to each other in a random order and orientation, producing a "board-by-board" effect in many species. Degrees of contrast and variations may change from panel to panel. This match is more difficult to obtain than a book or slip match, and must be clearly specified and detailed.

Visual Effect: Casual or rustic appearance, as though individual boards from a random pile were applied to the product. Conscious effort is made to mismatch grain at joints.



Pleasing Match

Veneer leaves are matched by color similarity, not necessarily grain characteristics.

Visual Effect: Since no sharp color contrasts can appear at the joints, an effect somewhere between book and slip matched and random matched is achieved.

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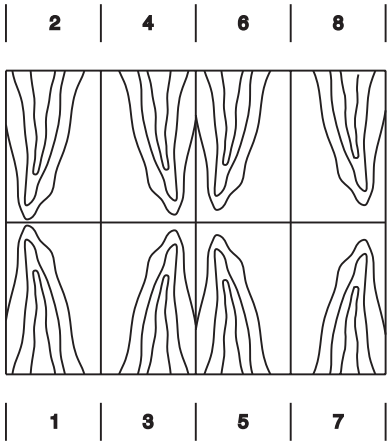
End- or Butt-Matching

This matching style is often used to extend the apparent length of available veneers for wall panels and long conference tables. Leaves are individually book- or slip-matched, first end-to-end and then side-to-side, alternating end and side.

Visual Effect: Yields best continuous grain patterns for length as well as width.

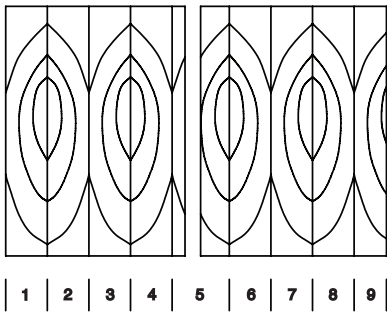


B. MATCHING WITHIN INDIVIDUAL PANEL FACES

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. There are several different methods of arranging book- and slip-matched leaves within a face.

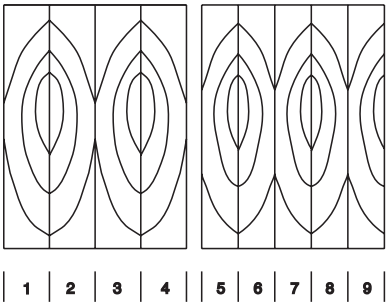
Running Match

Each panel face is assembled from as many leaves as necessary. Any portion left over from the last leaf may be used as the start of the next panel. This often results in a non-symmetrical appearance, with some veneer leaves of unequal width. The running match technique is the most economical method of veneer matching, but aesthetics are sacrificed to some extent when this method is used. Running matches are seldom “sequenced and numbered” for use as adjacent panels. Horizontal grain “match” or sequence cannot be expected.



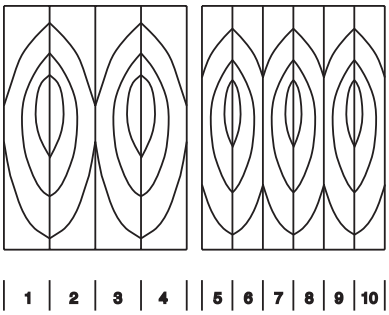
Balance Match

Each panel face is assembled from veneer leaves of uniform width. (When edge-trimmed the end leaves may be slightly smaller.) This is usually more aesthetically pleasing than the running match technique, but comes at a higher cost. Panels may contain an even or odd number of leaves, and distribution may change from panel to panel within a sequenced set.



Center-Balance Match

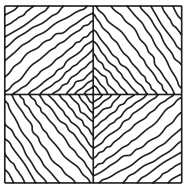
Each panel face is assembled of an even number of veneer leaves of uniform width. Thus, there is a veneer joint in the center of the panel, producing horizontal symmetry. A small amount of figure is lost in the process. This method increases the amount of waste from a flitch, therefore increasing the cost.



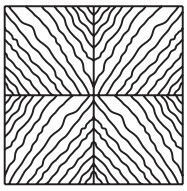
Special Matches

Special matches can include names such as box, diamond, basket weave, sunburst and reverse diamond, reverse box and checkerboard match. Because there are no standardized names for these matches, it is strongly recommended that the design professional include both names and drawings for the match to be sure the desired match is achieved.

