

ARCHITECTURAL FLUSH DOORS

SECTION
1300

Notice to Specifier

When specifying fine architectural flush wood doors, there are essentially two different types of standards from which to choose.

One type of standard is written by the woodworking associations, either the Woodwork Institute of California (WIC), titled the *Manual of Millwork*, or this standard, the *Quality Standards Illustrated*, which is a joint effort of the Architectural Woodwork Institute and the Architectural Woodwork Manufacturers Association of Canada (AWI/AWMAC).

The other type is written by the door manufacturer's association, the Window and Door Manufacturers Association (WDMA), and is titled I.S. 1-A.

Use either one of the woodworking standards, or use the WDMA standard, but *never both* in project specifications. The two types are different enough that compliance with both at the same time is impossible. Either of the two woodworking standards or the manufacturer's standard can serve the needs of the project. Understand the differences and make a choice when writing specifications for wood doors.

The following pages detail a woodworking standard. Every effort has been made to make this standard (AWI/AWMAC) comparable to that of WIC for the highest level of work, called Premium Grade by the woodworking associations.

Doors defined as Premium by others are not necessarily fabricated to meet these Standards.



CRITICAL NOTE AND WARNING:

The status of fire resistant doors and openings is in the process of great change as this Standard goes to press. The design professional shall contact the architectural hardware consultant to verify that the total opening complies with both international and local code requirements before finalizing the specification for fire rated doors, hardware, and openings.

Section 1300 Selection and Specification Checklist

Because most architecture, specification, and design firms have electronic master specifications in place, the AWI and AWMAC offer this quick checklist. A review of these items may help the design and specification team issue a complete and accurate contract document and avoid missing things vital to the successful completion of the project. The checklists are not considered a part of the Quality Standards for the purposes of compliance.

Part 1. GENERAL

1.1. REFERENCES

- A. AWI/AWMAC Quality Standards Illustrated (QSI), current edition

1.2. SUBMITTALS

A. Shop drawings:

- Submit two copies; one of which will be returned with reviewed notations prior to commencement of work under this section.
- Indicate plans and elevations, materials, surface grain directions, profiles, assembly methods, joint details, fastening methods, accessories, hardware, compliance with specified fire-retardant treatments, preservative treatments, and schedule of finishes.

B. Finish samples:

- When appropriate, submit one or more samples of veneer-on-substrate, 200 x 250 mm [8 x 10"] illustrating expected range of component finish color and/or grain.
- When appropriate, submit one or more samples of solid lumber, 300 square centimeters [50 square inches] illustrating expected range of component finish color and/or grain.
- The sample shall bear identification of the project, architect or designer, general contractor, woodwork manufacturer, items to which the finish applies and the system utilized to attain the finish.

1.3. QUALITY ASSURANCE

- A. Perform work in accordance with [Premium] [Custom] [Economy] Grade quality
- B. Work in this section shall comply with the specified Grade(s) of Work and Section (s) of the current edition of the AWI/AWMAC Quality Standards Illustrated.

1.4. QUALIFICATIONS

- A. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified.
- B. Manufacturers who are members in good standing of the Architectural Woodwork Institute (AWI) or the Architectural Woodwork Manufacturers Association of Canada (AWMAC) and are familiar with this Standard.

1.5. DELIVERY, STORAGE AND HANDLING

- A. Protect work from moisture damage according to QSI, Section 1700, Installation.

Part 2. PRODUCTS

2.1. MANUFACTURERS

- A. Manufacturers who are members in good standing of the Architectural Woodwork Institute (AWI) or the Architectural Woodwork Manufacturers Association of Canada (AWMAC) and are familiar with this Standard.

2.2. LUMBER

- A. Softwood Lumber: If a particular species is desired, specify here.

- For exposed surfaces:
- For semi-exposed surfaces:
- For concealed surfaces:

- B. Hardwood Lumber: If a particular species is desired, specify here.

- For exposed surfaces:
- For semi-exposed surfaces:
- For concealed surfaces:

2.3. PANEL PRODUCTS

A. Softwood plywood: Not usually used for in fine architectural woodwork, but specify here if part of the design aesthetic.

- For exposed surfaces:
- For semi-exposed surfaces:
- For concealed surfaces:

B. Hardwood plywood: Made with medium density particleboard or fiberboard (MDF) core for interior use or moisture-resistant core stock for exterior use; specify face veneer species here.

- For exposed surfaces:
- For semi-exposed surfaces:
- For concealed surfaces:

C. High-pressure decorative laminate (HPDL), specify by brand name and design name/part number.

- For exposed surfaces:
- For semi-exposed surfaces:

D. Core material for veneered or laminated components, if other than QSI standards:

- For exposed surfaces:
- For semi-exposed surfaces:

E. Solid surface materials, Thermoplastic sheets, Acrylic or methacrylate sheets, Solid phenolic core, or any other special panel product, specify by brand name and design name/product number.

2.4. WOOD TREATMENT

A. List the specific local requirement for fire retardant treatment, if any.

B. List the specific chemical and process for preservative treatment, if any.

2.5. GLAZING, HARDWARE, AND ACCESSORIES

A. If glass is to be supplied by woodworker, the materials and requirements should be listed here.

- Wood stops shall conform to the QSI for the Grade of Work specified.
- Finish coats on glazed exterior work, if any, shall be allowed to flow on to the glass.

B. Fasteners: Size and type to suit application. Weather resistant if exterior. The QSI does not set standards for fasteners.

C. Hardware, if not specified by brand name and part number, shall be mill option to meet QSI minimums.

2.6. FABRICATION

A. Fabricate to [Premium] [Custom] [Economy] Quality Standards.

B. Shop prepare and identify components of assemblies for matching during site assembly.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

D. Select a joinery technique, or leave it up to the manufacturer to choose from QSI compliant methods.

2.7. FINISHING MATERIALS AND APPEARANCE

A. List the name of the finish system (topcoats) to be used from Section 1500

B. List the sheen desired: [Flat] [Satin] [Semi-gloss] [Gloss].

D. List the special or extra steps and/or products to be used, such as bleach, distressing, filler, glaze, shading, stain, toner or washcoats.

2.8. FINISHING REQUIREMENTS

- A. Sand work smooth and set exposed nails [and screws].
 - For opaque finishes, apply wood filler in exposed nail [and screw] indentations and sand smooth.
 - For transparent finishes, use wax or burn-in filler which blends with surrounding color and sheen, often after stain and before final top coat.
- B. When combining wood and laminates or other specialty products, careful consideration must be given to finishing specifications. Responsibility for finish wood parts should be clarified by the design professional here.
- C. Finish work in the factory in accordance with Section 1500.
- D. [Prime paint] [Seal] surfaces in contact with cementitious materials.

Part 3. EXECUTION

3.1. EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are in place and ready to receive this work.

3.2. INSTALLATION

- A. Install work in accordance with [Premium] [Custom] [Economy] Grade, Section 1700, QSI.
- B. Set and secure materials and components in place, plumb and level.

3.3. ADJUSTING

- A. Adjust work under provisions of Section [] of the contract documents.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4. CLEANING

- A. Clean work under provisions of Section [] of the contract documents.



General Criteria

1300-G-1

Scope

This section defines the terminology, grades, and construction alternatives for flush wood doors as used primarily in commercial construction.

Includes:

- Unique or special architectural doors (Premium Grade)
- “Building-standard” doors (Custom Grade)
- Budget oriented doors (Economy Grade)
- Doors manufactured in conjunction with other architectural woodwork and millwork for a specific project.

Excludes:

- Commodity doors or commercial doors specified, manufactured, or purchased directly or without the benefit of selection, performance, and production control under these standards.

Flush doors are manufactured with a variety of face and edge materials, crossbanding, and core constructions. These are described so that a specifier may select a type of door which will satisfy function and performance criteria.

1300-G-2

Warranties

Door warranties vary between manufacturers as to:

- (1) what is covered by the warranty;
- (2) duration of the warranty;
- (3) items and conditions that void the warranty and;
- (4) extent of replacement and cost coverage. Warranties vary between interior and exterior exposure.

Most manufacturers do not warrant the following:

- (1) doors having different species, face materials, finish, or laminates on opposite sides;
- (2) doors with light or louver cutouts nearer than five inches from the door edge, or doors with less than five inches between cutouts for lights, louvers, locks, closures, and/or other hardware cutouts (six inches on fire-rated doors; as small as one and one half inches on SCLC doors);
- (3) appearance of doors with field-applied finishes;
- (4) fire-rated doors in exterior locations;
- (5) doors with cut-outs exceeding 40% of the door area or 54" of door height, and
- (6) exterior doors not properly protected from the elements, and
- (7) any door having different temperature and humidity conditions on opposite sides.

1300-G-3

Exterior Doors

Exterior Doors — Wood doors not recommended for exterior use. Most flush doors no longer have extended exterior use warranties and most have no warranty at all. Refer to manufacturers' written warranty for specifics.

Exterior doors shall be water repellent treated at the factory after manufacturing. Protect doors according to manufacturers' requirements, which may include flashing of top, bottom and cut outs.

Wood doors shall be protected from the sun and other weather elements by overhangs, deep recesses, etc.

Medium density overlay faced doors shall be used for severe exposure conditions.

All surfaces of exterior doors shall be primed with an exterior enamel primer, followed by a minimum of two additional coats of exterior enamel on all surfaces.

1300-G-4

Specification Requirements

GRADE MUST BE SPECIFIED

These standards provide for three grades: Premium, Custom, and Economy.

Premium Grade

The Grade specified when the highest degree of control over the quality of workmanship, materials, installation and execution of the design intent is required. Usually reserved for special projects, or feature areas within a project.

Custom Grade

The Grade specified for most conventional architectural woodwork. This Grade provides a well-defined degree of control over the quality of workmanship, materials and installation of a project. The vast majority of all work produced is Custom Grade.

Economy Grade

The Grade which defines the minimum expectation of quality, workmanship, materials, and installation within the scope of the Standards.

Prevailing Grade

When the Quality Standards are referenced as a part of the contract documents and no Grade is specified, Custom Grade standards shall prevail. In the absence of specifications, material shall be mill option lumber or veneers suitable for opaque finish.

Code and Rule Requirements

The design professional shall be responsible for contract documents which clearly detail products which will comply with applicable codes and rules including, but not limited to, NFPA 80 requirements; ADA national and federal guidelines; local, state, and federal building codes; positive pressure requirements and labeling; glass or glazing; prefabricating and/or machining for hardware; prehang and/or machining for weatherstripping; priming, sealing and/or transparent finishing; and flashing and/or metal edge guards. The door manufacturer is often a valuable assistant in these matters.



WARNING: Contract documents shall:

- (1) - Specify neutral pressure or positive pressure compliance
- (2) - If positive pressure, specify the category of door: A or B assembly
- (3) - Specify whether the smoke and draft label (S label) is validated or not

1300-G-5

Face Material Selection

The panel face veneer standards of the Hardwood Plywood & Veneer Association HP-1, latest edition, is adopted as the minimum standard for face veneers except as hereinafter modified. Special veneer standards for doors are specifically excluded.

Specifiers need to determine and specify the following:

A. Veneers for Transparent Finishes

1. Species: There are numerous foreign and domestic species available. Involve your member woodworker early in the design and selection process.
2. Matching: Many different visual effects can be obtained by face veneer matching.
 - a. Appearance and layout of individual pieces of veneer
 - b. Matching between pieces (leaves) of veneer
 - c. Orientation of spliced veneer on a door face
 - d. Appearance of doors in pairs or sets
 - e. Appearance of doors with transoms

B. Materials for Opaque Finishes

1. Medium Density Overlay. This provides the optimum paintable surface for architectural doors. The resin saturated paper overlay is designed to paint well and provide an even sheen.
2. Close Grain Hardwood. Extra preparation will be required by the finisher as there will be grain show-through, open-appearing veneer joints, and other wood characteristics when using this product for a painted finish.
3. Mill Option. Face materials are determined by the manufacturer.

C. High Pressure Decorative Laminates (HPDL)

Virtually any high pressure decorative laminate color and texture can be used in the manufacture of architectural doors with

the following cautions:

- High gloss and Vertical Grades of HPDL will highlight minor core and surface imperfections, often unacceptably.
- HPDL doors are not recommended for exterior use due to the potential differences in lineal expansion between the faces and wood components when exposed to the elements.

1300-G-6

Core Construction

The design professional or specification writer has the opportunity to select the door core type. In the absence of specification, particle core (PC) shall be furnished, complying with particleboard standard ANSI A208.1 Particleboard, Grade LD-1 or LD-2. If a specific grade of particleboard is desired, it must be specified. When not specified the manufacturer has the option to use either LD-1 or LD-2 particleboard as core material.

Basic Core Types

The five most common core types are particleboard core, stave lumber (glued block) core (SLC), structural composite lumber core (SCLC), hollow core, and fire-resistant door core.

Specify one, or a combination of, solid core, hollow core, or fire-resistant core, and acoustical, ballistic resistant, or lead lining when required. The requirements for each core type are illustrated on the "Technical Criteria" pages of this section. In the absence of clear specifications, the core shall be the option of the manufacturer. Structural composite lumber (SCLC) may be specified in any Grade.

- When solid core is selected, specify one of the following: particleboard (PC), stave lumber (SLC), or structural composite lumber (SCLC). When the weight of the door is a design factor, consult the door manufacturer to determine the differences between PC, SLC, and SCLC core types.
- When hollow core, specify the honeycomb, with the minimum cell size required, grid core, or ladder construction.
- When fire-resistant core is required beyond the 20-minute label level, consult your door manufacturer for code-compliant core types, blocking options, metal edges, cut outs, and astragals.



Note: This standard recommends limiting the use of structural composite lumber (SCLC) to interior applications. The use of structural composite lumber (SCLC) for top and/or bottom rails, and blocking is acceptable. SCLC is proving to have excellent performance characteristics as a replacement for stave core, as it often minimizes or eliminates telegraphing of the lumber blocks through the face veneers or overlays. When the edge of an SCL-core door will be visible after installation, design professionals may wish to specify a fill-and-paint treatment, or the application of a veneer edgeband to conceal the coarse texture of the edge of the SCL material. It is the responsibility of the design professional to make a selection in the best interests of the client.

Special Core Types

Special cores for X-ray doors, acoustical doors, electrostatic shield doors, ballistic resistant, and others are available. Consult your AWI/AWMAC door manufacturer for information.

1300-G-7

Core to Edge Assembly

These standards provide for two types of assembly between the core and the vertical and horizontal edges in solid core doors:

PC, SCLC, SLC or FD: Stiles and rails securely glued to core, abrasively planed flat prior to application of faces

FPC, FSCLC or FSLC: Stiles and rails not bonded to core prior to application of faces

IHC or SHC: Stiles and rails placed around hollow core inserts.

1300-G-8

Fire Ratings

The Model Codes have established a fire door rating and operating classification system for use in protecting door openings in fire-resistive-rated wall constructions. All fire doors must meet the requirements of ASTM E-152 (Negative/Neutral Pressure) or ASTM E-2074 (Positive Pressure) and bear certifying labels of an independent testing agency approved by the building official. The type of fire rating (Positive Pressure or Neutral Pressure), the label required (20, 45, 60 or 90 minute) must be specified. If Positive Pressure is required, the Category of door and validation of the Smoke and Draft Control Label shall be specified and all appropriate fire and smoke gaskets shall be added to the hardware schedule by the design professional.



CRITICAL NOTE AND WARNING:

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1300-G-9

1300 Special Function Doors

Sound retardant (acoustical), lead lined (X-ray), ballistic resistant, and electrostatic shield doors are manufactured by some companies to meet these special needs. Refer to manufacturer's literature for details.

Transom panels and special function doors are available and should be specified carefully, with particular attention to the meeting edge details, operational functions and accessories, and veneer match options. In the absence of clear and complete specifications fabrication details will be at the option of the manufacturer.

1300-G-10**Door Selection and Performance Criteria**

AWI/AWMAC members have relied on the natural strength of hardwood lumber and veneer to assure long term performance. The construction minimums required in previous editions of our standards have proved to have superior performance over the long term. However, it has long been recognized that these strength qualities are more than are needed for some architectural applications and many building standard projects. Economy Grade doors to a large extent are built from mill option parts to allow for maximum of choice of material to produce doors that are more economical but may have shorter performance life. Two things have occurred to require a closer look at the performance properties of door parts and incorporate some minimum physical property requirements to all three door grades.

Many new engineered wood products are now replacing traditional hardwood to reduce cost and improve production efficiency. Some of these are as good or better than natural hardwood. However, the risk of look alike and substandard products that do not perform as well is great. Some have no grain direction, increasing the chance of failure due to excessive linear expansion. Some have less than sufficient strength properties.

