SPECIFICATION CONSIDERATIONS FOR ARCHITECTURAL WOOD DOORS

Presented by:
Architectural Wood Doors
INDUSTRIES

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Identify components of an architectural wood door.
2. Increase awareness of wood door assembly and construction.
3. Provide a better understanding of industry standards and new door technology.
4. Review how to specify doors to meet project requirements.

CONTINUING EDUCATION

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ENDLESS CREATIVE POTENTIAL WITH ARCHITECTURAL WOOD DOORS

Architectural wood doors command attention with their distinctive elegance. Whether you're envisioning something understated or wildly exotic, extensive wood veneer options, as well as a variety of factory and custom finishes will open your eyes to endless creative possibilities. But, taking all design and performance options into consideration when specifying the perfect architectural wood door is of utmost importance. Sometimes thousands of doors are specified for a project, so it's imperative that you understand the technical aspects of architectural wood door components, construction, and industry standards.

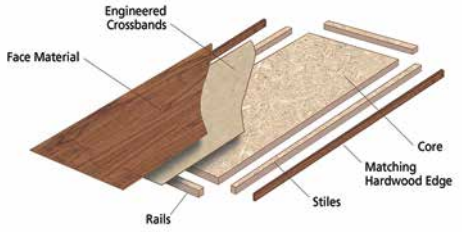
KEY DOOR COMPONENTS

Architectural wood doors are assembled products composed of multiple components, so let's begin by identifying these key components.

All doors consist of a core, stiles, rails, and face materials. Crossbanding and backers may be applied, depending on the construction process.

The core is the innermost layer or section in component construction. Core types include particleboard, structural composite lumber (SCL), staved lumber, agrifiber, and fire resistant composite. Stiles are the upright or vertical pieces of the core assembly of a wood flush door, while rails are the top and bottom edge bands of the door. The core, combined with stiles and rails, make up the bonded core assembly of the door. Faces are the outermost materials used in wood door construction and may include wood veneer, high pressure decorative laminate (HDPL), medium density overlay (MDO), high density fiberboard (HDF), or fiber reinforced laminate (FRL).

Crossbanding is a ply placed between the core and face veneer in 5-ply construction or a ply



All doors consist of a core, stiles, rails, and face materials. Crossbanding and backers may be applied, depending on the construction process.

placed between the back and face of a 3-ply skin in 7-ply construction. Crossbanding is typically constructed of hardwood veneer or engineered wood product.

CORE OPTIONS

Because cores are the main component of a wood door, the materials used for their construction are extremely important. The

The core material will provide varying degrees of durability, fire-rating, environmental, and acoustical performance and should be specified based on the application, installation, and project requirements.

material will provide varying degrees of durability, fire-rating, environmental, and acoustical performance and should be specified based on the application, installation, and project requirements.

Architectural wood door core options include particleboard, agrifiber, structural composite lumber (SCL), and staved lumber, as well as fire-rated cores and specialty cores such as lead-lined and those that are sound transmission class (STC) rated.

Particleboard Core

Particleboard is the most-specified core material because it has been an industry standard for over 30 years, has a proven track record, and meets ANSI A208.1 Performance Duty level and Window and Door Manufacturer Association (WDMA) Heavy Duty level performance requirements. A particleboard core is perfectly acceptable for most construction requirements and is available in 3-, 5-, and 7-ply construction.

In addition, particleboard will hold screws for closers and exit devices without blocking, and can meet a 20-minute positive pressure fire-rating. Or, it can be non-rated. A 20-minute positive pressure rating requires an intumescent seal or gasket applied to the frame or concealed within the door edge. Blocking is a material used to improve screw holding at hardware attachment points, and is also used to replace the core material at specific locations where the core material does not meet applicable performance duty levels.

100% of the door's construction weight is composed of pre-consumer recycled wood fiber and a Forest Stewardship Council® (FSC®) certified core is available, meaning it is manufactured with lumber from a certified forest. Alternatively, cores are available that contain no added urea formaldehyde (UF).

Structural Composite Lumber Core

Structural composite lumber (SCL) is an engineered wood product that is made by fusing a network of wood strands together with a water-resistant adhesive to produce a strong, solid, and stable product that has true structural properties with excellent screw holding capabilities and a very high split resistance. It is made from small diameter hardwood trees and is the most stable core material on the market.