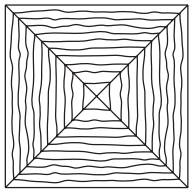
Diamond



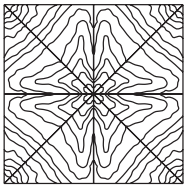
Reversed Diamond



Box



Sunburst



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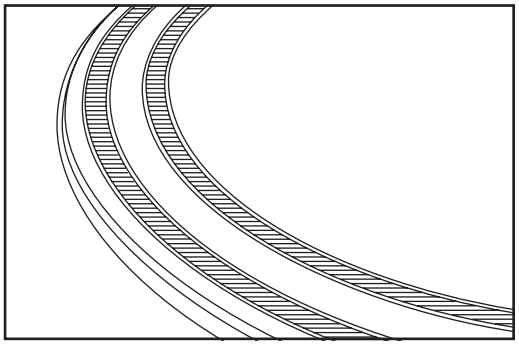
Matching of Sketch Faces

In this procedure, the layout of veneer follows a particular sketch or design. These include inlays of various woods, borders, frames, imitations of stiles and rails, and curved inlay shapes. The design professional should work closely with the woodworker and veneer supplier to make sure design intentions are realized. Most all sketch faces are laser cut for accuracy.

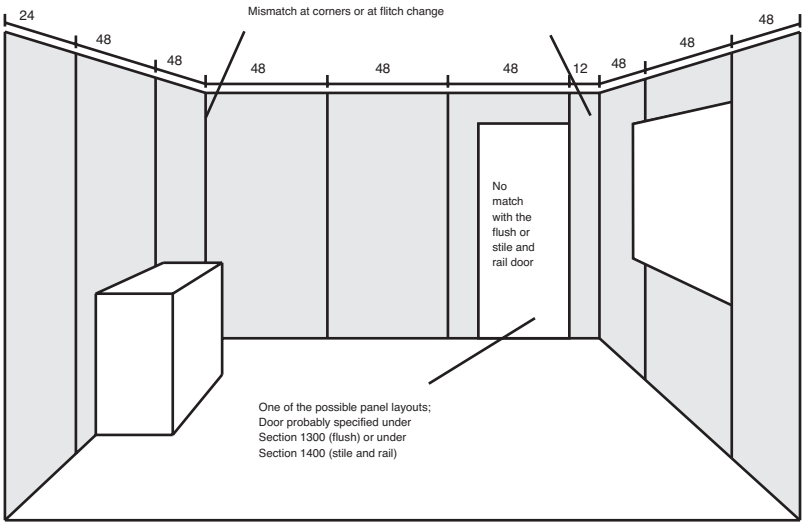


C. MATCHING BETWEEN PANELS (MATCHING ARCHITECTURAL PANELS)

Veneer panels used in casework, or paneling in the same area, may be matched to each other. This important component of the project must be detailed carefully and specified. The natural growth patterns of the tree will cause the figure on the sequential panel to ascend, descend, or show a “grain progression” as the eye moves from panel to panel. There are four common methods of matching panels to each other using sequence-matched and numbered panels:

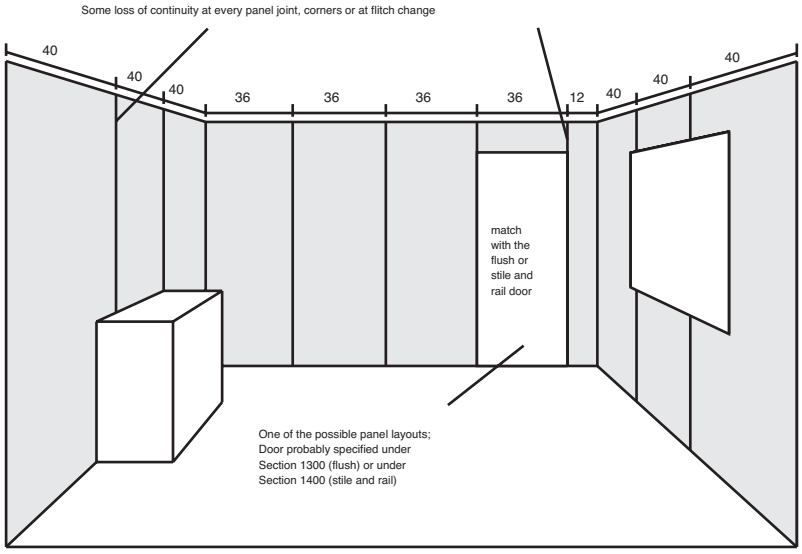
Pre-Manufactured Sets, Full Width

These are one step above “stock” plywood panels, usually made and warehoused in 4' x 8' or 4' x 10' sheets in sequenced sets. They may be produced from a single flitch or a part of a flitch, usually varying in number from 6 to 12 panels. If more than one set is required, matching between the sets cannot be expected. Similarly, doors or components often cannot be fabricated from the same flitch material, resulting in noticeable mismatch. This is the most economical type of special panel product.