Materials and construction methods used determine how well a door will resist high use and abuse. With the introduction of materials that are not the traditional hardwood lumber and veneer, this becomes more important. Wood products, whether natural or engineered, have a wide range of strength characteristics. The new requirements appear in Section 1300, Technical Criteria.

1300-G-11

Appearance of Individual Pieces of Veneer

Veneer Cuts

The way in which a log is cut in relation to the annual rings determines the appearance of veneer. The beauty of veneer is in the natural variations of texture, grain, figure, color and the way it is assembled on a door face.

Faces will have the natural variations in grain inherent in the species and cut. Natural variations of veneer grain and pattern will vary from these illustrations.

These are representative drawings of real wood veneers. Involve your woodworker early in the design and selection process.

Flat Cut (Plain Sliced)

Slicing is done parallel to a line through the center of the log. Cathedral and straight grained patterns result. The individual pieces of veneer are kept in the order they are sliced, permitting a natural grain progression when assembled as veneer faces.

Quarter Cut

A series of stripes is produced. These stripes vary in width from species to species. A natural distribution of ray fleck (flake) is a characteristic of this cut in red and white oak.

Rift Cut

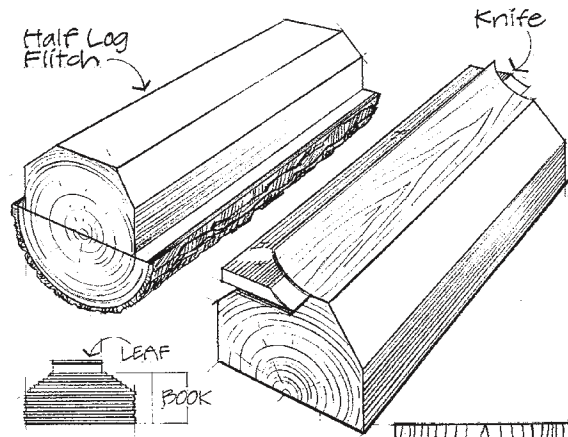
The cut slices slightly across the medullary rays, accentuating the vertical grain and minimizing the "fleck." Rift grain is restricted to red and white oak.

Comb Grain

Limited availability. This is a rift cut veneer distinguished by the tightness and straightness of the grain along the entire length of the veneer. Slight angle in the grain is allowed. Comb grain is restricted to red and white oak. There are occasional cross bars and fleck is minimal.

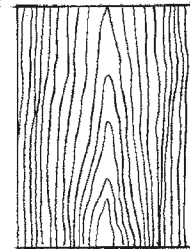
Rotary

This cut follows the log's annual growth rings, providing a generally bold random appearance.



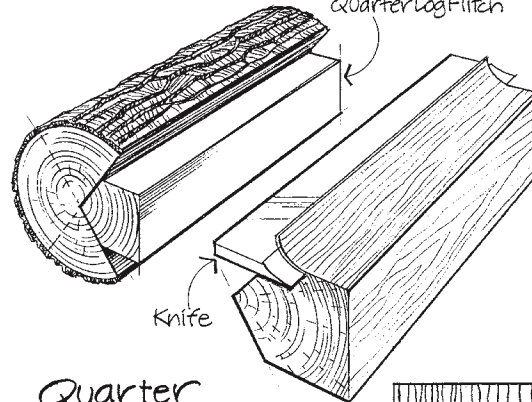
Plain Sliced
Or Flat Sliced
(slicer)

Leaf width depends on log size & placement in flitch.
Half Round A somewhat similar pattern is achieved by turning a half log flitch on a lathe.



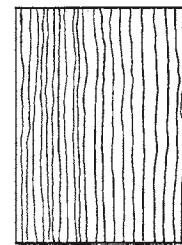
Cathedral Pattern

Flat Cut: Plain Sliced - Figure 1300-01
Quarter Log Flitch



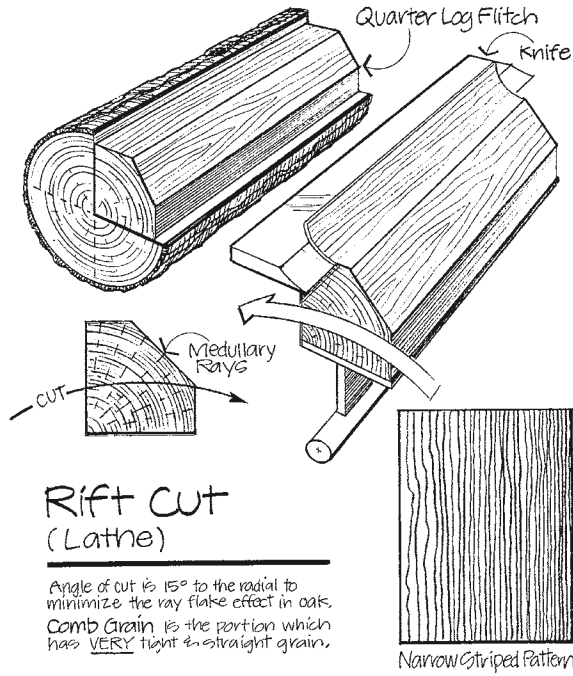
Quarter
Sliced
(slicer)

Flake pattern is produced when slicing through Medullary Rays in some species, principally oak.

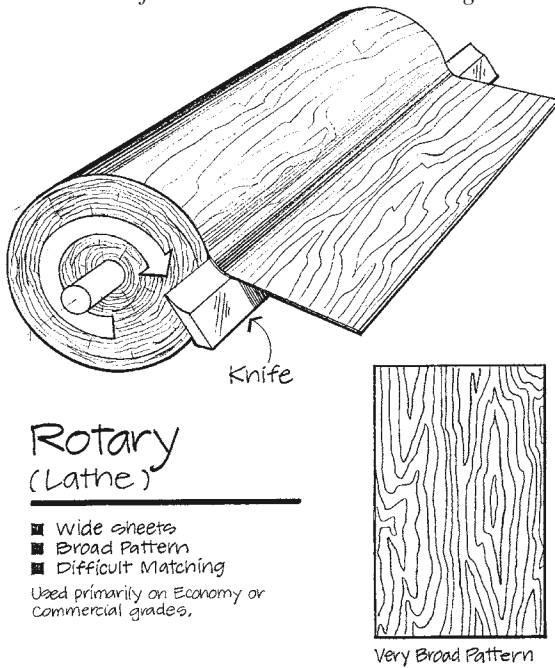


Narrow Striped Pattern

Quarter Cut Red and White Oak - Figure 1300-02



Rift Cut Red and White Oak - Figure 1300-03



Rotary Cut - Figure 1300-04

1300-G-12

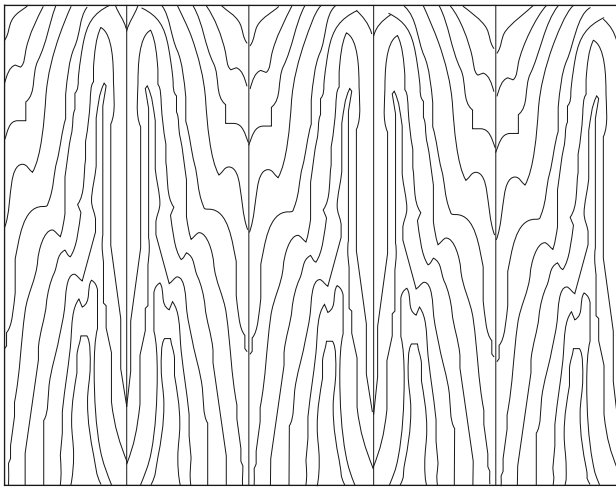
Matching Between Individual Pieces of Veneer

Leaf Matching

The way in which the individual cuts are placed next to each other during the fabrication of the veneer face is the next factor affecting the appearance of the doors. The type of match at the joint line must be specified.

Natural variations in the leaves and the progression of the grain pattern across the face are the hallmarks of real wood doors.

Book Match



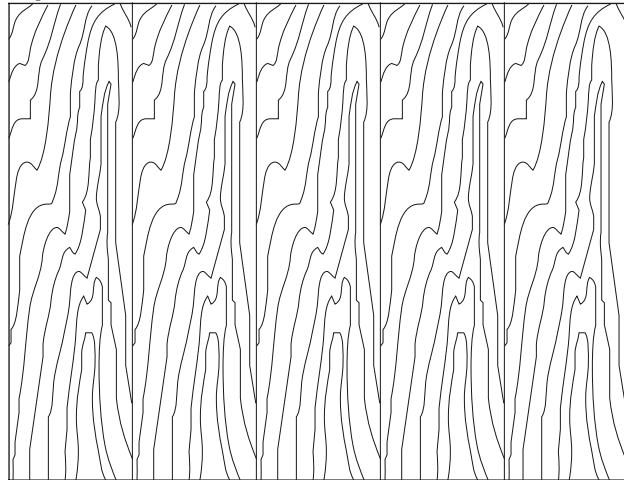
Book Match - Figure 1300-05

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, and less often with other cuts of veneers.

Barber Pole Effect in Book Match

Because the “tight” and “loose” faces alternate in adjacent pieces of veneer, they may accept stain differently, and this may result in a noticeable color variation. Book matching also accentuates cell polarization, causing the perception of different colors. These natural characteristics are often called barber pole, and are not a manufacturing defect. It is possible, in some instances, to minimize this effect with special finishing techniques.

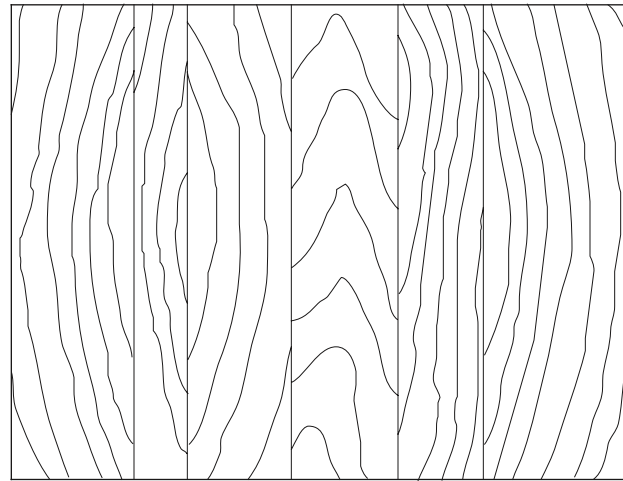
Slip Match



Slip Match - Figure 1300-06

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

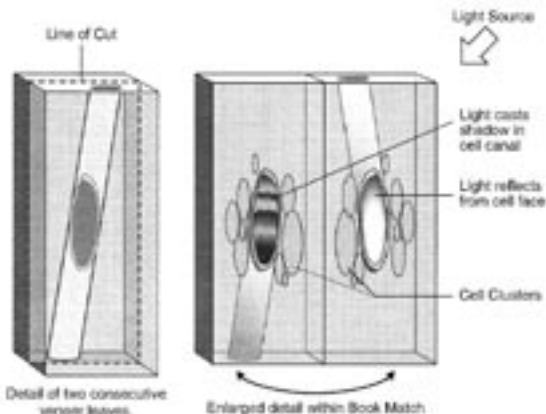
Random Match



Random Match - Figure 1300-07

A random selection of individual pieces of veneer from one or more logs. Produces a “board-like” appearance.

1300

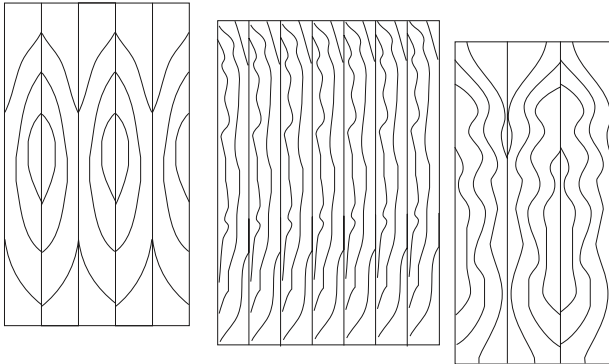


1300-G-13

Assembly of Spliced Veneer on a Face

The type of “assembly match” must be specified to obtain a desired appearance. Any sequence matching from opening to opening must be specified. The following three face assembly methods give a wide range of flexibility and cost control to the design professional.

Balance Match

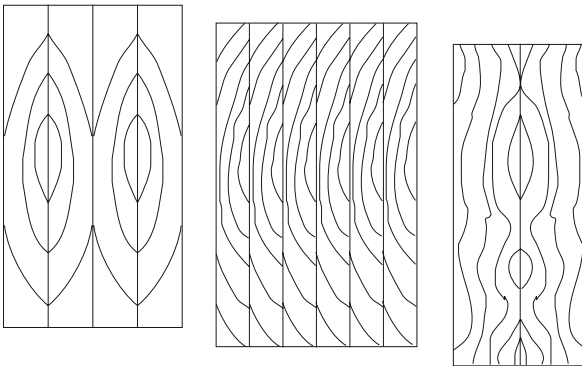


Balance Match

Balance Match - Figure 1300-08

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

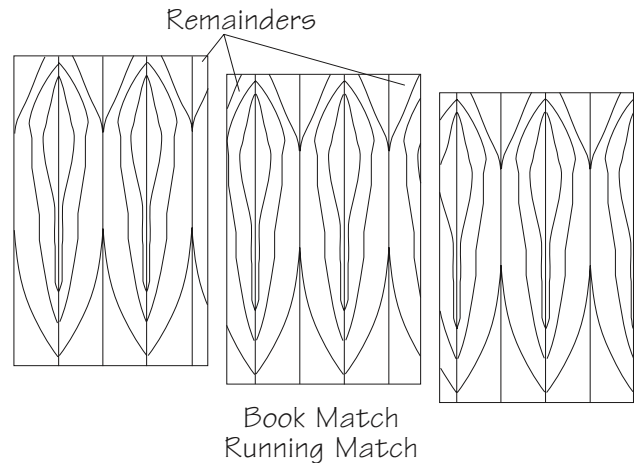


Balance and Center Match

Center Balance Match - Figure 1300-09

Symmetrical appearance. 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.

Running Match



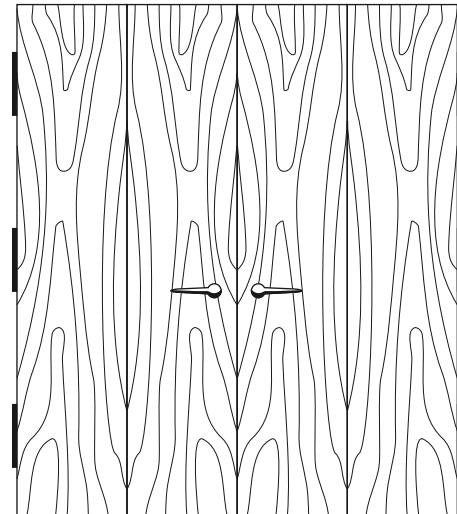
Running Match - Figure 1300-10

Non symmetrical appearance on any single door face. Veneer pieces of unequal width are common. Each face is assembled from as many veneer pieces as necessary.

1300-G-14

Doors in Pairs or Sets

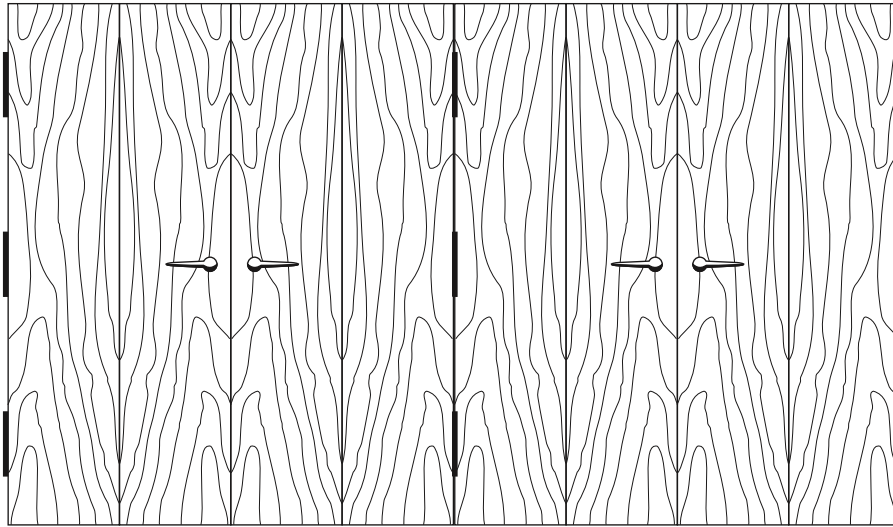
Pair Match



Door Pair Match - Figure 1300-11

Doors hung in adjacent sets or in close proximity may be (and in some grades, must be) specified as pair matched where appropriate. Note to specifiers: The illustration shows book-matched, center balance matched faces. The standards do not require this condition. A review of the previous few pages and careful specification will avoid misunderstandings.