SCL weighs more than particleboard, is moisture resistant, dimensionally stable, and has little environmental impact. In addition, the material does not require costly inner blocking to meet WDMA Extra Heavy Duty Levels. Structural composite lumber is available from some manufacturers with up to 45-minute fire-rating and can be FSC certified.

Staved Lumber Core

Staved lumber core is made with any combination of blocks or strips, not more than 2-1/2 inches wide, of one species of wood glued together (in butcher block fashion) with joints staggered in adjacent rows. Staved lumber is made from other wood product manufacturers' drop-off material. Previously, staved lumber was the standard core material for wood doors before better engineered, particleboard cores became available.

This core material is dry and will take on moisture differently from piece to piece, making it susceptible to twisting and warping. Staved lumber core is available FSC certified.

Agrifiber Core

Agrifiber is primarily manufactured with wheat and soybean stalks, which are both recycled and rapidly renewable. Cores are manufactured with no added urea-formaldehyde using a specialized resin bonding agent called methylenediphenyl isocyanate (MDI).

Agrifiber core doors are interchangeable with wood particleboard as they meet the same ANSI A208.1 and WDMA Heavy Duty levels, and have the same WDMA door descriptors with positive pressure fire-ratings up to 45-minutes. Note that there is limited availability for fire-rated agrifiber core products.

Fire-Rated Core

A fire-rated composite core is a non-combustible material typically incorporating minerals rather than wood fiber as the primary component, designed to improve fire resistance and thermal transmission. The fire-rated core, stiles, and rails meet rigorous smoke, flame, and pressure tests and have positive pressure fire-ratings up to 90-minutes.

Acoustical doors meet most building Sound Transmission Class (STC) performance requirements for a multitude of projects and applications, including schools, universities, government buildings, private offices, auditoriums, theatres, and libraries.

SPECIALTY CORE OPTIONS

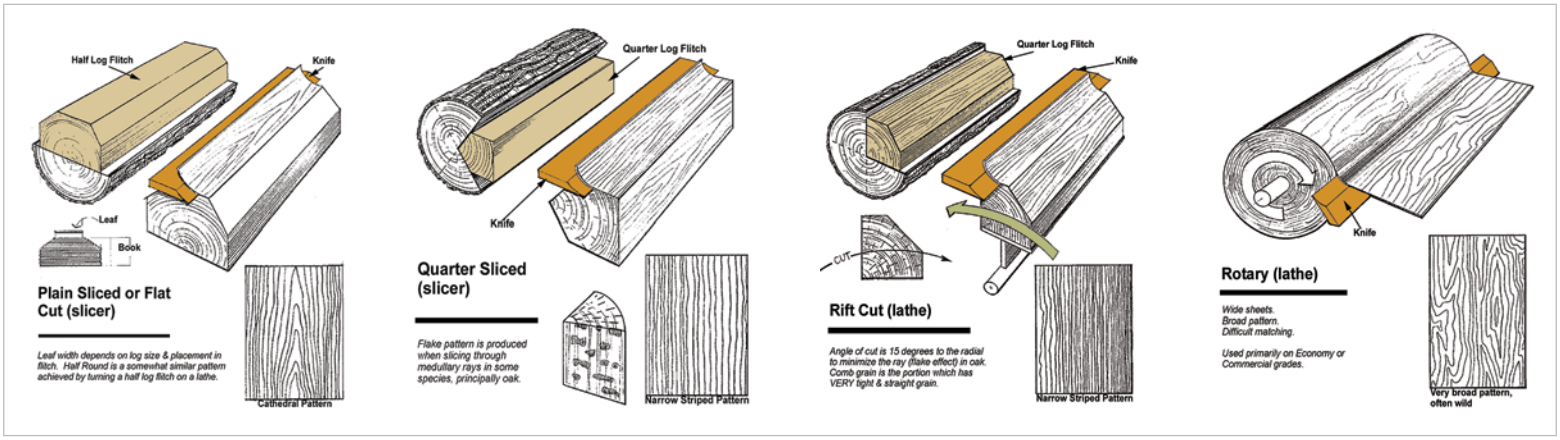
There are also specialty core options such as lead-lined, bullet resistant, and sound transmission class doors. Lead-lined doors provide different levels of radiation protection depending on the application; they have a sheet of lead on either side of the core. Lead-shielding doors are typically used in various medical X-Ray, PET, or CT scan rooms in hospitals and doctors' offices.