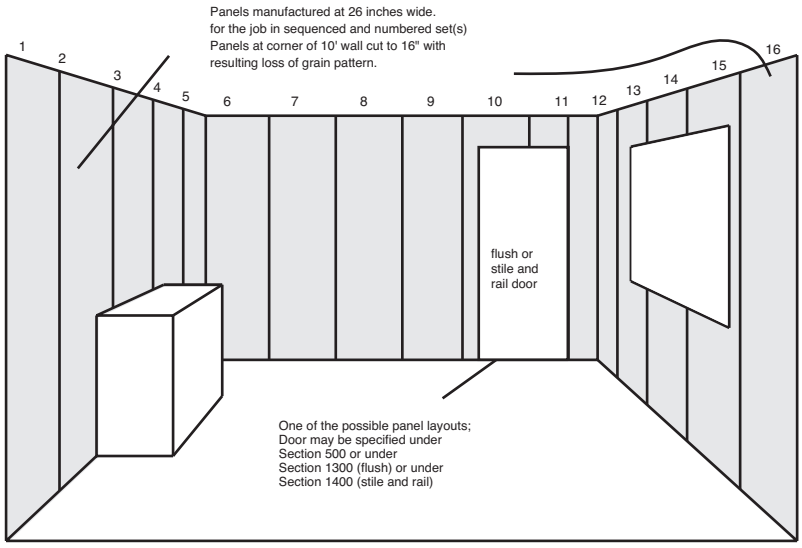
Pre-Manufactured Sets, Selectively Reduced In Width

These are panels just like those in the previous illustration, usually made and warehoused in 4' x 8' or 4' x 10' sheets in sequenced sets. They are often selected for continuity, re-cut into modular widths, and numbered to achieve the appearance of greater symmetry. If more than one set is required, matching between the sets cannot be expected. Similarly, doors or components often cannot be fabricated from the same flitch material, resulting in noticeable mismatch. This is the most economical type of special panel product.



Sequenced-Matched Uniform Size Set

These panels are produced for a specific installation to a uniform panel width and height. This type of panel matching is best used when panel layout is uninterrupted, and when the design permits the use of equal-width panels. Some sequence will be lost if trimming is required to meet field conditions. Doors and components within the wall cannot usually be matched to the panels. Moderate in cost, sequenced uniform panels offer a good compromise between price and aesthetics.



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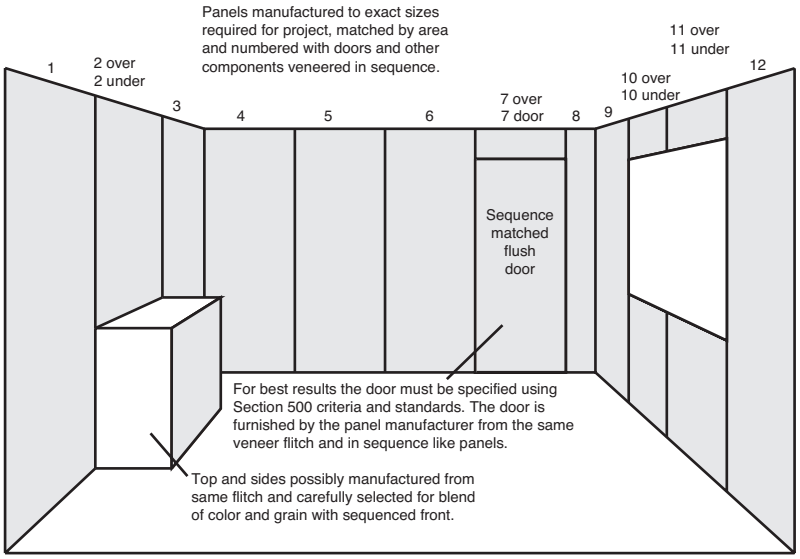
Blueprint Matched Panels and Components

This method of panel matching achieves maximum grain continuity, since all panels, doors, and other veneered components are made to the exact sizes required and in the exact veneer sequence. If possible, flitches should be selected that will yield sufficient veneer to complete a prescribed area or room. If more than one flitch is needed, flitch transition should be accomplished at the least-noticeable, pre-determined location. This method requires careful site coordination and relatively long lead times. Panels cannot be manufactured until site conditions can be accurately measured and detailed. This panel-matching method is more expensive and expresses veneering in the most impressive manner.