Set Match



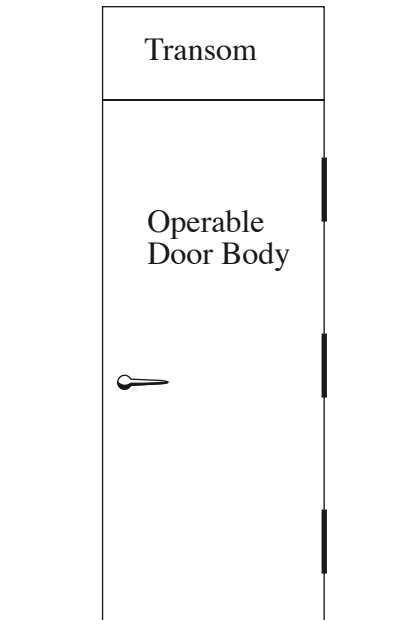
Door Set Match - Figure 1300-12

Doors hung in adjacent sets may be (and in some Grades, must be) specified as set matched where appropriate.

Note to specifiers: The illustration shows book-matched, center balance matched faces. The standards do not require this condition. A review of the previous few pages and careful specification will avoid misunderstandings.

1300-G-15

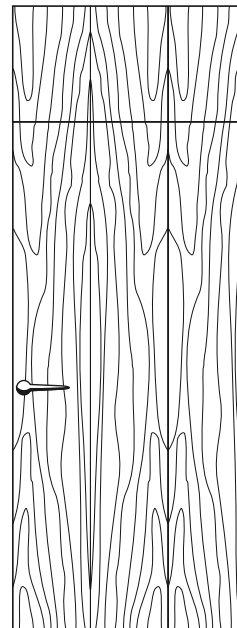
Doors with Transoms



Door Transoms - Figure 1300-13

The use of the transom increases the apparent height of the wood door and often enhances the appearance of the opening. The type of match should be specified, and a slight misalignment of veneer grain may occur between the transom and the door. Industry practice allows a variation in grain alignment from side to side of $\frac{3}{8}$ " on a single door, and $\frac{1}{2}$ " on pairs of doors with a single transom. Tighter tolerances must be specified as a part of Premium Grade doors.

Continuous Match



Continuous Match - Figure 1300-14

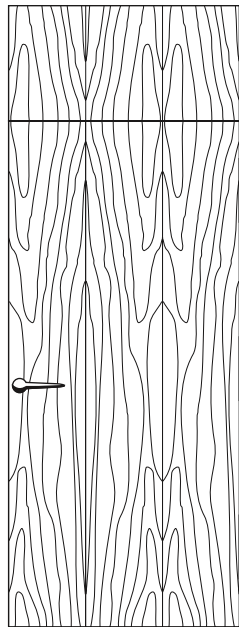
Provides optimum veneer utilization as each single piece of veneer extends from the top of the transom to the bottom of the door. Available veneer length in the species may limit this option.

Alignment Criteria

Grain pattern alignment between the door and transom, even when cut from the same panel, will vary to some extent. This is due to the natural progression of the annual rings which create the figure in the wood. Misalignment will be more apparent in doors veneered with open grain species than with close grain.

Misalignment of up to 9 mm [$3/8$ "] is permitted in every Grade.

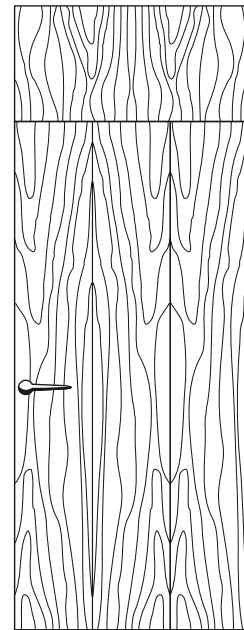
End Match



End Match - Figure 1300-15

A single piece of veneer extends from the bottom to the top of the door with a mirror image at the transom.

No Match



No Match - Figure 1300-16

Used only in Economy Grade doors.

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1300-G-16

Hardwood Veneer Face Grade Summary

Read Section 200 for the complete description of veneer face grades. The following tables summarize the text of the HPVA reprinted there. This data is also shown in Section 200.



Note: When veneers are specified as “natural” they may contain any amount or combination of sapwood and heartwood, with the resultant contrast in color in many species.

Doors fabricated to comply with this standard will require the same veneer grades as used in all the other sections of these standards. Other face veneer standards and/or criteria may be developed from time to time. They do not apply to doors specified to comply with the Quality Standards Illustrated.

AWI/AWMAC recognizes that cost is an important factor and having lower veneer standards can result in some savings. Specifying QSI Custom or Economy Grade meets that need. However, when doors are a part of an overall design scheme and/or are adjacent to other fine architectural woodwork specified under these standards, the level of quality of those doors must be consistent with other millwork components.

1300-G-17

Hardwood Veneer Face Grade Summary Tables (adapted from HPVA with permission)

Species	Ash, Birch, Maple, Poplar								
Cut	Plain sliced (Flat cut), Quarter, Rotary								
Grade Description	AA			A			B		
Color and Matching	Sap (White)	Heart (Red or Brown)	Natural	Sap (White)	Heart (Red or Brown)	Natural	Sap (White)	Heart (Red or Brown)	Natural
Sapwood	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Heartwood	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Color Streaks or Spots	Slight			Slight	Yes		Yes		
Color Variation	Slight		Yes	Slight	Yes		Yes		
Sharp Color Contrasts at Joints	No			No			No		
Type of Matching									
Book Matched	Yes			Yes			Specify		
Slip Matched	Specify			Specify			Specify		
Pleasant Matched	not applicable			not applicable			Yes		
Random Matched	Specify			Specify			Specify		
End Matched	Specify			Specify			Specify		
Nominal Minimum Width of Face Components ^a	Plain-Sliced — 152 mm [6"]			Plain-Sliced — 127 mm [5"]			Plain-Sliced — 76 mm [3"]		
	Quarter — 76 mm [3"]			Quarter — 76 mm [3"]			Quarter — 76 mm [3"]		
	Rotary — 152 mm [6"]			Rotary — 127 mm [5"]			Rotary — 102 mm [4"]		
Natural Characteristics									
Small Conspicuous Burls & Pin Knots - Combined Avg. Number	2 per 1 square meter (10 square feet)			4 per 1 square meter (10 square feet)			6 per 1 square meter (10 square feet)		
Conspicuous Burls - Max. Size	6.4 mm [1/4"]			9.5 mm [3/8"]			12.7 mm [1/2"]		
Conspicuous Pin Knots - Avg. Number	No			4 per 3 square meters (32 square feet)			3 per 1 square meter (10 square feet)		
Max. Pin Knot Size - Dark Part				3.2 mm [1/8"]			3.2 mm [1/8"]		
Max. Pin Knot Size - Total				6.4 mm [1/4"]			6.4 mm [1/4"]		
Scattered Sound and Repaired Knots - Combined Avg. Number	No			No			4 per 3 square meters (32 square feet)		
Maximum Size - Sound							9.5 mm [3/8"]		
Maximum Size - Repaired							3.2 mm [1/8"]		
Average Number - Repaired							4 per 3 square meters		
Mineral Streaks	No; Maple slight			Slight			Slight		
Bark Pockets	No			No			Few to 3.2 mm [1/8"] x 25.4 mm [1"]		
Worm Tracks	Slight			Slight			Slight; Ash yes		
Vine Marks	Slight			Slight			Slight		
Cross Bars	Slight			Slight			Yes		
Manufacturing Characteristics									
Rough Cut/Ruptured Grain	No			No			Slight		
Blended Repaired Tapering Hairline Splits	Two 0.8 mm [1/32"] x 76 mm [3"] on panel ends only			Two 1.6 mm [1/16"] x 152 mm [6"]			Four 3.2 mm [1/8"] x 203 mm [8"]		
Repairs	Very small blending			Small blending			Blending		
Special Characteristics									
Unfilled worm holes, open splits, open joints, open bark pockets, or doze not permitted in above grades.									
^a Outside components will be a different size to allow for edge trim loss and certain types of matching.									
Under Color and Matching: Red available in Birch and some Maple only, Brown available in Ash only.									

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1300-G-17 (continued)

Hardwood Veneer Face Grade Summary Tables (adapted from HPVA with permission)

Species	African and Honduras Mahogany, Lauan, Meranti		
Cut	Plain sliced, Quarter, Rotary		
Grade Description	AA ^a	A ^a	B
Color and Matching			
Sapwood	No	No	No
Heartwood	Yes	Yes	Yes
Color Streaks or Spots	Slight	Slight	Occasional
Color Variation	Slight	Slight	Moderate
Sharp Color Contrasts at Joints	No	No	No
Type of Matching			
Book Matched	Yes	Yes	Specify
Slip Matched	Specify	Specify	Specify
Pleasant Matched	not applicable	not applicable	Yes
Random Matched	Specify	Specify	Specify
End Matched	Specify	Specify	Specify
Nominal Minimum Width of Face Components ^b	Plain-Sliced — 152 mm [6"]	Plain-Sliced — 127 mm [5"]	Plain-Sliced — 76 mm [3"]
	Quarter — 76 mm [3"]	Quarter — 76 mm [3"]	Quarter — 76 mm [3"]
	Rotary — 152 mm [6"]	Rotary — 127 mm [5"]	Rotary — 102 mm [4"]
Natural Characteristics			
Small Conspicuous Burls & Pin Knots - Combined Avg. Number	2 per 1 square meter (10 square feet)	4 per 1 square meter (10 square feet)	6 per 1 square meter (10 square feet)
Conspicuous Burls - Max. Size	6.4 mm [1/4"]	9.5 mm [3/8"]	12.7 mm [1/2"]
Conspicuous Pin Knots - Avg. Number	No	4 per 3 square meters (32 square feet)	3 per 1 square meter (10 square feet)
Max. Pin Knot Size - Dark Part		3.2 mm [1/8"]	3.2 mm [1/8"]
Max. Pin Knot Size - Total		6.4 mm [1/4"]	6.4 mm [1/4"]
Scattered Sound and Repaired Knots - Combined Avg. Number	No	No	4 per 3 square meters (32 square feet)
Maximum Size - Sound			9.5 mm [3/8"]
Maximum Size - Repaired			3.2 mm [1/8"]
Average Number - Repaired			4 per 3 square meters
Mineral Streaks	No	Slight	Occasional
Bark Pockets	No	No	Few to 3.2 mm [1/8"] x 25.4 mm [1"]
Worm Tracks ^a	No	No	Slight
Vine Marks	Slight	Slight	Yes
Cross Bars	Occasional	Occasional	Yes
Manufacturing Characteristics			
Rough Cut/Ruptured Grain	No	No	Slight
Blended Repaired Tapering Hairline Splits	Two 0.8 mm [1/32"] x 76 mm [3"] on panel ends only	Two 1.6 mm [1/16"] x 152 mm [6"]	Two 3.2 mm [1/8"] x 203 mm [8"]
Repairs	Very small blending	Small blending	Blending
Special Characteristics			
Unfilled worm holes, open splits, open joints, open bark pockets, or doze not permitted in above grades.			
^a In Lauan and Meranti, Grade AA will permit occasional slight worm tracks, and Grade A will permit occasional worm tracks.			
^b Outside components will be a different size to allow for edge trim loss and certain types of matching.			

1300-G-17 (continued)

Hardwood Veneer Face Grade Summary Tables (adapted from HPVA with permission)

Species	Red and White Oak								
Cut	Plain sliced, Quarter, Rift and Comb Grain, Rotary								
Grade Description	AA			A			B		
Color and Matching	Red	<-Oak->	White	Red	<-Oak->	White	Red	<-Oak->	White
Sapwood	No		No	5% ^a		Yes ^a	10-20% ^b		Yes
Heartwood	Yes		Yes	Yes		Yes			
Color Streaks or Spots	Yes			Yes			Yes		
Color Variation	Slight			Slight			Yes		
Sharp Color Contrasts at Joints	No			No			No		
Type of Matching									
Book Matched	Yes			Yes			Specify		
Slip Matched	Specify			Specify			Specify		
Pleasuring Matched	Not applicable			Not applicable			Yes		
Random Matched	Specify			Specify			Specify		
End Matched	Specify			Specify			Specify		
Nominal Minimum Width of Face Components ^c	Plain-Sliced — 152 mm [6"]			Plain-Sliced — 127 mm [5"]			Plain-Sliced — 76 mm [3"]		
	Quarter/Rift — 76 mm [3"]			Quarter/Rift — 76 mm [3"]			Quarter/Rift — 76 mm [3"]		
	Rotary — 152 mm [6"]			Rotary — 127 mm [5"]			Rotary — 102 mm [4"]		
Natural Characteristics									
Small Conspicuous Burls & Pin Knots - Combined Avg. Number	3 per 1 square meter (10 square feet)			4 per 1 square meter (10 square feet)			8 per 1 square meter (10 square feet)		
Conspicuous Burls - Max. Size	6.4 mm [1/4"]			9.5 mm [3/8"]			12.7 mm [1/2"]		
Conspicuous Pin Knots - Avg. Number	No			4 per 1 square meter (10 square feet)			6 per 1 square meter (10 square feet)		
Max. Pin Knot Size - Dark Part				3.2 mm [1/8"]			3.2 mm [1/8"]		
Max. Pin Knot Size - Total				6.4 mm [1/4"]			6.4 mm [1/4"]		
Scattered Sound and Repaired Knots - Combined Avg. Number	No			No			4 per 3 square meters (32 square feet)		
Maximum Size - Sound							9.5 mm [3/8"]		
Maximum Size - Repaired							3.2 mm [1/8"]		
Average Number - Repaired							4 per 3 square meters		
Mineral Streaks	No			Slight, Blending			Few to 305 mm [12"]		
Bark Pockets	No			No			Few to 3.2 mm [1/8"] x 25.4 mm [1"]		
Worm Tracks	No			No			Slight		
Vine Marks	No			Slight			Yes		
Cross Bars	Slight			Slight			Yes		
Manufacturing Characteristics									
Rough Cut/Ruptured Grain	No			No			Slight		
Blended Repaired Tapered Hairline Splits	Two 0.8 mm [1/32"] x 76 mm [3"] on panel ends only			Two 1.6 mm [1/16"] x 152 mm [6"]			Four 3.2 mm [1/8"] x 203 mm [8"]		
Repairs	Very small blending			Small blending			Blending		
Special Characteristics									
Ray Fleck ^d	Slight, blending			Slight, blending			Slight, blending		
Rift and Comb Grain	Rift permits 1 mm [1"] in 12 mm [12"] max. grain slope; 2.5 mm [2.5"] in 12 mm [12"] max. grain sweep; occasional flake not to exceed 9.5 mm [3/8"] in width. Comb grain permits 0.5 mm [0.5"] in 12 mm [12"] max. grain slope; 0.5 mm [0.5"] in 12 mm [12"] max. grain sweep; occasional flake not to exceed 2.4 mm [3/32"] in width.								
Unfilled worm holes, open splits, open bark pockets, shake or doze not permitted in above grades.									
^a Sap allowed in Rotary only unless otherwise specified.									
^b 10% sap allowed in Rift, Comb and Plain-Sliced; 20% sap allowed in Rotary.									
^c Outside components will be a different size to allow for edge trim loss and certain types of matching.									
^d In the absence of specific flitch selection by owner representative, the natural distribution of ray fleck in quarter cut Red and White Oak is unlimited.									