The maximum fire-rating for a lead-lined door is 45-minutes and maximum door size is limited to 4'x9' for single doors and 8'x9' for double doors (non-rated and 20-minute only). The maximum door size for a single 45-minute door is 4' x 8'—pairs are not permitted. Note that lead-lined doors require lead-lined vision panels and pairs of doors must always have a lead-lined astragal; wood stops and astragals are not allowed. In addition, a lead-lined door cannot be made with a stave lumber core.

Acoustical doors meet most building Sound Transmission Class performance requirements for a multitude of projects and applications, including schools, universities, government buildings, private offices, auditoriums, theatres, and libraries. STC ratings vary depending upon the manufacturer, and specific construction and acoustical door thicknesses may range from 1 ¾" to 2 ¼". Lite kits must be installed at the factory for STC rating.

Specify acoustical doors that have been laboratory tested per the most recent version of ASTM E-90, Standard Method for Laboratory Measurement of Airborne Sound Transmission. Testing of the entire opening system is conducted, which includes the door in combination with properly installed gasket seal systems (frame gaskets and door sweeps), accupads, and frames. These tests should only be performed in an operable state to accurately simulate on-site performance.

Finally, bullet resistant architectural wood doors meet security requirements for applications



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such as offices, theaters, government and education buildings, dormitories, multi-family residences, stadiums, and airports. Bullet resistant doors are manufactured with special ballistic rated materials within the core assembly. They are available to meet or exceed protection levels defined in UL 752 performance standards. When specifying bullet resistant doors, identify what protection level is required. UL 752 listed and labeled doors meet the following levels of bullet resistance:

- Level 1—9mm (3 shots)
- Level 2—.357mm (3 shots)
- Level 3—.44 magnum (3 shots)

Stiles and Rails

Moving beyond core materials, let's discuss the other components of architectural wood doors and how they are constructed. For aesthetic purposes, outer stiles are constructed using a matching hardwood outer edge, or with a compatible hardwood with exposed crossbanding. For the inner stile a mill option material, typically SCL, is used. SCL provides stability and performance, as well as superior screw holding capabilities compared to hardwood or softwood edges.

Crossband

A crossband is a ply placed between the core and face veneer in 5-ply construction and a ply placed between the back and face of a 3-ply skin in 7-ply construction. Crossbands are applied to prevent telegraphing of the stile and rail through the face material and provide stability to the door.

Engineered crossbands are typically high density fiberboard (HDF), a superior crossband material that meets all industry standards. These crossbands have a uniform quality and appearance that will not show through on light veneers and eliminates delamination due to their extremely flat surface.

Natural crossband materials are not recommended, as the color ranges from white to very dark, which could show through on light veneers. Also, voids and lapped crossbands may occur, which are not accepted by WDMA industry standards.

FACE MATERIALS

Both AWS and WDMA quality standards recognize multiple face material options as suitable for architectural wood doors. Wood veneers are available in multiple grades, matches, and assemblies to meet design requirements, including domestic and exotic selections. High pressure decorative laminate (HDPL) offers endless design possibilities and increased durability over wood veneer, while fiber reinforced laminate (FRL) meets high-traffic application requirements. Finally, mill option face materials provide a paintable surface.

Wood Veneer

Wood veneer faces are available in a variety of species, slices, and matches. Natural variations of the veneer and different cuts create unique textures, grains, figure, and color for each veneer piece and door. Decorative veneer cutting methods include plain sliced (or flat cut), quarter sliced, rift cut, and rotary cut. There are many species available, including exotic veneers for 5-ply construction, but 7-ply construction with 3-ply skins are only available in limited species. Door manufacturers follow WDMA standards for veneer grades, which are adapted from the Hardwood Plywood Veneer Association.

Wood veneer doors may be GREENGUARD Air Quality Certified.