4. Selecting Panel Core (Substrate)

Hardwood plywood is composed of at least three elements: a face, a back and a core. Holding these pieces together is the glue line or glue. Each type of core has a specific use and represents a better value or better product for the specific use. Consideration should be given to special requirements, such as fire resistance, water resistance, weight, flatness, rigidity and strength required. FSC-certified and CARB-certified cores are available, as well as formaldehyde-free cores, which may qualify toward the U.S. Green Building Council's LEEDTM green building program.There are a large number of different cores available, including:

- Medium-Density Fiberboard Core (MDF)
- Particle Board Core (PB)
- Veneer Core (VC)
- Combination Core
- Fire-Retardant Core
- Moisture-Resistant Core
- Bendable Core

Medium-Density Fiberboard (MDF) Core

To form fiberboard, wood particles are reduced to fibers in a moderate pressure steam vessel, combined with a resin, and bonded together under heat and pressure. Medium-density fiberboard (MDF) is one of the most rapidly growing composite board products. The surface is flat, smooth, uniform, dense, and free of knots or grain patterns. It makes a superb carrier for veneers and can be enhanced to a fire-retardant, moisture-resistant or bendable core. (See below.)

Particleboard Core (PB)

Particleboard is produced from wood particles of various sizes that are bonded together with a synthetic resin or binder under heat and pressure. This product is commercially classified by "density," which is measured by the weight per cubic foot of the panel product. Medium density industrial particleboard is used in the broadest applications of architectural woodwork. It is especially well suited as a core (substrate) for veneers and decorative laminates. It can be enhanced to a fire-retardant, moisture-resistant or bendable core. (See below.)

Veneer Core (VC)

To form veneer core, three or more layers (plies) of wood veneers are pressed and glued into a single sheet. Layers of veneer are pressed together in alternating perpendicular layers balanced on either side of a central core layer. This type of plywood is more prone to surface irregularities and defects, but it exhibits greater strength in bending and in stress than other core types. High-quality, calibrated veneer core - with as many as 13 plies – is recommended for architectural veneer panels. This virtually eliminates the surface irregularities and defects.

Combination Core

Particleboard or fiberboard is combined in a balanced blend with veneer layers to form combination core.

Fire Retardant Core

Particleboard and medium-density fiberboard (MDF) cores can be treated during manufacturing to carry a UL stamp for Class I fire rating (Flame spread 20, Smoke developed 25).

Moisture-Resistant Core

Particleboard and medium density fiberboard (MDF) cores both are available with special resins that resist swelling when exposed to moisture.

Bendable Core

Kerfed particleboard and medium density fiberboard (MDF) cores are available for radius projects. Depending on the veneer (and veneer backer), a radius of 16 inches should be obtainable when applying a veneer prior to bending. Certain cores are capable of bending to five inches or less before applying the veneer face.

5. Selecting Veneer Backer

An important consideration in selecting veneers is the backer. Raw veneer may be difficult to handle and tends to split easily. The addition of a backer makes the veneer easier to handle. Application can be made easier and better results achieved when the best backer for the veneer is considered carefully in the specifications for the job.

There are a large number of different backers available, including:

- Paper Backers
- Pressure-Sensitive Adhesive Backers
- Wood Backers
- Phenolic Backers
- Polybak®

Paper Backers

Veneers are backed with a single layer of paper, permitting easier handling when compared to ordinary, un-backed products. The paper layer greatly reduces the potential for splitting during cutting and application. A selection of 10-, 20- and 30-mil paper-backed veneer is available with or without a pressure-sensitive adhesive.

Pressure-Sensitive Adhesive Backers

This is a real wood veneer backed with a layer of paper that is treated with pressure-sensitive adhesive. Veneers can be applied easily by peeling away a sheet that protects the adhesive. Once the adhesive is exposed it is simple to position the veneer and apply pressure. Platen and bag presses work best, but a fiber knife or veneer scraper carefully worked in the direction of the grain will yield good results.

Wood Backers

These real wood veneers are made by bonding two layers of the selected species with an adhesive that provides an internal moisture barrier, shielding the finish from adhesive bleed-through that can occur with water- or solvent-based adhesives. The resulting veneer bonds securely to the substrate without delaminating or bubbling. The use of two layers also offers less telegraphing and checking.

Phenolic Backers

To manufacture this product, real wood veneer is laminated to impregnated phenolic resin paper, similar to the backing on high-pressure plastic laminate, (e.g. Arborite, or Wilsonart). This surprisingly flexible product is ideal for use by installers who already familiar with handling high-pressure laminates. It is installed using the same tools and procedures as high-pressure plastic laminates.