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1300-G-17 (continued)

Hardwood Veneer Face Grade Summary Tables (adapted from HPVA with permission)


Species	Pecan and Hickory		
Cut	Plain sliced, Rotary		
Grade Description	AA	A	B
Color and Matching			
Sapwood	Yes	Yes	Yes
Heartwood	Yes	Yes	Yes
Color Streaks or Spots	Yes	Yes	Yes
Color Variation	Yes	Yes	Yes
Sharp Color Contrasts at Joints	No	No	No
Type of Matching			
Book Matched	Yes	Yes	Specify
Slip Matched	Specify	Specify	Specify
Pleasing Matched	not applicable	not applicable	Yes
Random Matched	Specify	Specify	Specify
End Matched	Specify	Specify	Specify
Nominal Minimum Width of Face Components ^a	Plain-Sliced — 152 mm [6"]	Plain-Sliced — 127 mm [5"]	Plain-Sliced — 76 mm [3"]
	Quarter not applicable	Quarter not applicable	Quarter not applicable
	Rotary — 152 mm [6"]	Rotary — 127 mm [5"]	Rotary — 102 mm [4"]
Natural Characteristics			
Small Conspicuous Burls & Pin Knots - Combined Avg. Number	11 per 1 square meter (10 square feet)	22 per 1 square meter (10 square feet)	No limit
Conspicuous Burls - Max. Size	6 mm [1/4"]	9.5 mm [3/8"]	12.7 mm [1/2"]
Conspicuous Pin Knots ^b - Average Number	6 per 1 square meter (10 square feet)	22 per 1 square meter (10 square feet)	No limit
Max. Pin Knot Size - Dark Part	3.2 mm [1/8"]	3.2 mm [1/8"]	3.2 mm [1/8"]
Max. Pin Knot Size - Total	6.4 mm [1/4"]	6.4 mm [1/4"]	6.4 mm [1/4"]
Scattered Sound and Repaired Knots - Combined Avg. Number	No	No	4 per 3 square meters (32 square feet)
Maximum Size - Sound			9.5 mm [3/8"]
Maximum Size - Repaired			3.2 mm [1/8"]
Average Number - Repaired			4 per 3 square meters
Mineral Streaks	Slight	Slight	Yes
Bark Pockets	No	Small, occasional	Few to 6.4 mm [1/4"] x 50.8 mm [2"]
Worm Tracks	No	Slight	Few
Vine Marks	Slight	Occasional	Yes
Cross Bars	Slight	Occasional	Yes
Manufacturing Characteristics			
Rough Cut/Ruptured Grain	No	No	Slight
Blended Repaired Tapering Hairline Splits	Two 0.8 mm [1/32"] x 76 mm [3"] on panel ends only	Two 1.6 mm [1/16"] x 152 mm [6"]	Four 3.2 mm [1/8"] x 203 mm [8"]
Repairs	Very small blending	Small blending	Blending
Special Characteristics			
Bird Peck ^c	No	Slight	Yes
Knife Marks	Knife marks may occur in these high-density species.		
Unfilled worm holes, open splits, open joints, open bark pockets, or doze not permitted in above grades.			
^a Outside components will be a different size to allow for edge trim loss and certain types of matching. ^b For Pecan and Hickory, conspicuous pin knots means sound knots 6.4 mm [1/4"] or less in diameter with dark centers larger than 1.6 mm [1/16"]. Blending pin knots are sound knots 6.4 mm [1/4"] or less in diameter with dark centers 1.6 mm [1/16"] or less and are permitted in all grades of Pecan and Hickory. ^c To achieve a more rustic appearance, bird peck shall be specified.			

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1300-G-17 (continued)

Hardwood Veneer Face Grade Summary Tables (adapted from HPVA with permission)

Species	Walnut, Butternut, Cherry		
Cut	Plain sliced, Quarter, Rotary		
Grade Description	AA	A	B
Color and Matching			
Sapwood	No	No ^a	No ^a
Heartwood	Yes	Yes	Yes
Color Streaks or Spots	Slight	Slight	Yes
Color Variation	Slight	Slight	Yes
Sharp Color Contrasts at Joints	No	No	No
Type of Matching			
Book Matched	Yes	Yes	Specify
Slip Matched	Specify	Specify	Specify
Pleasant Matched	Not applicable	Not applicable	Yes
Random Matched	Specify	Specify	Specify
End Matched	Specify	Specify	Specify
Nominal Minimum Width of Face Components ^b	Plain-Sliced — 152 mm [6"]	Plain-Sliced — 127 mm [5"]	Plain-Sliced — 76 mm [3"]
	Quarter — 76 mm [3"]	Quarter — 76 mm [3"]	Quarter — 76 mm [3"]
	Rotary — 152 mm [6"]	Rotary — 127 mm [5"]	Rotary — 102 mm [4"]
Natural Characteristics			
Small Conspicuous Burls & Pin Knots - Combined Avg. Number	3 per 1 square meter (10 square feet)	8 per 1 square meter (10 square feet)	22 per 1 square meter (10 square feet)
Conspicuous Burls - Max. Size	6.4 mm [1/4"]	9.5 mm [3/8"]	12.7 mm [1/2"]
Conspicuous Pin Knots ^c - Average Number	3 per 1 square meter (10 square feet)	6 per 1 square meter (10 square feet)	11 per 1 square meter (10 square feet)
Max. Pin Knot Size - Dark Part	3.2 mm [1/8"]	3.2 mm [1/8"]	3.2 mm [1/8"]
Max. Pin Knot Size - Total	6.4 mm [1/4"]	6.4 mm [1/4"]	6.4 mm [1/4"]
Scattered Sound and Repaired Knots - Combined Avg. Number	No	No	4 per 3 square meters (32 square feet)
Maximum Size - Sound			9.5 mm [3/8"]
Maximum Size - Repaired			3.2 mm [1/8"]
Average Number - Repaired			4 per 3 square meters
Mineral Streaks	Slight	Slight	Yes
Bark Pockets	No	No	Few to 3.2 mm [1/8"] x 25.4 mm [1"]
Worm Tracks	No	No	Slight
Vine Marks	Slight	Occasional	Yes
Cross Bars	Slight	Occasional	Yes
Manufacturing Characteristics			
Rough Cut/Ruptured Grain	No	No	Slight
Blended Repaired Tapering Hairline Splits	Two 0.8 mm [1/32"] x 76 mm [3"] on panel ends only	Two 1.6 mm [1/16"] x 152 mm [6"]	Four 3.2 mm [1/8"] x 203 mm [8"]
Repairs	Very small, blending	Small, blending	Blending
Special Characteristics			
Gum Spots	Occasional gum spots permitted in Cherry	Occasional gum spots permitted in Cherry	Gum spots and gum streaks permitted in Cherry
Unfilled worm holes, open splits, open joints, open bark pockets, or doze not permitted in above grades.			
^a Sap is allowed in A and B grades; however the percentage to be agreed to by buyer and seller. ^b Outside components will be a different size to allow for edge trim loss and certain types of matching. ^c For Walnut and Cherry, conspicuous pin knots means sound knots 6.4 mm [1/4"] or less in diameter with dark centers larger than 1.6 mm [1/16"]. Blending pin knots are sound knots 6.4 mm [1/4"] or less in diameter with dark centers of 1.6 mm [1/16"] or less and are allowed in all grades of Walnut and Cherry.			

 Other species not specifically listed should be as agreed to by the buyer and seller. These characteristics may be more or less restrictive than those outlined in the previous tables.

1300-G-18

Construction Details

General Moulding Requirements

Species shall match or be compatible with face veneer or laminate.

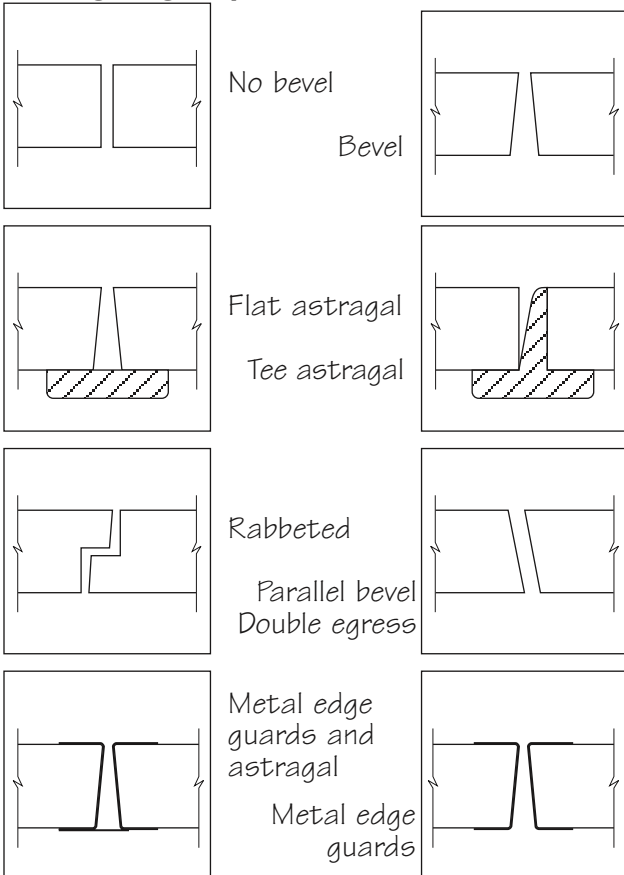
Specify transparent or opaque finish.

Moulding shall be free of open defects, shake, splits, or doze.

Moulding must be smooth and free of visible knife, saw, or sanding marks.

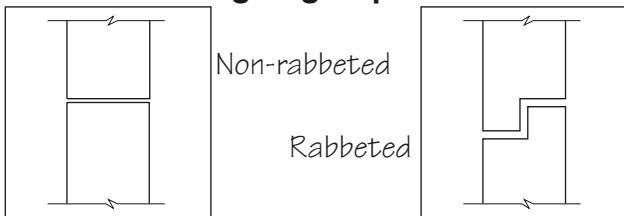
Specify from following options:

Meeting Edge Options



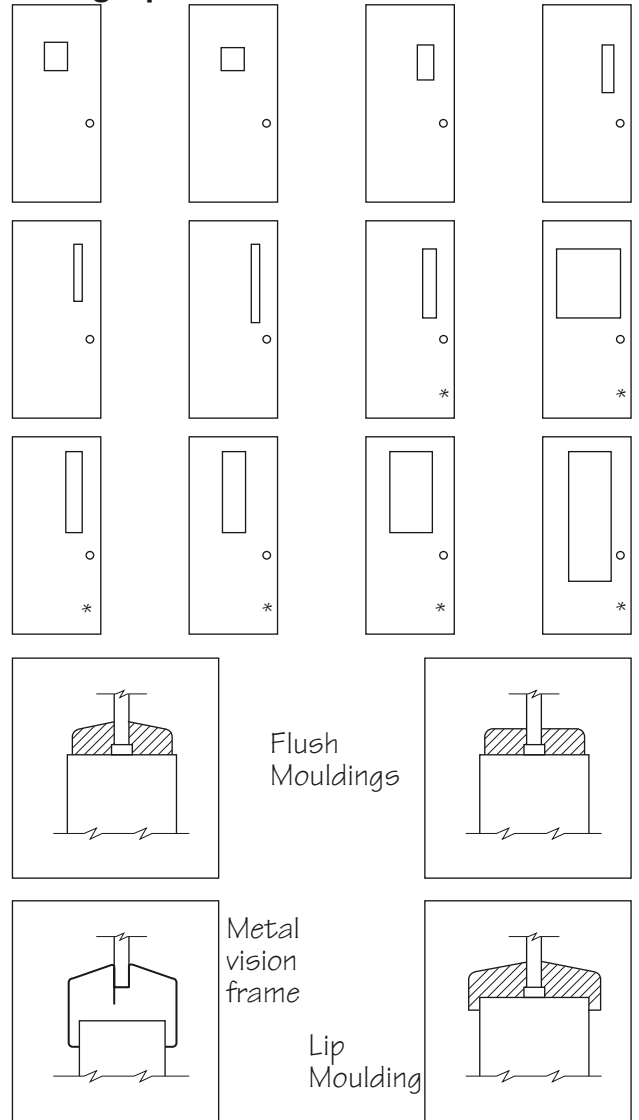
Meeting edge options - Figure 1300-17

Transom Meeting Edge Options



Transom edge options - Figure 1300-18

Glazing Options



Glazing Options - Figure 1300-19

W = Wood mouldings

M = Metal vision frames

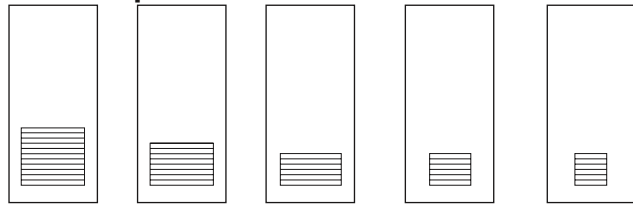
All cutouts for metal or wood vision panels must be a minimum of 152 mm [6"] from the edge of the door and/or other cutouts for louvers, locks, closers or other hardware for 45-minute though 90-minute doors. 20-minute PC and SLC doors must be a minimum of 127 mm [5"], and 20 minute SCLC doors must be a minimum of 38 mm [1 1/2"].

These distances must be maintained or the fire label and warranty will be voided.

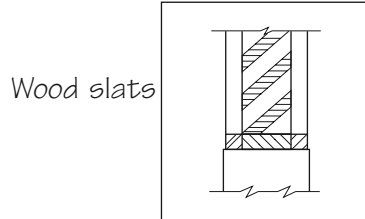
Using a 254 mm [10"] margin between the edge of the door and the edge of any cutout near the lock area will eliminate most label and warranty conflicts.

1300-G-18 Construction Details (cont.)

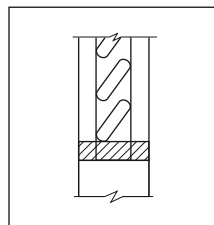
Louver Options



Variety of sizes

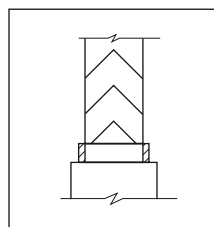
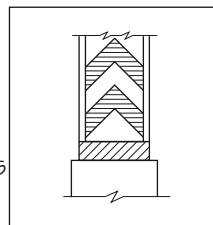


Wood slats



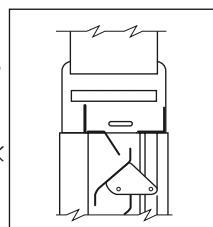
Wood slats

Wood chevrons



Metal chevrons

Fusible link



Louver Options - Figure 1300-20

WL = Wood louver.

Not allowed by NFPA 80 in fire-rated doors.

FL = Fusible link louver.

Not allowed by NFPA 80 in means-of-egress fire doors.

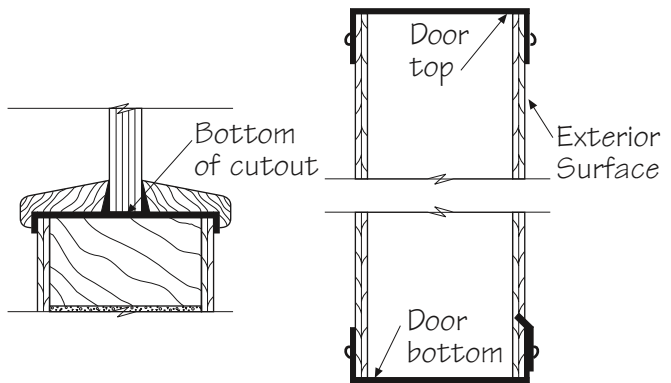
Generally, fusible link louvers installed in 45, 60, and 90 minute fire-rated doors must comply with individual fire door authorities and ADA requirements.

All fusible link louvers must be minimum 203 mm [8"] from the bottom of the door to the bottom of the louver cutout and 152 mm [6"] from the edge of the louver cutout to the edge of the door and/or other cutouts for vision panels, locks, closers, or other hardware.

These minimum dimensions must be maintained or the fire rating label and warranty will be voided.

Sizes and details other than those illustrated are available.

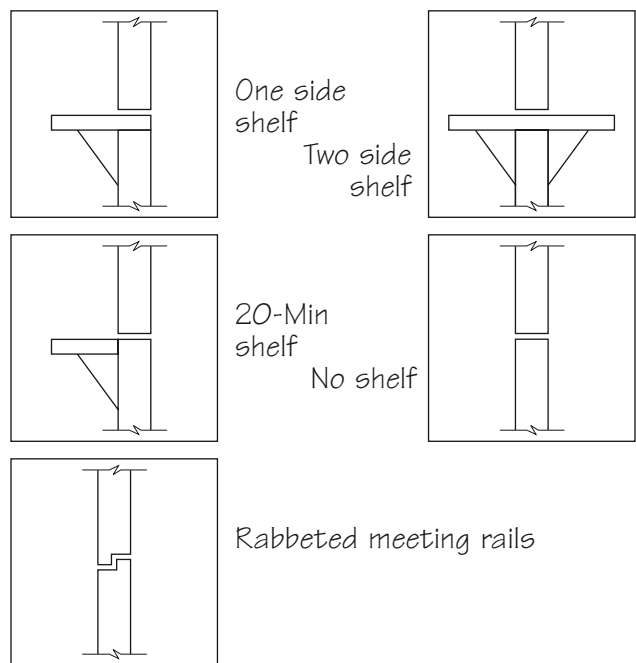
Flashings



Flashing Detail - Figure 1300-21

If the woodworker is to flash the top of the door or the bottom edge of cutouts for exterior doors, it must be specified.