WOOD VENEER CUTTING METHODS

Plain Sliced Veneer

There are different cutting methods used to achieve the desired aesthetics for a wood veneer. With plain sliced or flat cut veneer, the half log, or flitch, is mounted with the heart side against the guide plate of the slicer. Cuts are made parallel to a line through the center of the log, producing a distinct figure. By keeping the veneer leaves in the same order in which they are cut, the leaves can be reassembled with only a very gradual grain figure transition from one panel to another. The leaf width depends on the log size and placement in the flitch. Half round is a similar pattern achieved by turning a half log flitch on a lathe.

Quarter Sliced Veneer

A quarter log, or flitch, is mounted so that the slicer cuts the log at a 45° angle to the axis lines of the log, creating a narrow striped pattern or straight grain effect. A flake effect is produced in oak veneers using this method.

Rift Cut Veneer

The rift cut veneer method is generally restricted to Red and White Oak. A quarter log is mounted off center and cut at an angle 15° to the radial, resulting in a straight grain without the flake effect of quarter sliced oak. Comb grain is the portion that has a VERY tight and straight grain.

Rotary Cut Veneer

Rotary cut veneer is a method of cutting in which the log is placed on a large lathe and turned against a fixed blade, so that a

continuous cut is made round and round the log, more or less parallel at all times to the growth ring. This results in wide sheets. The result is a broad pattern with a wild, varied grain effect. Since the grain pattern is non-repetitive it cannot be used for sequence matching, and is used primarily for economy grade or commercial grades.

MATCHING OF VENEER COMPONENTS

Once the decorative veneer cutting method is specified, the type of match at the joint line must be specified. The way in which the individual cuts are placed next to each other during the fabrication of the veneer face affects the appearance of the doors.

Types of Veneer Match

Book Match—Book Match is the most commonly used match in the industry. Every other piece of veneer is turned over so adjacent pieces are opened like two adjacent pages in a book. The veneer joints match and create a mirrored image pattern at the joint line, yielding a maximum continuity of grain. Book matching is used with plain sliced, but less often with other cuts of veneer.

Slip Match—Slip Match is the adjoining of veneer components in sequence without turning over every other piece. The grain figure repeats, but joints won't show a mirrored effect. Slip matching is often used in quarter cut, rift cut, and comb grain veneers to minimize the barber pole effect.

Random Match—Random Match is a random selection of veneer components from one or more logs that produces a "board-like" appearance.

End Match—The End Match is typically selected for doors with transoms. This match utilizes a single piece of veneer that runs from the bottom to the top of the door. At the transom, a mirror image is created by turning the veneer at the joint.

Continuous Match—Continuous Match is when a single piece of veneer is utilized for both the face of the door and the transom.

Barber Pole—Because the "tight" and "loose" faces alternate in adjacent pieces of veneer, they may accept stain or reflect light differently, resulting in a noticeable color variation, often called "barber pole." These variations are not considered a manufacturing defect.

QUIZ

1. True or False: Rails are the upright or vertical pieces of the core assembly of a wood flush door.

2. Which of the following is the most specified core material?
   a. Particleboard
   b. Structural composite lumber
   c. Staved lumber
   d. Agrifiber

3. True or False: Crossbands are applied to prevent telegraphing of the stile and rail through the face material and provide stability to the door.

4. Which of the following meets high-traffic application requirements?
   a. High pressure decorative laminate
   b. Fiber reinforced laminate

5. Which wood veneer cutting method results in a narrow striped pattern or straight grain effect?
   a. Plain sliced
   b. Quarter sliced
   c. Rift cut
   d. Rotary

6. Which of the following is the most commonly used veneer match in the industry?
   a. Book match
   b. Slip match
   c. Random match
   d. End match

7. True or False: 3-ply doors are not as stable and durable as 5-ply HPDL doors and are not available with wood veneer, as the core will show through or telegraph.