Polybak®

Polybak® is a single-ply sheet which can be used as a backer sheet for veneer. It is extremely flexible and up to two-and-a-half times stronger than other backers. The sheet is comprised of kraft paper impregnated with a proprietary polymer system that contains no formaldehyde, which is unique when compared to other commercial backers. It provides exceptional moisture resistance and high tensile strength. Polybak is a stable product with a virtually unlimited shelf-life.

GLOSSARY

Backed Veneer
Veneer that has been backed with special paper, laminate, backing veneer or other material.

Backer
A non-decorative laminate used on the back of composite panel constructions to protect the substrate from changes in humidity and to balance the panel construction.

Back
The reverse side to the face of a plywood panel. Generally, the poorer side of any grade plywood panel which has a face and a back.

Balanced Construction
A panel construction that will not warp when subjected to uniformly distributed moisture changes.

Balanced Match
Two or more veneer components or leaves of equal size to make up a single face.

Birdseye
Characterized by its scattered circles or ovals that have a similar appearance to that of a bird's eye. This type of figure is found almost exclusively in hard maple.

Block Mottle Figure
An irregular form of figuring which runs over the complete surface of the veneer.

Book
The most commonly used term for a bundle of veneer, especially by carpenters. This term comes from the veneer leaves following one after the other like pages in a book.

Book Match
Adjacent pieces of veneer from a flitch or log are opened like a book and spliced to make up a face with matching occurring at the spliced joints. This is the most popular matching method and creates a symmetrical pattern and a series of pairs.

Bow
The deviation from absolute flatness along the length of the panel.

Burl (or Burr) Veneer
Veneer obtained from rare woody outgrowths appearing on trees around grafts or injuries. This produces an appearance of a close arrangement of many small eyes or knots intermingled with distorted grain. The rare and unusual patterns of burls make them in high demand and are also more expensive, due to the small size of the veneer and scarcity. Differentiation is generally made between burl or burr growth above ground (elm, ash, oak) and root burl or burr growth that develops below ground in the root (Californian walnut, madrona, vavone, myrtle).

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Butt- or End-Match
Butt- or end-matching refers to a technique where the veneer is joined end-to-end and side-to-side. This is sometimes used when the veneer is not long enough to cover the desired panel height. It is also a popular method for burls, crotches, and highly decorative veneers.

Cathedral
A much sought-after structure in crown-cut bundles, cathedral patterns are considered to be very elegant. The grain appearance is characterized by a series of stacked or inverted “Vs” forming an arch-like cathedral pattern.

Center Match
Each face has an even number of veneer sheets, but the widths are not necessarily the same. The center joint will be in the middle of the panel.

Checks
Small slits running parallel to the grain of wood caused by strains produced in seasoning.

Clipping
The process cutting out undesirable patterns or defects or trimming veneer to make it suitable for jointing.

Comb Grain
A quality of rift cut veneer with exceptionally straight grain and closely spaced growth increments.

Condensate
The tannic acid that is yellow in color and deposits on the surface of the veneer when it is dried too harshly.

Core
Also referred to as “center” or “substrate.” The innermost portion of plywood composed of veneer, fiberboard, particleboard, or a combination of the above.

Crossfire
This term is used to describe all of the various figure marks running perpendicular to the veneer grain. In some wood species the crossfire is a contrast of color, while others appear as an irregularity of the grain creating the illusion of horizontal marks

Crotch
This type of figure occurs where limbs emerge from the tree trunk. The high amounts of fiber distortion at this junction results in a feather or flame pattern appearance. Mahogany is the most common species with this type of figuring.

Crown Cut
The first bundles from a log when sliced over the heart. Produces the so-called cathedral structure.

Cup
Deviation from a straight line stretched across the width of a panel or board.

Curl
See Crotch

Curly
The term used for a wavy or curly figuring produced by distorted fiber growth that reflects light differently. Most commonly available in walnut and maple veneers.

Delaminating
The separation of the panel's face layer from the core, or a laminate from a substrate, or separation of the inner plies, usually from failure of the adhesive bond.

Density
The weight of a panel as measured in pounds per cubic foot.

Diamond Match/Box Match
Four equal pieces of veneer are cut diagonally to the usually straight grain. These are matched to create a diamond pattern. In a reverse diamond match, the pieces are matched so that the grain direction runs toward the middle.

Discoloration
Undesirable color variations in the veneer, e.g. green stripes in European cherry.

Door Length
Log and veneer lengths between 6'8" and 8' required by the door industry.

Doze (also Dote)
A form of incipient decay characterized by a dull or lifeless appearance of the wood and accompanied by a loss of strength and softening of the wood substance.

Dye
Vat or pressure-infused process to produce colored veneers.