Dutch Door Options



One side shelf

Two side shelf

20-Min shelf

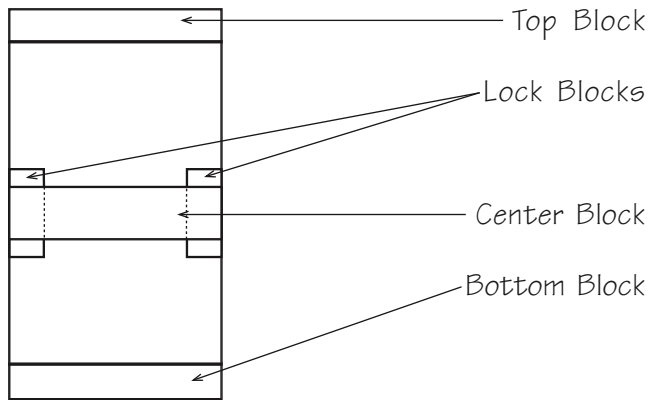
No shelf

Rabbeted meeting rails

Dutch Door Options - Figure 1300-22

Blocking Options
(Particle Core and Fire-resistant Core)

For undercutting flexibility and specialized hardware applications, a number of internal blocking options are available from most manufacturers. Among them are such options as 127 mm [5"] top rail, 127 mm [5"] bottom rail, 127 x 457 mm [5" x 18"] lock blocks (may be one side only), 64 mm [2 1/2"] cross blocking. Other options may be available. Consult your AWI/AWMAC manufacturer early in the design process to determine availability.



Blocking Options - Figure 1300-23

1300-G-19 Workmanship

General Requirements

Veneer Faces

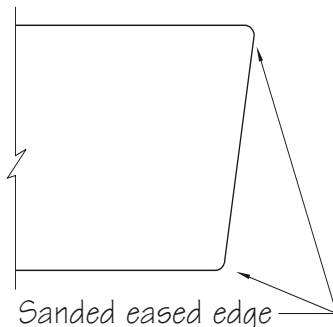
Opaque or Transparent Finish

- Joints must be tight.
- Veneer faces must be completely glued to substrate.
- Veneer faces shall be thoroughly sanded with no visible scratches, knife marks, or other manufacturing defects.
- Veneer faces shall meet face grades set forth in this standard.
- Veneer faces may not exhibit glue bleed-through at joints or through veneer.
- Door manufacturer is not responsible for the appearance of field finished doors.

Vertical Edges

Opaque or Transparent Finish

- Vertical edges shall be same species and grade as face for transparent finish, same grade as face for opaque finish, and smoothly sanded, free of knife and saw marks.
- Voids are not permitted between veneer layers and solid wood edges.
- Vertical edges shall be free of knots, shake, or doze.
- Where allowed, the hinge edge may be jointed. Joints must be tight. Number of joints shall not exceed the number of hinges.
- Vertical edges shall have a sanded ease at intersection of edges and face veneers.



3° Bevel and Eased Edges - Figure 1300-24

Crossbands

- Crossbands shall be edge-glued or one piece wood or high performance composite product with an internal bond of at least 200 psi (ASTM D 1037), without voids or show-through (telegraphing). Medium Density Fiberboard (MDF) and particleboard not permitted in any Grade.

Horizontal Edges

- Joints in horizontal edges shall be without gaps.
- Horizontal edges shall be sound without splits, shake, or doze.
- There shall be no gaps between veneer layers and solid horizontal edges.

1300-G-20

Dimensional Tolerances

Note: These dimensions given as typical industry tolerances. The dimensions shall apply in the absence of specifications.

Doors Not Prefit

- Width, Height, Thickness: ± 1.6 mm [$1/16$ "]
- Out of Square: max. 3.2 mm [$1/8$ "] measured from corner to corner on the diagonal

Doors Machined for Hardware

- Width: ± 0.8 mm [$1/32$ "]
- Height: ± 1.6 mm [$1/16$ "]
- Thickness: ± 1.6 mm [$1/16$ "]
- Hardware location: ± 0.8 mm [$1/32$ "]
- Locks and hinges: ± 0.8 mm [$1/32$ "]

Typical Prefit Clearances

- Top and hinge edges: 3.2 mm [$1/8$ "]
- Single door, lock edge: 3.2 mm [$1/8$ "]
- Pair meeting edge: 1.6 mm [$1/16$ "] per leaf
- Bottom (rated or nonrated): 13 mm [$1/2$ "] from top of decorative floor covering; 19 mm [$3/4$ "] maximum from top of non-combustible floor; 10 mm [$3/8$ "] maximum from top of non-combustible sill or threshold.

1300-G-21

Factory Finishing

Factory finishing is generally specified when a project requires high quality performance and superior appearance. Factory finishing selections and specifications are based on Section 1500 of these standards.

Doors shall be sealed and/or finished top and bottom if required per manufacturers standard warranty. For appearance, doors may be specified to be finished on the top with care taken to preserve manufacturers warranty information.

Factory finishing offers many benefits, including:

- State-of-the-art equipment in a well-lighted, dust-free environment (conditions normally not available in the field) provides uniform color, texture, and sheen.
- Proper sanding prior to the application of stains and finishes.

Field conditions often hinder surface preparation, resulting in a lack of clarity and uniformity in finish and color.

- Protection from unfavorable relative humidity conditions at the earliest possible time.
- Cost savings (in most cases) over the total cost of field applied finishes by a separate contractor.
- Shorter installation time on the job site, resulting in faster project completion.
- Single-source responsibility.

Sample Submission

Woodwork manufacturers will provide standard colors for selection.

To specify nonstandard colors and sheens, the architect shall provide two or more samples at least 200 x 250 mm [8 x 10"] showing the desired finish effect on the wood species and cut to be used.

Samples are to bear identification of the project, architect, general contractor, and door supplier. The manufacturer may elect to submit samples in sets of two or more, illustrating the possible range of variations. The finished sample sets then become the final criteria for evaluating color and finish appearance conformity. However, variations can be expected due to the nature of wood.

Sample Protection

Approved samples must be protected from the effect of light. Cover faces and place samples in closed storage during the period between approval and fabrication, finishing and delivery of the finished product.

1300-G-22

Care and Installation at Job Site

In the absence of specific requirements of door manufacturer the criteria shall prevail.

Storing

- Store at least 4" off floor, flat on a level surface in a clean, dry, well-ventilated area protected from sunlight, wide swings in relative humidity, and abnormal heat or cold. Relative humidity should not be less than 25% nor more than 55%.
- Store doors in closed-in building with operational HVAC system.
- Cover doors to keep clean, but allow air circulation.
- Seal at earliest possible moment. Edge sealing is particularly important.
- Lift or carry door. Do not drag one door against another.
- Handle doors with clean hands or clean gloves.

Installation

- Allow doors to become acclimated to finished building heat and humidity before fitting and hanging.
- Utility or strength of doors must not be impaired by fitting to the opening, applying hardware, plant-ons, louvers or other detailing.
- In fitting for width, trim equally from both sides. See Fire Door Requirements (following section) for special fitting

instructions on rated doors.

- In fitting for height, do not trim top or bottom edge more than 19 mm [³/₄"] unless accommodated by additional blocking. See Fire Door Requirements for special fitting instructions on rated doors.
- Threaded-to-the-head wood screws are preferable for fastening all hardware on nonrated doors and required on all rated doors. Pilot holes must be drilled for all screws to avoid splitting.
- Use two hinges for doors up to 1524 mm [60"] in height, three hinges for doors up to 2286 mm [90"] in height, and an additional hinge for every additional 762 mm [30"] of door height or portion thereof.
- Light or louver cuts in exterior doors must be treated or flashed to prevent moisture from entering the door core.

1300-G-23

Fire Door Requirements

Install doors as required by NFPA Pamphlet 80.

All 45-, 60-, and 90-minute rated doors may be hung with either half surface or full mortise hinges. Core reinforcements (blocking) can be specified to permit hardware to be surface mounted with screws. Labels shall not be removed from fire-rated doors.

Preparation of Labeled Door

Preparation of 20-, 45-, 60-, and 90-minute rated doors must be done under label service in accordance with the manufacturer's service procedure. This includes trimming for size except a maximum of 19 mm [³/₄"] off the bottom of the door. Preparation of locks, latches, hinges, closers, lights, louvers, astragals, and any fabrication must be done under licensed label service. Refer to NFPA 80, Standards for Fire Doors and Fire Windows for requirements and exceptions.

Fire-Retardant Salts

The edge and crossbands of some rated doors contain salts which attract moisture. When exposed to high humidity, they appear on the surfaces as white crystals. Clear finishes will highlight these crystals. Remove the crystals by light sanding after the doors are thoroughly dried. If the crystal build-up is heavy, clean with a damp sponge and allow to dry before sanding. At that point seal, and refinish. Avoid the use of steel wool on fire-rated wood doors.

Additional Details

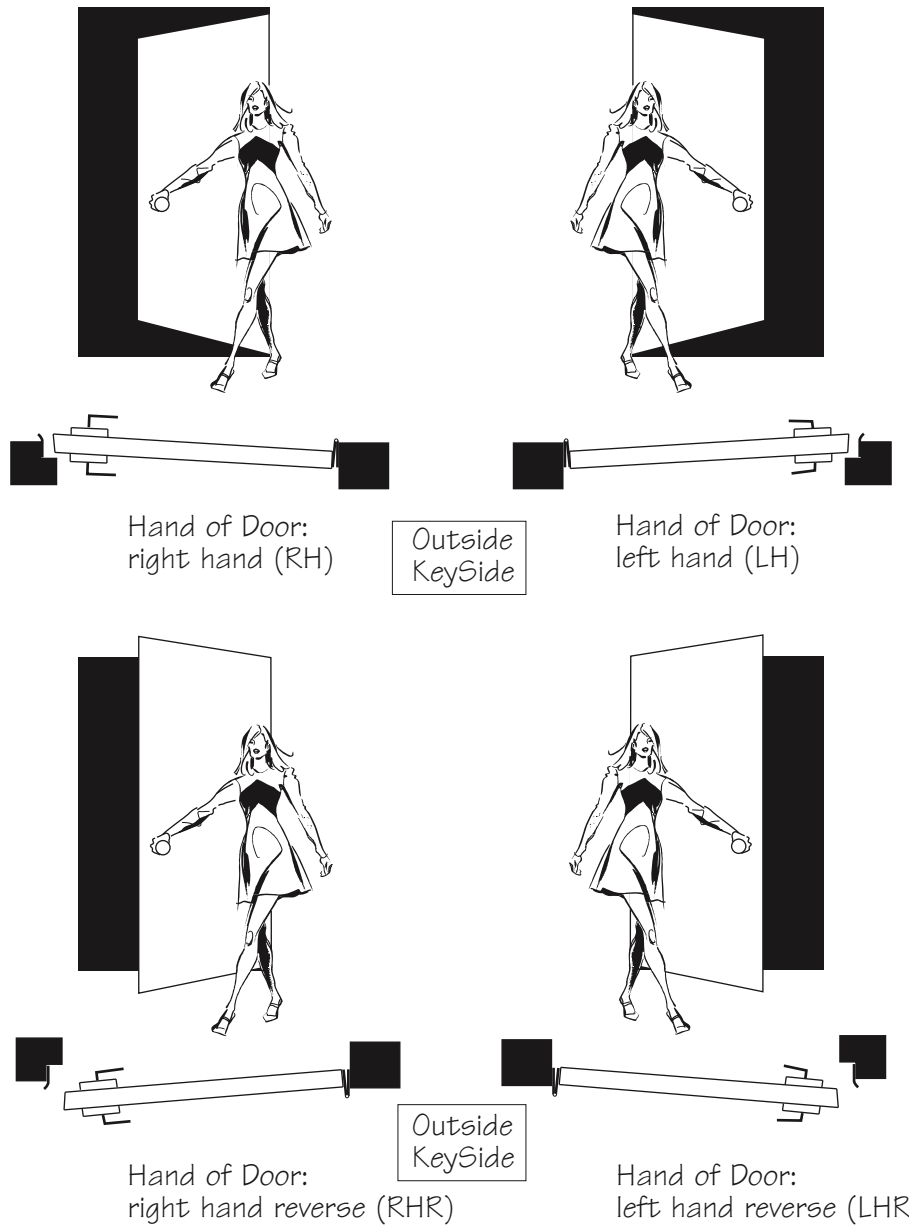
There is additional information in the Appendix. Also, contact your door manufacturer for the latest information.

1300-G-24

Hand and Bevel of Doors

The “hand” of a door is always determined from the outside. The outside of an exterior door is the street or entrance (key) side. The outside of an interior room or auditorium door is the corridor or hall (key or imaginary key) side. The outside of a closet door is the side opposite the closet; the room, corridor or hall side. The outside of a single communicating door is the side from which the butts are invisible when the door is closed. The outside of twin communicating doors is the space between the two doors.

Standard-handed doors push away from the person standing on the outside/key side. Reverse-handed doors pull toward the person standing on the outside/key side.



Hand of Doors - Figure 1300-25

1300-G-25

Positive Pressure Bulletin

CRITICAL NOTE AND WARNING:

The status of fire resistant doors and openings is in the process of great change as this Standard goes to press. The Design Professional shall contact the architectural hardware consultant to verify that the total opening complies with both international and local code requirements before finalizing the specification for fire rated doors, hardware, and openings.

In 1997 the International Council of Building Officials (ICBO) approved a change to the Uniform Building Code (UBC) that requires fire doors to be tested under positive pressure instead of neutral pressure. Most recently many code groups across the U.S. have adopted the International Building Code (IBC) which also contains the requirement for positive pressure.



WARNING: Contract documents shall

- (1) - Specify neutral pressure or positive pressure compliance
- (2) - If positive pressure, specify the category of door: A or B assembly
- (3) - Specify whether the smoke and draft label (S label) is to be validated or not

It is very important that architects, contractors and distributors are aware of the requirements in their area so the appropriate type of door is supplied (neutral or positive pressure). Door manufacturers may not be apprised of interpretations of local codes.

All fire doors must meet the requirements of recognized fire door tests and bear certifying labels of an independent testing agency approved by the building official.

Installation is required to be in accordance with the National Fire Protection Association's Publication NFPA 80, "Standard for Fire Doors and Fire Windows". Machined fire doors shall be provided with detailed installation instructions when doors bear a label indicating compliance to UBC 7-2-1997 or UL 10C.

IMPORTANT FACTS TO CONSIDER WHEN READING SPECIFICATIONS

KEY PHRASES INDICATING POSITIVE PRESSURE

- A. UBC 7-2-1997 – UBC Fire Test
- B. IBC 2000 – Code
- C. UL 10-C – Fire Test
- D. ASTM 2074-00 – Fire Test
- E. After 5 minutes into the test the neutral pressure plane should be at 40".
- F. Shall meet positive pressure requirements
- G. Intumescent seals – not telling you it is positive pressure but implying that it is.

KEY PHRASES INDICATING NEGATIVE (NEUTRAL) PRESSURE

- A. UL 10-B – Fire Test
- B. UBC 7-2-1994 – UBC Fire Test
- C. UBC 43-2 – UBC Fire Test
- D. Tested at atmospheric pressure
- E. Neutral pressure
- F. Negative pressure
- G. ASTM E-152 – Test Method

PHRASES THAT DON'T TELL YOU IF IT IS POSITIVE OR NEGATIVE

- A. NFPA 101 – Life Safety Code
- B. NFPA 105 – Smoke and Draft Control Document
- C. NFPA 252 – Fire Test method which gives the option to be positive or negative
- D. UBC – With no date given could be either positive or negative
- E. UL 1784 – Air Leakage Test for Door Assemblies
- F. NFPA 80 – Installation standard for fire doors and windows

POSITIVE PRESSURE DOOR INFORMATION

(1) METHODS OF COMPLIANCE

Positive pressure openings can be accomplished in two basic ways:

The first is described as **Category “A”** doors:

NO ADDITIONAL EDGE-SEALING SYSTEM REQUIRED

This category includes doors evaluated without any intumescent on either the frame or door. It also includes doors evaluated with intumescent incorporated into the edge of the door by the manufacture or licensed machining facility.

The second method is called **Category “B”** doors.

ADDITIONAL EDGE-SEALING SYSTEM REQUIRED

This category includes doors evaluated with an intumescent applied to the frame- either surface applied or “built-in”.

(2) “S” LABEL SMOKE RATING

Many positive pressure openings will also require a smoke seal. An “S” label requirement indicates the opening needs to have smoke and draft control gasketing. This category “H” includes gasket systems that are surface-applied (such as kerf applied, adhesive backed or mechanically attached) to frames or doors. It includes gasketing for the meeting edges for use in pair and double egress assemblies. This category covers gasket systems that have been evaluated for use in positive pressure rated assemblies but do not provide an edge-sealing system to the opening as described below.