8. In which type of architectural wood door construction are wood stiles and rails NOT attached to one another or the core?
   a. Drop-in core
   b. Loose layup
   c. Bonded core

9. Which production finish provides the highest performance properties?
   a. Pre-catalyzed laquer finish
   b. TR/OP 6 - Catalyzed Polyurethane

The End Match is typically selected for doors with transoms.
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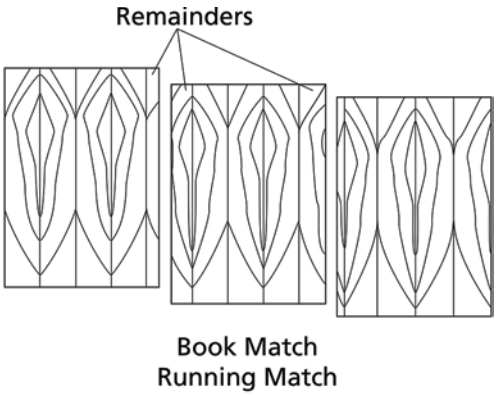

Running Match is the industry standard. Reproduced and used with permission of AWI.

ASSEMBLY OF VENEER COMPONENTS—TYPES OF ASSEMBLY MATCH

The type of "assembly match" must also be specified to obtain the desired appearance, and any sequence matching from opening to opening must be specified.

Running Match—Running Match produces a non-symmetrical appearance on any single door face. Veneer pieces of unequal width are common and each face is assembled from as many veneer pieces as necessary. Running Match is the industry standard.

Balance Match—Balance Match has a symmetrical appearance. Each face is assembled from an even or odd number of pieces of uniform width before trimming. This match reduces veneer yield.

Center Balance Match—A symmetrical appearance is also achieved with Center Balance Match. Each face is assembled from an even number of veneer pieces of uniform width before trimming. Thus, there is a veneer joint in the center of the panel. This match further reduces veneer yield.

Pair Match—Pair Match describes the way in which leaves of veneer are assembled for a pair of doors or a series of door pairs in the immediate vicinity.

Set Match—Set match describes how leaves of veneer are assembled for sets of doors hung adjacently.

Finally, Blueprint Matched Panels and Components are manufactured to the exact sizes the manufacturer determines from the blueprints, clipping and matching each individual face to the project's specific needs. Each face will be matched in sequence with adjacent panels, doors, transoms, and cabinet faces as needed to provide for continuity. Unless specified, running match is standard.

High Pressure Decorative Laminate doors are available in a full array of patterns, solid colors, and wood grains, as well as custom designs like this one.

High Pressure Decorative Laminates (HPDL)

Moving on from veneers, High Pressure Decorative Laminate (HPDL) doors are available in a full array of patterns, solid colors, and wood grains. HPDL faces are consistent, durable, and cost effective and available with custom designs. They do not require on-site staining, sealing, or painting and have minimal maintenance costs. Edge-before-face construction minimizes the appearance of seams and reduces chipping by limiting the potential contact areas. In addition, HPDL doors may be GREENGUARD Air Quality Certified.

Fiber Reinforced Laminate (FRL)

Fiber reinforced laminates (FRLs) are ideal for the highest-traffic applications such as schools, hospitals, and hospitality, because of stain resistance and increased durability over other engineered face materials. The material is available in a variety of patterns and wood grains, no removable edge is required, and stainless steel edge guards are available.

Mill Option Paintable Surface

Mill option paintable surfaces provide a consistent substrate with no raised grain, knots, or flaws to show-through for opaque finishes. Doors are available pre-primed, reducing the need to sand or prime in the field. They are considered a WDMA Premium Grade 3-ply construction.

COMMERCIAL DOOR COMPONENT ASSEMBLY

For commercial applications, a 7-ply door assembly is standard, which includes a core, backer materials, crossbands, and thinner face materials. 7-ply wood doors are constructed using pre-manufactured 3-ply door skins, which consist of a face, crossband, and back veneer and are applied with cold press technology to each side of a drop-in core assembly using Type II, water resistant adhesives.

These skins are readily available for face materials such as birch and oak (rotary cut or plain sliced) and mahogany (plain sliced). Exotic and AA veneers are difficult to source for 3-ply skins and are often only available in book and running matched. 7-ply doors have limited warranties with 1 year being standard.

ARCHITECTURAL DOOR COMPONENT ASSEMBLY

3-ply and 5-ply door construction is standard for architectural applications. 3-ply consists of the core and face material assembled with hot press technology. Symmetry or equal plys surrounding the core assembly is an important manufacturing technique to avoid warping. 3-ply doors are primarily used for high pressure decorative laminate doors in architectural applications such as office spaces or low use areas. They are not as stable and durable as 5-ply HPDL doors and are not available with wood veneer, as the core will show through or telegraph.