Edge Banding
Strips of veneer joined continuously head-on to be applied onto the sides of the substrate.

Egg Shape
A structure in the crown-cut bundle desired by the piano industry. Ideally suited for the fronts and lids of the instruments.

End-Matched (Butt-Matched)
Often called butt-matched, the veneers are matched as described for book-matched veneers, but the ends of the sheets are matched. Quite often, veneers are both book-matched and end-matched, which is called a four-way match.

Face
The better side of any panel where the outer plies are of different veneer grades. Also, either side of a panel in which there is no difference in veneer grades.

Fiberboard
See medium density fiberboard.

Fiddleback
A term describing a consistent ripple figure running across the grain. Fiddleback is not commonly found, but occasionally occurs in mahogany, maple, English sycamore and anegre. The term fiddleback comes from the veneer's popularity in making violin backs.

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Figure
The pattern produced in a wood surface by annual growth rings, rays, knots and deviations from natural grains, such as interlocked and wavy grain, and irregular coloration.

Fingered Heart
Irregularly developed heartwood.

Flake (Fleck)
The typical figuring of wood when the pithrays are cut across, i.e. at an angle of 180 degrees when slicing. This is strongly pronounced, particularly in oak. They are generally considered as inferior veneers, unless from brown oak, silky oak or plane, for example, where this figuring is in special demand.

Flat Cut
This is the cutting/slicing method most often used to produce veneers for high quality architectural woodworking. Cutting 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 patterns from leaf to leaf.

Flitch
A complete bundle of veneer sheets laid together in sequence as they are cut from a given log or section of a log.

Four-Piece Match
Special method used for burl veneers to produce highly decorative surfaces and patterns. Four veneer leaves in succession are turned twice and folded up once.

Gap
Open slits in the inner plys or improperly joined veneers.

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

Gum
A small patch of accumulated gum (mineral or resin) that commonly occurs in American cherry and beech. It is often the result of crown damage, bird pecks, or other insect damage. Gum patches are not arranged in a regular pattern, but can be positioned quite differently from one veneer leaf to the next.

Half-Round Cut
A combination of rotary and plain cut. Segments, or flitches, of a log are mounted off center on the lathe resulting in a cut slightly across the annular growth rings. This produces figures characteristic of both rotary- and plain-sliced veneers. This is used primarily to accentuate the grain in various woods such as in burls, or Bird's Eye Maple, or to gain a wider width on a cathedral on small dimension logs.

Hardwood
General term referring to the wood of many different deciduous trees, as opposed to the softwood of evergreen or coniferous trees. Does not relate to the density of wood.

Hardwood Plywood
Composed mostly of inner plys peeled from fir, poplar, lauan or other species of either soft or hardwood, only the face and back panels are pure hardwood veneers of 1/30th to 1/40th or less of an inch thick.

Heart
The term used for the core wood area in veneer, which is different in color to the remaining part of the veneer leaf.

Heartwood
The center portion of a tree consisting of mature wood that has stopped growing. Generally distinguishable by its dark color from sapwood or the growing outer portion of the tree.

Inconspicuous
Marks, grain, figure or other characteristics of wood barely detectable with the naked eye at a distance of 6-8 feet.

Inlay
Thin strips of veneers used for decorative purposes. Usually sold in one-meter lengths, the various types commercially available today including: stringings, flat lines, square lines, purfling and bandings.

Kiln-Dried Lumber
Solid wood that has been dried in a kiln.

Knot
A place in the wood where a branch has grown out of the heartwood

Knot (Open)
Opening produced when a portion of a knot has dropped out or separated due to seasoning.

Knot (Pin)
Sound knots less than _ inch in diameter.

Knot (Sound)
Knots that are solidly fixed by growth and retain their place in lumber or veneer.

Leaf
Veneer leaf.

Live Sample
Single sheets of veneer pulled out of a log to represent the whole log. (Our live samples are sent for selection, and those not chosen must be returned or a re-sampling charge is be accessed.)

Loose Side
In knife-cut veneer, that side of the sheet that was in contact with the knife as the veneer was being cut. The loose side contains cutting checks (lathe checks) because of the bending of the wood at the knife's edge.

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Marquetry
Joining veneers of different colors and species to obtain a specific pattern.

Matching
Joining veneers in a sequence according to their natural sequential order or to obtain specific dimensions and a pattern desired.

MDF
Medium density fiberboard: A material consisting of a wood fiber - resin combination formed into a homogenous mat of random fiber orientation, then hot-pressed and finished. It can be machined or sanded to a smooth finish.