(3) EDGE-SEALING SYSTEMS

This category “G” includes intumescent-type systems that are surface applied (such as kerf applied, adhesive backed or mechanically attached) to frames or doors. It includes seals for meeting edges for use in pair and double egress assemblies.

(4) DOOR SPECIFICATION DESCRIPTORS

Fire rated flush doors for positive pressure openings are designated with the “PP” suffix. Stile and rail doors are also available for positive pressure openings based on specific manufacturer’s approvals.

The change to positive pressure requirements can be confusing as the new codes are implemented and various door, frame and hardware manufacturers develop new products to meet those requirements. For additional information contact your Architectural Wood Door Manufacturer or the Window and Door Manufacturer’s Association (WDMA).

This bulletin furnished by the Window and Door Manufacturers Association (WDMA) and is used with permission, current as of October 16, 2001.

1300-G-26

Door Symbols and Abbreviations

Door style descriptors were assigned in previous editions to facilitate specifying. They were found to be more confusing than helpful. They have been discontinued. The following short list of abbreviations applies to the balance of this standard:

ME = Matching edges, i.e., vertical edges same as decorative faces.
CE = Compatible edges, i.e., vertical edges selected for compatibility with decorative faces.

PC = Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.

PC-5 = Core with 2 layers on each side

PC-7 = Core with 3 layers on each side

PC-HPDL-3 = Core with laminate to each side

PC-HPDL-5 = Core with crossband and laminate each side

SCLC = Structural composite lumber core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.

SCLC-5 = Core with 2 layers on each side

SCLC-7 = Core with 3 layers on each side

SCLC-HPDL-5 = Core with crossband and laminate each side

SLC = Staved lumber core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.

SLC-5 = Core with 2 layers on each side

SLC-7 = Core with 3 layers on each side

SLC-HPDL-5 = Core with crossband and laminate each side

FPC = Floating particleboard core, solid core placed within a stile and rail frame, bonded together by the faces.

FPC-5 = Core with 2 layers on each side

FPC-7 = Core with 3 layers on each side

FSLC = Floating staved lumber core, solid core placed within a stile and rail frame, bonded together by the faces.

FSLC-7 = Core with 3 layers on each side

FD = Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.

Labeled fire doors are specified by their resistance ratings.

FD-5 = Core with 2 layers on each side

FD-7 = Core with 3 layers on each side

FD-HPDL-3 = Core with laminate to each side

FD-HPDL-5 = Core with crossband and laminate each side

IHC-7 = Institutional hollow core, honey comb, ladder, or grid type cores inside stiles and rails, bonded together by the faces.

SHC-7 = Standard hollow core, honey comb, ladder, or grid type cores inside stiles and rails, bonded together by the faces.

SR = Sound retardant doors, specified by their performance characteristics.

LL = Lead lined doors, designed to resist penetration by radiation of various types, and specified by their performance.

ES = Electrostatic shielded doors.

BR = Ballistic resistant doors.

NOTE: Your door manufacturer is the best source of specific guidance when writing door specifications.



Technical Criteria

Specific requirements for face materials and door construction are provided in this section. General requirements for architectural doors are provided in the previous section.

Solid Core Doors

Solid core doors are customarily manufactured 44 mm [1-3/4"] thick. When functional requirements dictate their specification, solid core doors can be manufactured 35 mm [1-3/8"] thick, although there are little or no savings in cost. When specified, thicker doors (commonly 57 mm [2-1/4"] can be manufactured with commensurate adjustment in cost and delivery times.

Hollow Core Doors

Hollow core doors are customarily manufactured 35 mm [1-3/8"] and 44 mm [1-3/4"] thick.

1300-T-1

Grades and Specification Requirements

Specific requirements for face, matching veneers, vertical edges, lights, louvers, moulding, and transoms are provided in the following tables. The Grade must be specified. In the absence of method and/or materials specifications, the following standards will apply. When the Quality Standards are referenced as a part of the contract documents and no Grade is specified, Custom Grade standards shall prevail. In the absence of specifications, material shall be mill option lumber or veneers suitable for opaque finish. Where more than one method or material is listed for a Grade, manufacturers will supply their choice from the alternatives.

1300-T-2

Face Material Requirements

(See Section 1300-G-17 for face veneer grade summary tables. Commercial doors will usually be manufactured to AWI/AWMAC Custom Grade.

Veneers for Transparent Finishes:

Section 1300-G-17 grade faces are required for Premium, Custom, or Economy Grade doors. Veneer is required to be of sufficient thickness (minimum 0.5 mm [1/50"] at 12% MC) to preclude sand-through, show-through of core, and glue bleed.

Materials for Opaque Finishes:

Premium Grade

Medium density overlay (MDO)

Custom Grade

Sound close grain hardwood, minimum HPVA B grade (minimum 0.5 mm [1/50"] at 12% MC))

Economy Grade

Mill option

Materials for Laminate Faces:

Premium Grade

HGS high pressure decorative laminate, matte finish recommended

Custom Grade

HGS high pressure decorative laminate, matte finish recommended

Economy Grade

Mill option

1300-T-3

Core Requirements

The architect/specifier is required to make a core selection depending upon the application. The core materials are manufactured according to the following requirements:

Particleboard Core

Particleboard door core is manufactured to the ANSI standard A208.1; either grade LD-1 (MOR 400 psi/MOE 80K psi) or grade LD-2 (MOR800 psi/MOE 150K psi).

Staved Lumber Core

May be a combination of blocks or strips, not more than 63.5 mm [2-1/2"] wide, of one species of wood at 6-9% moisture content. Joints to be tight and staggered in adjacent rows.

Hollow Core

Phenolic impregnated honeycomb made of corrugated fiberboard. Minimum cell size shall be specified. In the absence of specifications, cell size shall not exceed 152 mm [6"]. Ladder and grid core construction also permitted.

Fire-resistant Core

Fire-resistant core for fire rated doors shall conform to the requirements of the applicable labeling agency acceptable to the authority having jurisdiction for the label specified.

Lead Lined

Architect shall specify lead thickness, typically sheets have a thickness of 1/32" (2 lb.); 1/16" (4 lb.); 3/16" (12 lb.) or 1/4" (16 lb.) or the metric equivalent. Other thicknesses available.

Structural Composite Lumber Core

A engineered composite that utilizes wood strands from a variety of tree species providing an alternative to dimension lumber. The material is engineered for strength and stability. SCLC is available as a lumber substitute to be used primarily in place of other core materials. SCLC is tested under a number of ASTM and other test criteria. There is insufficient data to recommend SCLC for exterior use.



Note: This standard recommends limiting the use of Structural Composite Lumber (SCLC) to interior applications. The use of structural composite lumber (SCLC) for top and/or bottom rails, and blocking is acceptable. SCL is proving to have excellent performance characteristics for these uses, as it often minimizes or eliminates telegraphing through the face veneers or overlays. When the edge of an SCL-core door will be visible after installation, design professionals may wish to specify a fill-and-paint treatment, or the application of a veneer edgeband to conceal the coarse texture of the edge of the SCL material. It is the responsibility of the design professional to make a selection in the best interests of the client.

1300-T-4

Exposed Vertical Edges, Lite and Louver Openings

Premium Grade

Same species and grade on exposed surface as face; lumber, or veneer over hardwood. Joints not allowed. Sanded ease.

Custom Grade

Same species on exposed surface as face; lumber, or veneer over hardwood, or compatible hardwood. Joints allowed on hinge edge only. Sanded ease.

Economy Grade

Mill option veneer or lumber. Joints allowed. Sanded ease.

Note: Select White Maple is allowed for vertical edges, beads, mouldings, and lite and louver openings on Natural and Select White Birch doors; not allowed on Select Red Birch doors, in all QSI grades. Edges for opaque finish may be any close grained hardwood, i.e. Birch, Maple, Poplar, etc.

Selection for Grain and Color

Plant Assemblies

For transparent finish, adjacent members shall ...

- Premium Grade: ... be well matched for grain and color.
- Custom Grade: ... be compatible for color.
- Economy Grade: ... not be selected.

Visible finger joints not permitted in Premium Grade; permitted on hinge edge in Custom Grade; and permitted in Economy Grade. No selection for grain or color is required for opaque finish in any Grade.

Field Assemblies

Selection of adjacent members for compatibility is the responsibility of the installation contractor.

1300-T-5

Glass and Glazing

In the absence of specifications, the following standards will apply. Where more than one method or material is listed for a Grade, woodworkers will supply their choice from the alternatives.

Glass/Glazing	Premium	Custom	Economy
Wood Moulding Glass Stop	Plant prepared and bundled in sets appropriately labeled for the jobsite	Plant prepared and bundled in sets appropriately labeled for the jobsite	Shipped loose without preparation
Type, thickness, and manufacturer of glass, particularly insulated glass, must be specified as its construction dictates details of the receiving members. Specifications regarding code compliance are the responsibility of the design professional.			
In the absence of specifications, profile of stop shall be mill option.			
It is recommended that the following be included in the painting section of the specifications: "To create the proper seal against weather, wind, and rain, the finish coats of all doors should be allowed to flow onto the glass area at least 1.6 mm [1/16"]. When cleaning the glass, a razor blade should not be used to scrape the glass. This will destroy the seal. A broad blade putty knife should be used to protect the seal between the glass and the wood."			

1300-T-6

Vertical and Horizontal Edge Interface with Core Components

The architect/specifier is required to make a core interface selection depending upon the application. There are two types of interface between the core and the edges in solid core doors:

A. PC or SLC or SCLC: Bonded: Vertical and horizontal edges of solid and fire resistant core doors must be securely bonded to the core with adhesives and then abrasive planed before veneering to ensure minimal telegraphing of core parts through veneers or overlay.

B. FPC or FSLC or FSCLC: Nonbonded: Vertical and horizontal edges are not bonded to the core. The maximum gap between core and vertical and horizontal edges to be 0.8 mm [¹/₃₂"]. Component size thickness tolerance is ± 0.13 mm [.005"] to ensure minimal telegraphing of core parts through veneers or overlay and adequate veneer bonding to core components. In this construction the components that compose the face of the door, whether 5-ply or 7-ply, serve to hold the core components.

C. Prevailing Standard: In the absence of specifications Bonded Core shall be required for Premium and Custom Grade.

Thickness of Vertical Edges after Factory Prefit (prior to installation fitting, if any)

Door Type	Lock Stile	Hinge Stile	Top Rail	Bottom Rail
Solid Core - Stave Lumber Core	9 mm [³ / ₈ "]	9 mm [³ / ₈ "]	9 mm [³ / ₈ "]	9 mm [³ / ₈ "]
Solid Core - Other Cores	20 mm [¹³ / ₁₆ "]	24.5 mm [1"]	20 mm [¹³ / ₁₆ "]	20 mm [¹³ / ₁₆ "]
Hollow Core - 35 mm [1- ³ / ₈ "]	20 mm [¹³ / ₁₆ "]	24.5 mm [1"]	32 mm [1- ¹ / ₄ "]	32 mm [1- ¹ / ₄ "]
Hollow Core - 44 mm [1- ³ / ₄ "]	20 mm [¹³ / ₁₆ "]	24.5 mm [1"]	32 mm [1- ¹ / ₄ "]	32 mm [1- ¹ / ₄ "]

Note: Data above consistent with and used by permission of the Woodwork Institute of California (WIC) April 2002

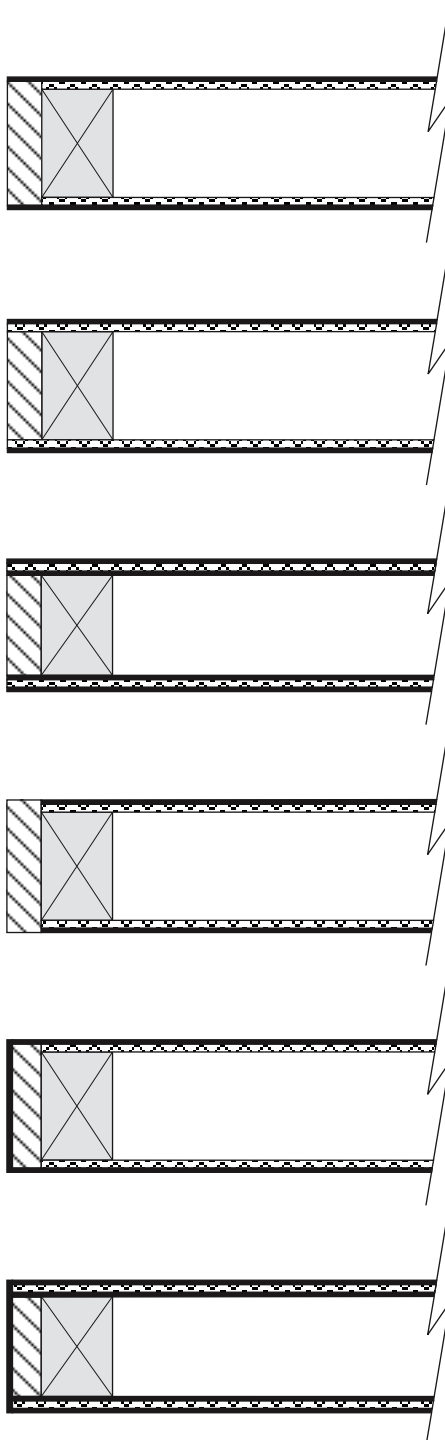
Fire-rated (labeled) Doors	Sizes and engineering determined by the rating agency
Sound Retardant	Consult manufacturers' data sheets for design and specification requirements. Establishment of the need and details is the responsibility of the design professional.
Establishment of the need and details is the responsibility of the design professional.	
Lead Lined	
Ballistic Resistant	
Electrostatic Shielded	

1300

1300-T-7

Door Edge Details

In the absence of specifications, where more than one method or material is listed, woodworkers will supply their choice from the alternatives. All edges must conform to standards and comply with tests for telegraphing and warp. All edge types are not available from all door manufacturers.



#1 Edge: 5-ply door, abrasive planed before veneering, with the edge of the veneer but not the edge of the crossband exposed. Not available in all areas.

#2 Edge: 5-ply door, abrasive planed before veneering, with the edge of the veneer and the crossband exposed.

#3 Edge: 7-ply door, abrasive planed before veneering, with the edges of the 3-ply face veneer and crossbands exposed.

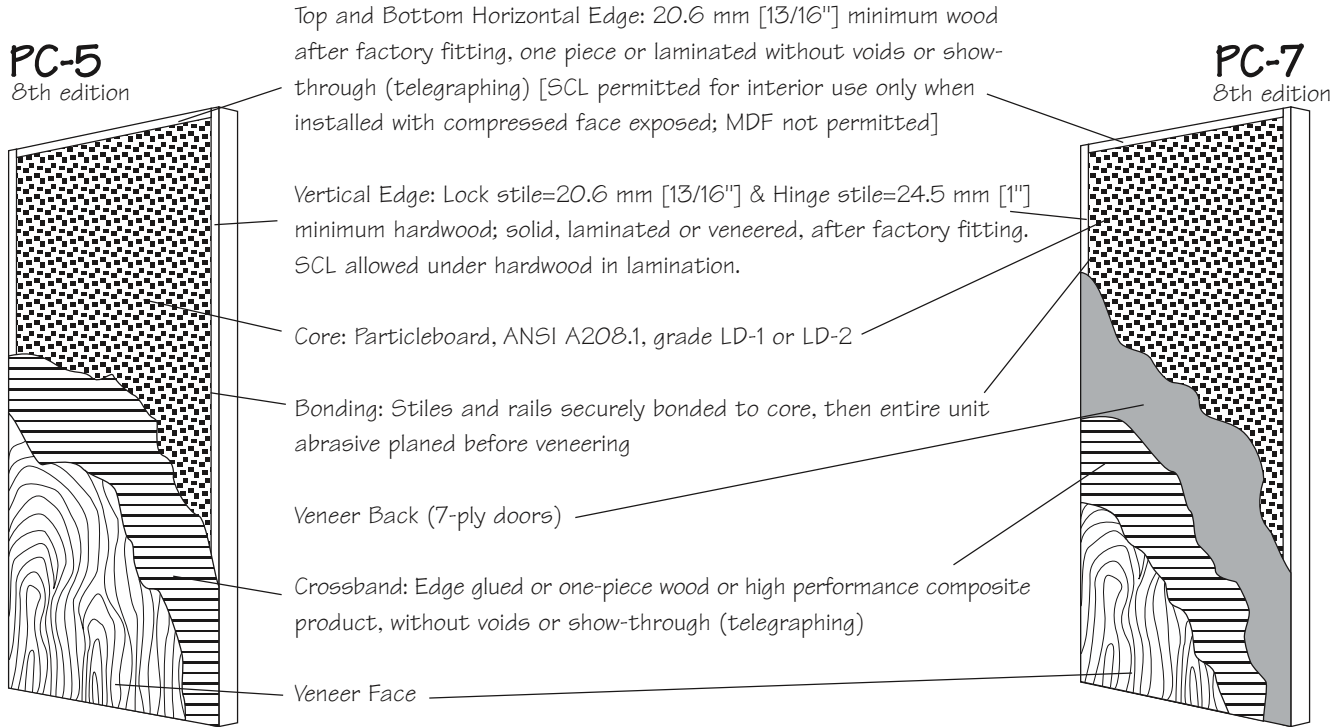
#4 Edge: 5-ply or 7-ply door banded with a solid hardwood trim strip such that the joint shows on the face of the door.