Doors with 5-ply construction include core assembly, crossbands, and faces manufactured with hot press technology. 5-ply door construction is available with two edge options—a compatible wood edge, or a compatible wood stile with exposed crossbands.

For architectural applications such as hospitals, full service hotels, and class A office space, 5-ply wood door construction is preferred by most end users and architects because the crossbands provide increased stability, the face veneer is thicker than 7-ply, and the manufacturing technique provides a strong, durable bond between the component parts .

ARCHITECTURAL WOOD DOOR MANUFACTURING METHODS

In architectural wood door manufacturing there are 3 methods of core assembly: drop-in core, loose layup, and bonded core. Drop-in core assembly consists of the core material

dropped into a pre-assembled wood frame without adhesive. The core must be smaller than the frame, resulting in gaps up to ¼". Also, the core and frame are not bonded or glued together or sanded as a unit. Because of this construction, telegraphing is common. A drop-in core is used in 7-ply door construction.

In loose lay-up construction wood stiles and rails are NOT attached to one another or the core. Rather, they are placed loose around the core without adhesive. Because the core and frame are not bonded, gaps up to ¼" can occur and they are not sanded as a unit. Telegraphing is common. Loose lay-up construction is also used in 7-ply door construction.

With bonded core manufacturing, stiles and rails are bonded to the core and the entire assembly is sanded smooth. There are no voids between the stiles, rail, and core; this smooth surface limits the possibility of telegraphing. The bonded core method is used in 3-ply, 5-ply, and some 7-ply door constructions.

Press Technology—Hot Press vs. Cold Press

Architectural wood doors are constructed using hot press or cold press technology. Controlling the press process is key to door manufacturing consistency but in most cases certain factors during the cold press process are uncontrollable. Therefore, in order to assure the greatest degree of control, consistency, and quality in door construction, be sure to specify hot press. Hot press controls all three critical factors for consistency in manufacturing the highest performing wood doors. Hot press technology involves pressing each door individually in a platen under controlled pressure, temperature and time, based on the type and thickness of material.

Cold press technology involves stacking a pile of doors one on top of another and placing them in a press at the ambient temperature until the adhesives are cured. The pile of doors creates uneven pressure and the curing is dependent on the surrounding temperature and humidity conditions. Cold pressing takes much longer and cannot produce the quantity or quality that hot pressing does.

Machining

There are two types of machining, factory and in the field. Factory machining is available for architectural wood doors, and ensures perfect installation because of the precision of the automated process during manufacturing. Machining equipment is bar code computer operated, which results in more consistency and closer tolerances. fire-rated doors require licensed machiners, but factory machining ensures the performance of hardware.

Field machining is done with hand tools and has inconsistent results due to lack of tool and fabricator consistency in the field. In addition, the margin of error is higher from individual to individual.

FINISH OPTIONS FOR ARCHITECTURAL WOOD DOORS

Now let's discuss finish options, which protect wood from moisture, handling damage, and harsh chemicals, and can be applied in either a factory or in the field under jobsite conditions. The sooner moisture is restricted from entering or leaving, the longer wood lasts and the finer it looks. It should be noted, however, that finishing only retards moisture penetration; it will not prevent it. The finishes discussed here are intended for interior applications only.

Transparent finishes without stain provide a protective "window" for the wood, maintaining its natural look. Transparent finishes with stain provide the architect or designer an opportunity to create a striking visual effect by modifying the color, look, and sheen of the door. Opaque finishes protect the wood and provide a solid color painted appearance.

Factory finishes are applied in a controlled environment that is clean and well-lit, and sanding and staining is automated for consistent results. Factory finishing also reduces on-site VOC emissions. Additionally, responsibility shifts from the jobsite to the manufacturer to provide specified color and finish results. When applied in the field however, dust, poor lighting, hand sanding, and staining produce inconsistent finishes. The majority of architectural wood doors are now finished at the factory as opposed to the jobsite. It is highly recommended that specifications require factory finishing to achieve the best overall door appearance, consistency in finish, and durability.