Mild Texture
Very fine and slow growing wood that produces a beautiful, even marking in the veneer.

Mineral Streak
A discoloration - dark patches or pockets – found in veneer and lumber.

Mottle
Mottle is the intermingling of broken cross markings with stripe figure. Block mottle involves broad cross markings, producing a patch effect that is commonly found in makore. Bee's wing mottle is very small, fine figure and often occurs in sapele, satinwood and black bean.

Natural Veneer
Composed of both heartwood and sapwood. Select or uniform heartwood veneers are usually more expensive than their sapwood counterparts, since the heartwood is the smallest is the smallest portion of the tree. Natural veneers are a combination of both heartwood and sapwood, and is, therefore, generally less expensive than select or uniform veneers.

Number of Leaves
The number of veneer leaves in a bundle--generally 24 or 32 leaves.

Panel Length
Log and veneer lengths between 104" and 126" required by the paneling industry. The quality is generally not as good as bedroom furniture length.

Particleboard
A panel product constructed from wood particles. The wood particles are blended with resin and wax and pressed into panels. It is firm and solid throughout and makes a good core for hardwood plywood, and, depending on the grade, an excellent substrate for wood veneers, high-pressure laminate, and other overlay materials.

Peanut Shell
A quilted or blistered figure that incorporates a dominant grain or yearring pattern. Mostly found in tamo or bubinga.

Plain Slicing
See flat cut.

Plywood
Any combination of veneers, lumber, core, paper or other material joined together with adhesive to create a single panel. Plywood can be of any thickness. Standards are 1/8", _", _", _", or 1". Hardwood plywood usually has a hardwood face, core and back.

Pommele
Pommele gets its name from the French word for “apple.” The figure resembles small round or oval circles that can overlap each other. Sometimes a log that has larger and more sparsely occurring “apples” can be referred to as blistered.

Quarter Cut
Quarter cutting/slicing simulates the quarter sawing process of solid lumber, roughly parallel to the 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.

Quilted
This figuring is produced by rotary- or half-round slicing of logs that have a “bumpy” surface. The uneven weaving of the growth rings produces a quilted, three-dimensional effect. Maple and mahogany are species often available with quilted figure.

Random Match
Deliberate mismatched leaves are placed next to each other to give a rustic, natural look. This works especially well with knotty or wormy species.

Ray Flake
See Flake

Reconstituted Veneer
Natural wood that has been reconstituted. The wood used in reconstituted veneers is harvested from fast-growing trees. The logs are cut (sliced to veneer), dyed and then re-glued in different molds to create the “grain” pattern. The way in which the reconstituted veneers are re-glued and re-sliced determines the grain and figures.

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

Resin Spots
Hard pieces of dark or black foreign material in the face layer that are composed of glue and wood dust.

Ribbon Stripe
In some woods, principally mahogany, a pattern of wide, unbroken stripes can be obtained. It is produced by cutting on the quarter a log that shows growth rings.

Rift Cut
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 lumber is highly unlikely. In both cases, the cutting is done slightly off the radius lines, minimizing the “flake” associated with quarter slicing.

Root Burl
See Burr

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Rotary Cut
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. Except for creating a specific design effect, rotary veneers are the least useful in fine architectural woodwork. Rotary-sliced fine hardwood veneers are used in a limited way, usually for special figure and cut. Careful consideration, specification, and communication are recommended when rotary cut is contemplated.

Sand Through
A condition where the face layer has been sanded off exposing the core. These areas will appear to be darker and larger particles will be exposed.

Sapwood
The soft wood, living portion of a tree located between the heartwood and the bark, often lighter in color than the central heartwood.

Sequence
The sequence of veneer leaves within a bundle and the complete log.

Single Bundles
Bundles of veneer taken out of their regular sequence within the log so that the sequence is no longer given.

Slip Matched
Veneer components are laid side by side (slipped out in sequence) to form a whole sheet of veneer with a repetitive grain appearance.

Spliced Veneers
Spliced veneers are composed of several pieces of veneer varying in width that are glued together to form a whole sheet. The way they are laid out during composing determines the final look of the veneer.

Splits
Separations of wood fiber running parallel to the grain.

Stained Veneer
A veneer which has been stained by an external factor such as mold, light, grease etc., or end stain, which is the stain that often occurs at the end of a log.

Sunburst Match (Pie Match)
Consecutive sheets are trimmed into pie shaped pieces and matched in a circular fashion in which the points meet in the center. Mostly used on round, oval or octagonal shaped panels.

Tight Side
In knife-cut veneer, that side of the sheet that was farthest from the knife as the sheet was being cut containing no cutting checks (lathe checks).