#5 Edge: 5-ply door with the vertical edge veneered to match or contrast with the face as specified.

#6 Edge: 7-ply door with the vertical edge veneered to match or contrast with the face as specified.

1300-T-8

Veneer, Bonded Particle Core



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer over hardwood (ME); sanded ease No visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease Visible joints allowed on hinge edge	Mill option; sanded ease Visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option
Transoms	Bottom horizontal edge runs full width. Matching species and grade lumber or veneered	Bottom horizontal edge runs full width. Compatible species lumber or veneered	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

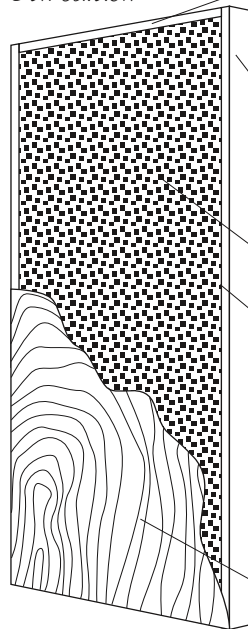
NOTES: Veneer match in excess of Standards must be specified. Maple edges allowed for Natural and White Birch. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. In the absence of specifications the manufacturer may choose from the alternatives within or above the Grade.

1300

1300-T-9

High Pressure Decorative Laminate (HPDL), Bonded Particle Core

PC-HPDL-3
8th edition



Top and Bottom Horizontal Edge: 20.6 mm [13/16"] minimum wood after factory fitting, one piece or laminated without voids or show-through (telegraphing) [SCL permitted for interior use only when installed with compressed face exposed; MDF not permitted]

Vertical Edge: Lock stile=20.6 mm [13/16"] & Hinge stile=24.5 mm [1"] minimum hardwood; solid, laminated or veneered, after factory fitting. SCL allowed under hardwood in lamination.

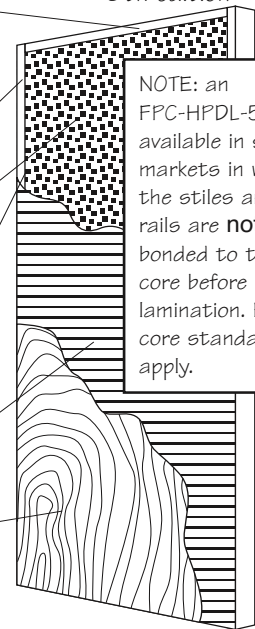
Core: Particleboard, ANSI A208.1, grade LD-1 or LD-2

Bonding: Stiles and rails securely bonded to core, then entire unit abrasive planed before laminating

Crossband: Edge glued or one-piece wood or high performance composite product, without voids or show-through (telegraphing)

Laminate Face

PC-HPDL-5
8th edition



NOTE: an FPC-HPDL-5 is available in some markets in which the stiles and rails are **not** bonded to the core before lamination. FPC5 core standards apply.

Criteria	Premium	Custom	Economy
Laminate face	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; Mill Option door and transom match.
Vertical edges for wood grain patterns	Matching HGS laminate, or finished matching species lumber or veneer to blend with face; no visible joints allowed	Matching HGS laminate, or finished compatible lumber or veneer; no visible joints allowed	Mill option
Vertical edges for solid colors	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate or close grain hardwood painted to blend; visible joints allowed on painted hinged edge only	Mill option
Lights, louvers, and mouldings for wood grain patterns	Matching species, lumber or veneer with transparent finish, or painted metal vision frame or louver	Compatible species lumber or veneer for finishing or primed metal vision frame or louver	Mill option
Lights, louvers, and mouldings for solid colors	Matching HGS laminate, or close grain hardwood with paint finish, or painted vision frame or louver to match	Matching HGS laminate, or close grain hardwood for paint finish, or primed vision frame or louver	Mill option
Transom bottom horizontal edges for wood grain patterns	Matching HGS laminate, or matching species lumber or veneer with transparent finish to blend with face	Matching HGS laminate, or compatible lumber or veneer for transparent finish	Mill option
Transom bottom horizontal edges for solid colors*	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate, or matching species lumber or veneer for transparent finish; no visible joints allowed	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

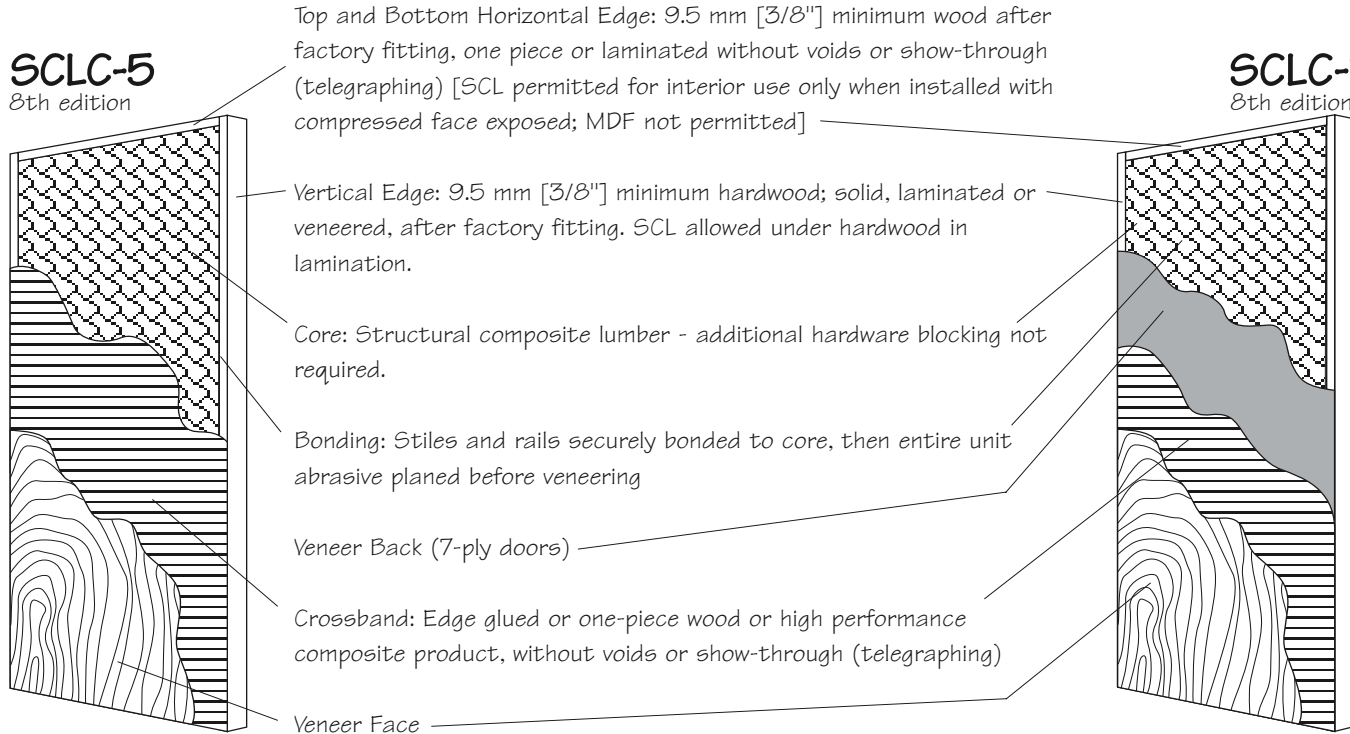
NOTES: Pair matching not available. Species, color, and finishing for entire wood and/or metal trim package to be specified. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. * Includes other non-wood grain patterns.

1300-T-10

Veneer, Bonded Structural Composite Lumber Core

SCLC-5
8th edition

SCLC-7
8th edition



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer over hardwood (ME); sanded ease No visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease Visible joints allowed on hinge edge	Mill option; sanded ease Visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option
Transoms	Bottom horizontal edge runs full width. Matching species and grade lumber or veneered	Bottom horizontal edge runs full width. Compatible species lumber or veneered	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

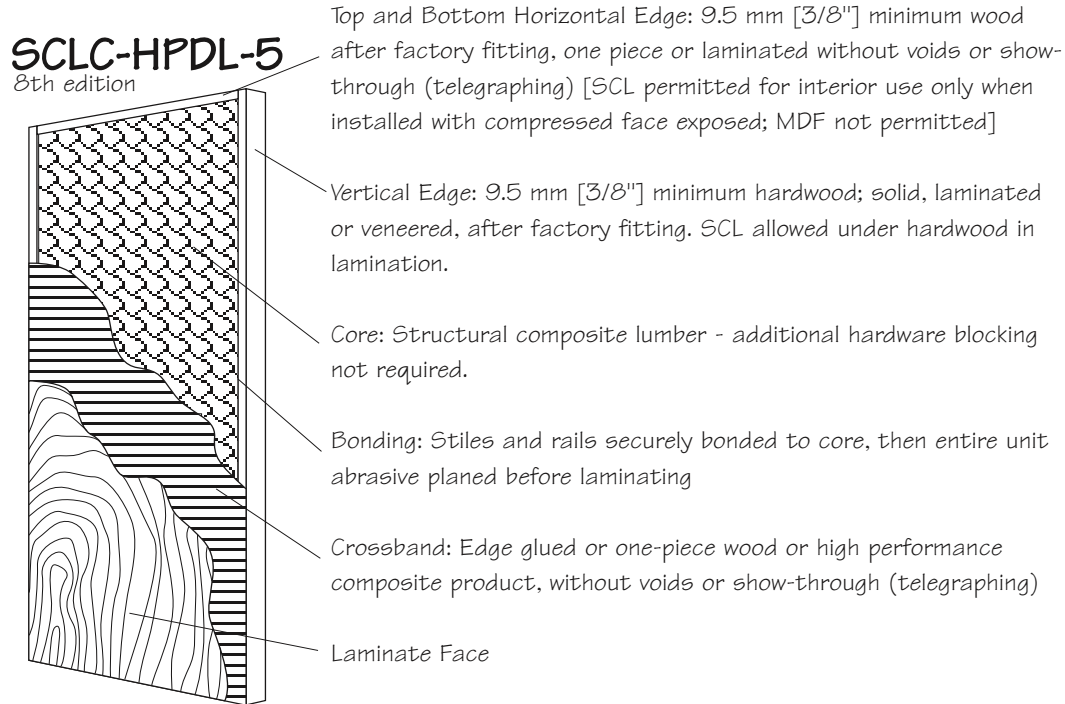
Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

NOTES: Veneer match in excess of Standards must be specified. Maple edges allowed for Natural and White Birch. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. In the absence of specifications the manufacturer may choose from the alternatives within or above the Grade.

1300

1300-T-11

High Pressure Decorative Laminate (HPDL), Bonded Structural Composite Lumber Core



Criteria	Premium	Custom	Economy
Laminate face	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; Mill Option door and transom match.
Vertical edges for wood grain patterns	Matching HGS laminate, or finished matching species lumber or veneer to blend with face; no visible joints allowed	Matching HGS laminate, or finished compatible lumber or veneer; no visible joints allowed	Mill option
Vertical edges for solid colors	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate or close grain hardwood painted to blend; visible joints allowed on painted hinged edge only	Mill option
Lights, louvers, and mouldings for wood grain patterns	Matching species, lumber or veneer with transparent finish, or painted metal vision frame or louver	Compatible species lumber or veneer for finishing or primed metal vision frame or louver	Mill option
Lights, louvers, and mouldings for solid colors	Matching HGS laminate, or close grain hardwood with paint finish, or painted vision frame or louver to match	Matching HGS laminate, or close grain hardwood for paint finish, or primed vision frame or louver	Mill option
Transom bottom horizontal edges for wood grain patterns	Matching HGS laminate, or matching species lumber or veneer with transparent finish to blend with face	Matching HGS laminate, or compatible lumber or veneer for transparent finish	Mill option
Transom bottom horizontal edges for solid colors*	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate, or matching species lumber or veneer for transparent finish; no visible joints allowed	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

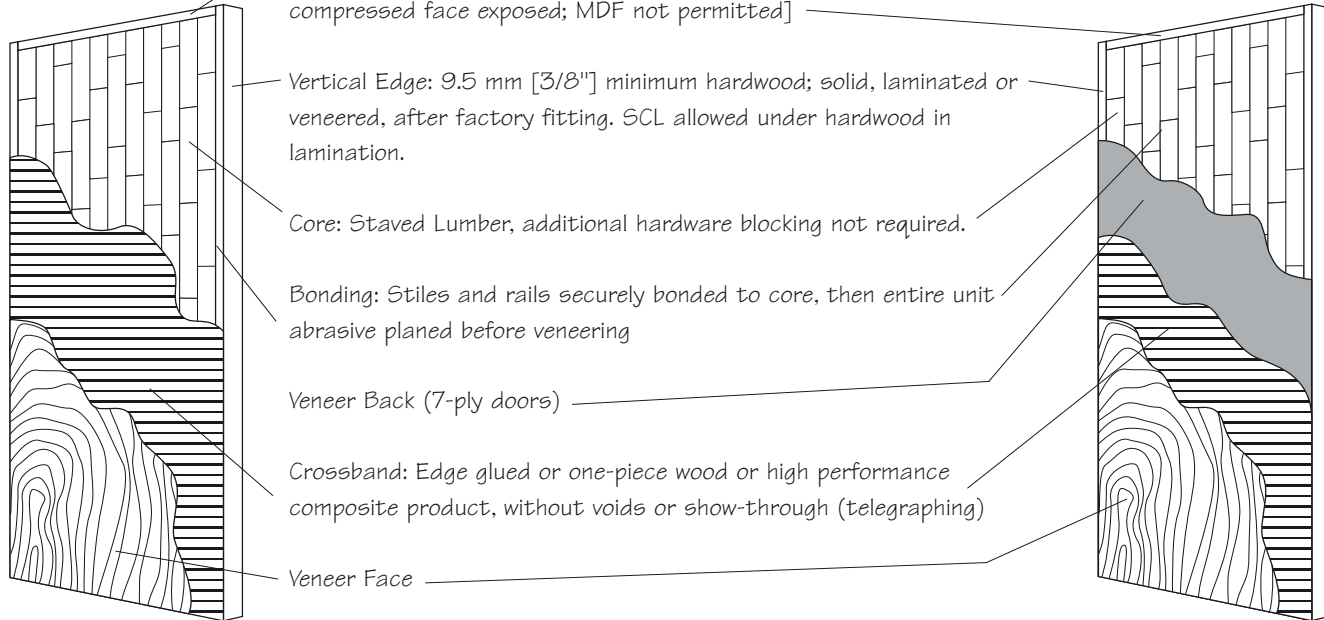
NOTES: Pair matching not available. Species, color, and finishing for entire wood and/or metal trim package to be specified. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. * Includes other non-wood grain patterns.