Types of Wood Finishes

A variety of wood finishes are available, from single stains to multi-step processes. When selecting a finish, consider the desired appearance, exposure, and maintenance it will require. There are two recommended finishing systems that are commonly referenced for architectural wood flush doors.

Finish options protect wood from moisture, handling damage, and harsh chemicals, and can be applied in either a factory or in the field under jobsite conditions.

These are:

TR-2 & OP-2 (Catalyzed Lacquer)

TR-8 & OP-8 (UV Cured Acrylated Polyester/Urethanes)

* "TR" indicates a transparent finish, while "OP" indicates an opaque finish.

* Opaque finishes are typically applied in the field, not the factory.

Finishes are available in different bases and curing methods. The basic types are solvent, water reducible or ultraviolet cure. Solvent bases cure by the evaporation of volatile organic compounds (VOC's) into the atmosphere and their use is regulated by environmental agencies. Water base systems evaporate water for curing. Ultraviolet (UV) finishes are cured using light to create a chemical reaction within the finishing material. UV finishes are typically the most environmentally friendly of the systems used for architectural door production finishing.

WDMA TR-8 or AWS System 9 finishes use water based stains and most factory finished doors are offered in a UV-cured catalyzed polyurethane system. For all projects, custom color matching is available. After the stain three

sealer coats and two topcoats are applied to shield and protect flush doors. A computer-controlled automatic sprayer provides durable, even coats for flawless application.

For AWS System 2 a pre-catalyzed laquer finish is standard. Oil based stain is either hand-sprayed or hand-wiped and achieves a furniture grade finish. Artisans tailor the finish process to the individual species of veneers being used to create a furniture grade finish. Multiple sheen options are available, including an opaque lacquer finish. The transparent pre-catalyzed lacquer provides a warm, vibrant finish that enhances the beauty and intricate craftsmanship of architectural wood doors.

UV-Cured Catalyzed Polyurethane

A UV-cured catalyzed polyurethane finish protects wood from moisture, handling, or harsh chemicals and must be applied in a controlled environment. This finish also uses WDMA TR-8 or AWS System 9 water based stains. The system most often specified is TR/OP 6 - Catalyzed Polyurethane, which provides the highest performance properties of production finishes. They are typically roll coated using a high solids, VOC-free material, then cured by an ultraviolet (UV) process.

These finishes are completely cured before leaving the manufacturing plant and have the highest performance ratings for wear, chemical resistance, durability, abrasion, and stain resistance.

Value-Added Options

Some manufacturers provide value-added options such as installed, surface-applied moldings, or factory-installed glazing, louvers, and stainless steel mortised edge guards. In addition, finished top and bottom rails with veneer or HPDL, or sealed top and bottom rails are available. These options result in less installation time at the jobsite and ensure desirable design and performance.

AWS AND WDMA STANDARDS

WDMA is the industry standard for door manufacturers, while the Architectural Woodwork Standards (AWS) are typically used in installations where the doors are blueprint matched with wall paneling and/or the doors are adjacent to millwork. Therefore, these standards match requirements on the doors so they are consistent with the surrounding millwork. However, most architectural and commercial doors are not directly adjacent to panels or millwork, so the requirements in WDMA are more than adequate to ensure a consistent appearance amongst doors.

	7-ply Commercial	5-ply Architectural
Faces	Standard 3-ply wood veneer of all grades	Grade A wood veneer
Core	Drop-in core or loose lay-up core, standard	Bonded and sanded monolithic core
Stiles	1–1/4" softwood stiles, standard	1–3/8" SCL inner stiles with 1/16" compatible hardwood outer edge
Rails	2–1/2" softwood rails, standard	1–3/8" SCL
Adhesives	Type II bond, standard	Type I bond
Pressing	Cold Press	Hot Press
Warranty	One year, five year or limited lifetime	Lifetime of installation including rehanging & refinishing costs
NOTE: Specifications vary by grade of door and manufacturer.		

AWS

The AWS, 2nd Edition is a joint standard adopted and published in 2014 sponsored by the Architectural Woodwork Institute (AWI), the Architectural Woodwork Manufacturers Association of Canada (AWMAC), and the Woodwork Institute (WI). These standards are applied to the fabrication and installation of all architectural wood products in climate controlled environments and are intended to assist the design professional in specifying a variety of millwork products that meet the functional and aesthetic requirements of their clients.