Type Sample
Approximately 8"x11", a type sample represents a wood species as a whole. It does not represent a specific log or flitch. Live samples are use to represent a specific log or flitch.

Unbalanced Construction
Warping caused when the individual layers or components of a panel do not respond equally to changes in moisture or humidity.

Veneer
A thin sheet of wood ranging in thickness from 1/8" to 1/100". The standard thickness may vary depending on species.

Vine Marks
Vine marks are made by restrictions of growth caused by woody vines that wind their way around a tree trunk. The strength of certain vine species are such that, as the tree grows in girth, instead of breaking the restricting vine, it actually grows around it.

Warp
When a board bends, twists or turns from a straight line due to unbalanced construction, excessive moisture absorption, wetting or other unfavorable exposure.

Worm Holes, Tracks
Holes or tracks in the wood resulting from an infestation of worms.

Wrapping
A process to “wrap” three-dimensional areas (profiles, curved edges, etc.) with veneers. To some extent this has replaced the molded edges made of solid wood.

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Natural Wood Veneer Index

Afrormosia
Afrormosia, Fiddleback
Alder, Red
Anegre
Anegre, Fiddleback
Anegre, Figured
Ash, Brown
Ash, Figured
Ash, Figured European
Ash, Japanese
Ash, Olive Burl
Ash, Tamo
Ash, White
Ash, White Burl
Avodire
Beech, European
Beech, European Steamed
Birch, Red
Birch, White
Bubinga
Bubinga, Fiddleback
Butternut
Camphorwood Burl
Carpathian Elm Burl
Cedar, Aromatic Red
Cedar, Spanish
Cherry, American
Cherry, Curly Figured
Cypress
Douglas Fir, Vertical Grain
Ebony, Macassar
Etimoé
Eucalyptus Pommele
Eucalyptus, Figured
Figueroa, Figured
Hickory
Iroko, Figured
Kewazinga
Koa, Hawaiian
Koto
Lacewood
Lacewood, Bleached
Laurel
Laurel Burl
Limba
Louro Preto
Madrone Burl
Mahogany
Mahogany, African, Fiddleback
Mahogany, Broken Stripe
Mahogany, Crotch
Mahogany, Honduras
Mahogany, Ribbon
Makoré
Makoré Pommele
Makoré, Block Mottled
Makoré, Fiddleback
Mapa Burl
Maple
Maple Burl
Maple, Birdseye
Maple, Curly
Maple, Fiddleback
Movingui
Movingui, Figured
Movingui, Figured Dyed
Movingui, Figured Pearl
Mozambiqeue, Figured
Mutenye, Fiddleback
Oak, English Brown
Oak, Red
Oak, Red Heavy Flake
Oak, White
Oak, White Heavy Flake
Okume
Orientalwood, Figured
Padauk
Pearwood

Natural Wood continued...

Pecan
Pine, Knotty Random
Pine, White
Pine, Yellow
Poplar
Prima Vera
Purpleheart
Redwood Burl
Rosewood, African
Rosewood, East Indian
Rosewood, South American
Sapele
Sapele Pommele
Sapele, Fiddleback
Sapele, Figured
Satinwood
Sycamore, English Figured
Sycamore, Figured
Teak
Teak, Honey
Walnut Burl
Walnut Crotch
Walnut, American
Walnut, Olive
Wenge
Yew
Zebrawood

Reconstituted Veneer Index

Ash
Ash, Brown
Ash, Olive Burl
Carpathian Burl
Cherry
Ebony
Ebony, Macassar
Italo Pearl
Mahogany
Mahogany, Classic
Maple
Maple Pommele
Maple, Birdseye Brandied Peach
Maple, Birdseye Butternut
Maple, Birdseye Coral Dust
Maple, Birdseye Platinum
Maple, Birdseye Prima
Maple, Birdseye Silver Lining
Maple, Birdseye Snow White
Maple, Figured
Oak, Red
Oak, White
Rosewood
Sapele Pommele
Teak
Walnut
Walnut Burl
Wenge
Zebrawood

Hardwoods of TENNESSEE

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NOTES

TOOLS FOR ARCHITECTS AND DESIGNERS

This technical reference guide is provided as a tool to help architects and design professionals specify veneer products. We also provide a veneer catalogue that includes type samples, which is helpful in developing accurate specifications. Our veneer samples binder may be viewed at our Clarksville, Tenneessee location or may be made available to architectural firms and other organizations by request.

*ACKNOWLEDGMENTS

Much of the information provided in this guide was developed with reference materials available through the Architectural Woodwork Institute (AWI).

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FSC-certified products are available upon request.