The joint standards are based on three definitive levels of materials and workmanship: Economy, Custom, and Premium Grade. Premium grade doors are intended for the finest buildings due to increased cost and limited availability. AWS requires AA grade veneers based on HPVA panel veneer grading tables. Book or slip match and balance center assembly match is required.

The nominal minimum width of face components for premium grade veneers is 5" for plain sliced veneer, 3" for quarter sliced veneer, and 5" for rotary cut veneers. AWS defines premium grade veneer as, "The highest grade available in both material and workmanship intended for the finest work." These veneers should be reserved for special projects and feature areas.

Custom is the standard grade that is intended for high-quality appearance. Grade A faces, as well as book and running match, are required. Veneers are available to meet custom requirements. Custom grade is the most commonly specified grade, as there is no difference in performance between custom and premium doors.

WDMA Performance Duty Levels

WDMA 1.S 1A-13 is the Industry Standard for Interior Architectural Wood Flush Doors. Like AWS, there are three performance duty levels for this standard: Extra Heavy Duty, Heavy Duty, and Standard Duty.

Extra Heavy Duty involves doors where use is considered heavy and frequent, and requires the highest minimum performance standards. Applications include classrooms, patient rooms, public bathrooms, dormitory rooms, auditorium entry, detention/correctional, gymnasium/locker rooms, and surgical entry/trauma centers.

Heavy duty door usage is moderate, and requires intermediate minimum performance standards.

Examples include assisted living room entry, office-interior passage, stairwell, mechanical service, hallway, hotel/motel room entry, storage, apartment/condo entry, X-ray, acoustic, or medical examination rooms.

Standard Duty may be considered where frequency of use is low, and requires the lowest minimum performance standards. Usages may include a closet, wardrobe, private bathroom, or low usage office.

WDMA Door descriptors are used to identify construction for architectural wood doors. Manufacturers use multiple naming systems or branding for their products and the WDMA descriptors standardize these offerings. The descriptors identify the core, core assembly, and face material. PC-5 describes a particleboard core door with veneer faces using 5-ply construction with stiles and rails bonded to the core. PC-HPDL-5 is the same as above with High Pressure Decorative Laminate faces. An "F" is added to the descriptors to identify a non-bonded core assembly.

These descriptors are important for specification writers to identify doors without using proprietary names associated with a single door manufacturer. It also offers a short hand way to specify core, core assembly, and face material that is recognized by the door industry.

Typical Specifications

Specifications vary by grade of door and manufacturer. The table above compares typical architectural specifications for five- and seven-ply doors. The five-ply architectural stile is 1–3/8 inch, composed of hardwood edge with the remainder of the stile being SCL (LSL) for strength, stability, and cost. The advantages of five-ply construction include face material availability, core assembly, and stile and rail performance and aesthetics. Hot press technology is superior to cold press methods and is often backed with a lifetime of installation warranty.

Summary

In order to achieve the beautiful finished product you have envisioned, you must have a good understanding of architectural wood door components, constructions, and finishes. We hope you now have a better understanding of factors you need to consider when specifying architectural wood doors. ■

CASE STUDY

Duke Cancer Center

Project Profile:

The Duke Cancer Center, a teaching and research hospital in North Carolina, is a 267,000 square foot fully integrated cancer care and research facility. They are ranked #13 nationally and the building offers state-of-the-art patient care with a more streamlined approach to cancer care. The building was designed with input and suggestions from patients, caregivers, faculty, and staff.

At Duke Cancer Center the doors needed to match the millwork package seamlessly while providing the protection patients and staff demand.

Building Challenge:

With cancer care being the focus of the building, the atmosphere needed to be warm and inviting and be a place where patients feel comfortable while maintaining their privacy. In addition, the doors needed to match the millwork package seamlessly while providing the protection patients and staff demand.

Over 700 openings for the Duke Cancer Center were specified. Veneer doors were chosen that feature a unique low-sheen finish and were hand selected for the project. The fire-ratings for the doors include 20-, 45-, and 90-minutes. Some of the doors used featured an Agrifiber core which contains no added urea formaldehyde and are composed of pre-consumer rapidly renewable material. The warmth of the facility was enhanced while patients' privacy was maintained.