1300-T-12

Veneer, Bonded Staved Lumber Core

SLC-5
8th edition

SLC-7
8th edition



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer on hardwood (ME); sanded ease; no visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease; visible joints allowed on hinge edge	Mill option; sanded ease; visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option
Transoms	Bottom horizontal edge runs full width; matching species and grade lumber or veneered	Bottom horizontal edge runs full width; compatible species lumber or veneered	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

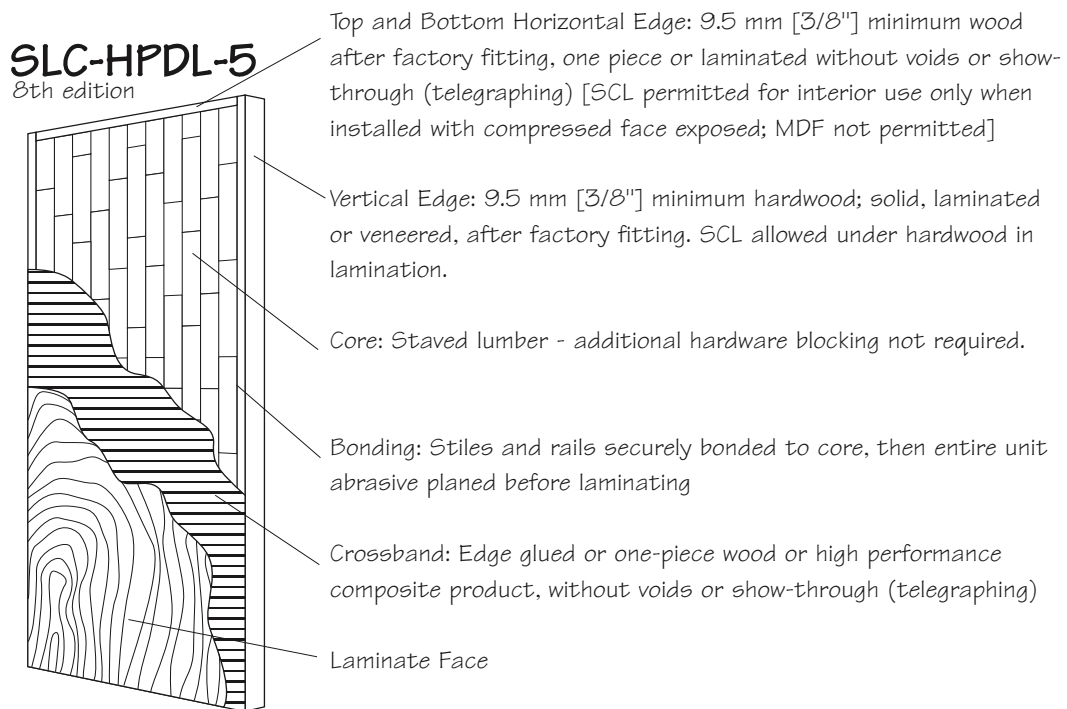
Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

NOTES: Veneer match in excess of Standards must be specified. Maple edges allowed for Natl. and White Birch. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. In the absence of specifications, manufacturer may choose from the alternatives within or above the Grade.

1300

1300-T-13

High Pressure Decorative Laminate (HPDL), Bonded Stave Lumber Core



Criteria	Premium	Custom	Economy
Laminate face	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; Mill Option door and transom match.
Vertical edges for wood grain patterns	Matching HGS laminate, or finished matching species lumber or veneer to blend with face; no visible joints allowed	Matching HGS laminate, or finished compatible lumber or veneer; no visible joints allowed	Mill option
Vertical edges for solid colors	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate or close grain hardwood painted to blend; visible joints allowed on painted hinged edge only	Mill option
Lights, louvers, and mouldings for wood grain patterns	Matching species, lumber or veneer with transparent finish, or painted metal vision frame or louver	Compatible species lumber or veneer for finishing or primed metal vision frame or louver	Mill option
Lights, louvers, and mouldings for solid colors	Matching HGS laminate, or close grain hardwood with paint finish, or painted vision frame or louver to match	Matching HGS laminate, or close grain hardwood for paint finish, or primed vision frame or louver	Mill option
Transom bottom horizontal edges for wood grain patterns	Matching HGS laminate, or matching species lumber or veneer with transparent finish to blend with face	Matching HGS laminate, or compatible lumber or veneer for transparent finish	Mill option
Transom bottom horizontal edges for solid colors*	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate, or matching species lumber or veneer for transparent finish; no visible joints allowed	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

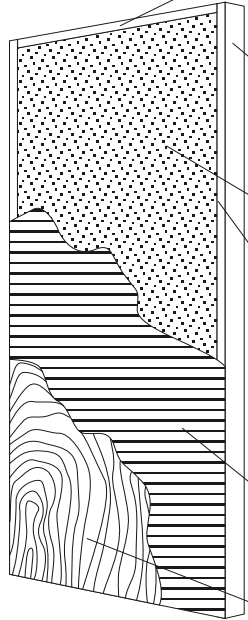
Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

NOTES: Pair matching not available. Species, color, and finishing for entire wood and/or metal trim package to be specified. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. * Includes other non-wood grain patterns.

1300-T-14

Veneer, Nonbonded Particle Core

FPC-5
8th edition



Top and Bottom Horizontal Edge: 24.5 mm [1"] minimum wood after factory fitting, one piece or laminated without voids or show-through (telegraphing) [SCL permitted for interior use only when installed with compressed face exposed; MDF not permitted]

Vertical Edge: Lock & Hinge stile=24.5 mm [1"] minimum hardwood; solid, laminated or veneered, after factory fitting. SCL allowed under hardwood in lamination.

Core: Particleboard, ANSI A208.1, grade LD-1 or LD-2

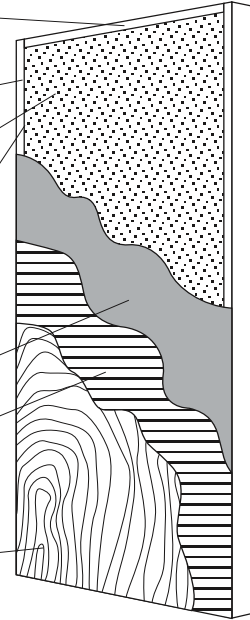
Bonding: Stiles and rails not bonded to core, maximum gap between core and vertical and horizontal edges to be 0.8 mm [1/32"]. Component size thickness tolerance is ± 0.13 mm [0.005"].

Veneer Back (7 ply doors)

Crossband: Edge glued or one-piece wood or high performance composite product, without voids or show-through (telegraphing)

Veneer Face

FPC-7
8th edition



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer over hardwood (ME); sanded ease No visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease Visible joints allowed on hinge edge	Mill option; sanded ease Visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option
Transoms	Bottom horizontal edge runs full width. Matching species and grade lumber or veneered	Bottom horizontal edge runs full width. Compatible species lumber or veneered	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

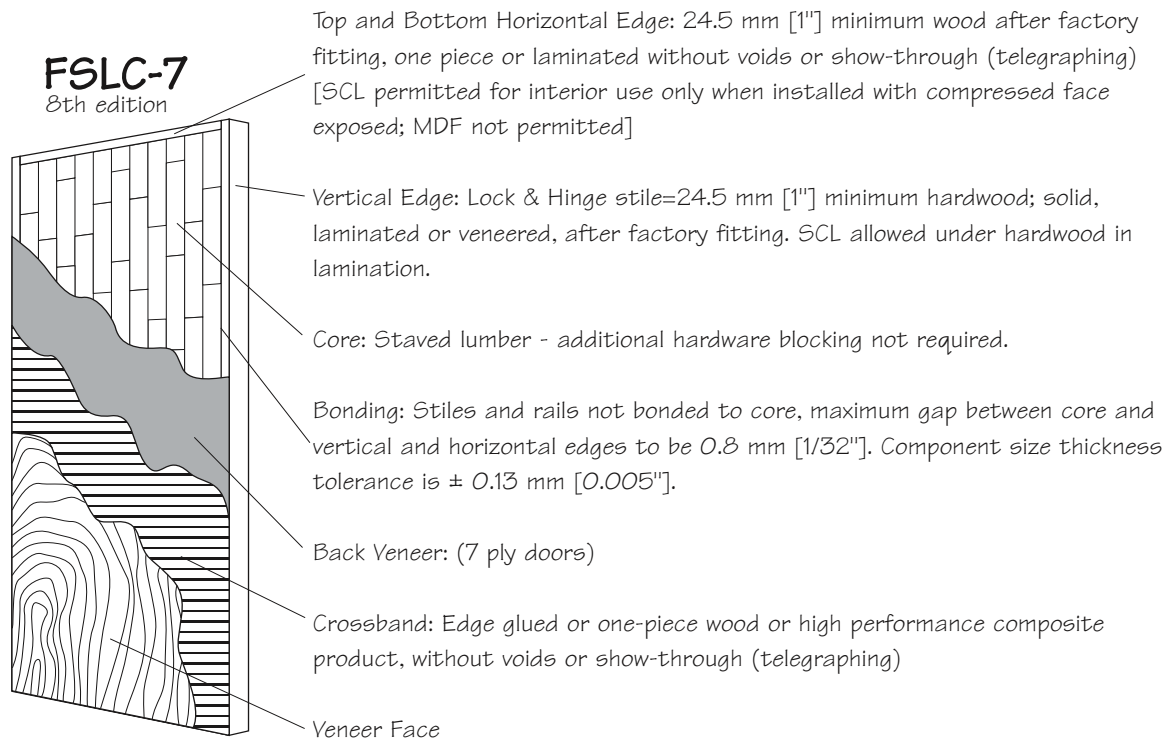
Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

NOTES: Veneer match in excess of Standards must be specified. Maple edges allowed for Natural and White Birch. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. In the absence of specifications the manufacturer may choose from the alternatives within or above the Grade.

1300

1300-T-15

Veneer, Nonbonded Stave Lumber Core



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer on hardwood (ME); sanded ease; no visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease; visible joints allowed on hinge edge	Mill option; sanded ease; visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option
Transoms	Bottom horizontal edge runs full width; matching species and grade lumber or veneered	Bottom horizontal edge runs full width; compatible species lumber or veneered	Mill option

NOTE: Label rating is available in any grade, subject to fabrication under label agreement.

Label	Door Symbol	Rating	Wall Rating
20-minute	FD 1/3	1/3 hour	1 hour

NOTES: Veneer match in excess of Standards must be specified. Maple edges allowed for Natl. and White Birch. Core and edge requirements also apply to 20-minute rated doors. Light openings in 20-minute doors allowed up to size tested by manufacturer. Louvers not allowed in 20-minute doors. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired. In the absence of specifications, manufacturer may choose from the alternatives within or above the Grade.

1300-T-16

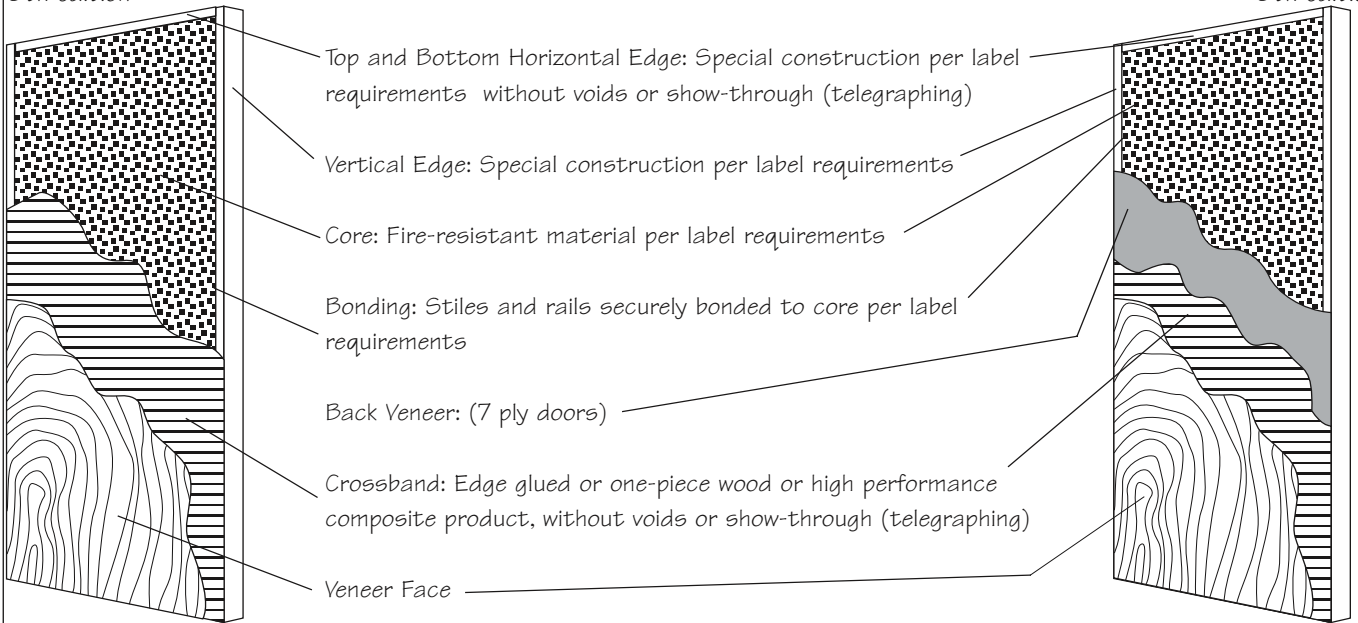
Veneer, Fire Resistant Core

FD-5

8th edition

FD-7

8th edition



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer over hardwood (ME); sanded ease; no visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease; visible joints allowed on hinge edge	Mill option; sanded ease. Visible joints allowed
Lights, louvers and mouldings	Special construction per label requirements	Special construction per label requirements	Special construction per label requirements
Transoms	Per manufacturer's label requirements	Per manufacturer's label requirements	Per manufacturer's label requirements

1300

NOTE: All label ratings are available in any grade, subject to fabrication under label agreement.

Label	Door Symbol	Rating	Wall Rating
45-minute	FD 3/4	3/4 hour	1 hour
60-minute	FD 1	1 hour	1 hour
90-minute	FD 1-1/2	1-1/2 hour	2 hour

NOTES: In the absence of specifications the manufacturer may choose from the alternatives within the Grade.

Light openings allowed up to size tested by manufacturer.

Louvers not allowed in 45-, 60-, and 90-minute doors.

9-ply doors may be available and should be evaluated and specified or approved by the design professional when desired.

1300-T-17

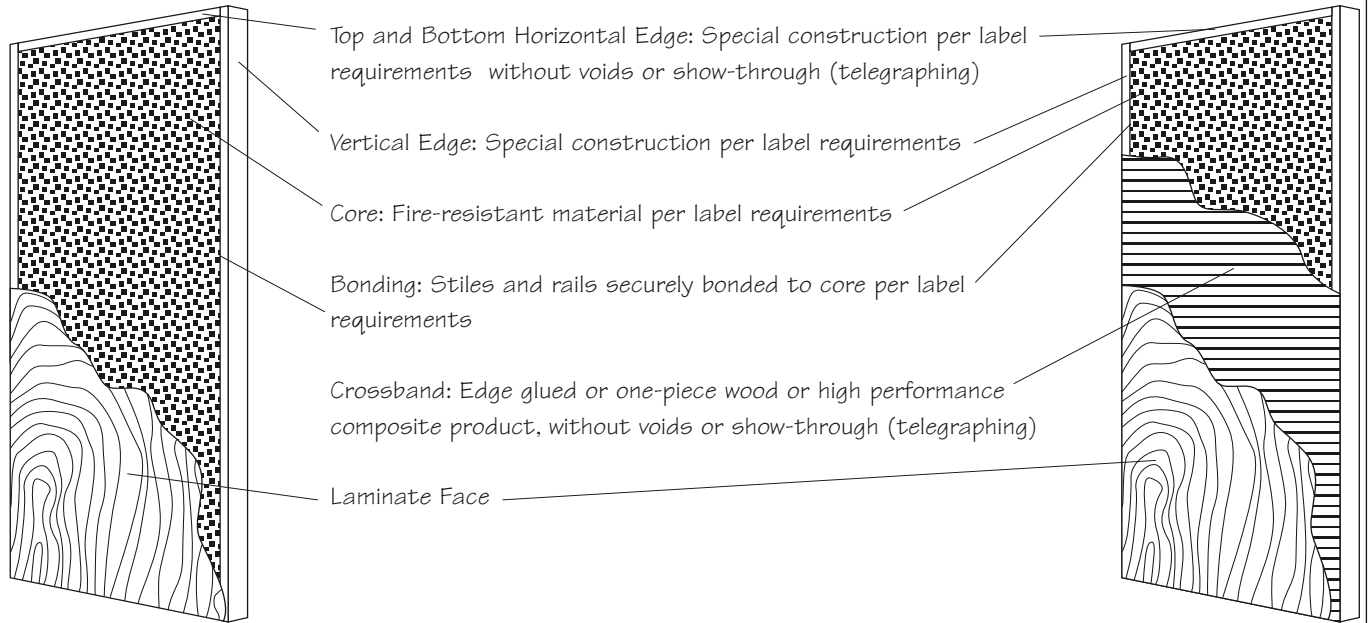
High Pressure Decorative Laminate, Fire Resistant Core

FD-HPDL-3

8th edition

FD-HPDL-5

8th edition



Criteria	Premium	Custom	Economy
Laminate face	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate; continuous door and transom match, material permitting	HGS (nominal 0.048") high pressure decorative laminate.
Vertical edges for wood grain patterns	Matching HGS laminate, or finished matching species lumber or veneer to blend with face; no visible joints allowed	Matching HGS laminate, or finished compatible lumber or veneer; no visible joints allowed	Mill option
Vertical edges for solid colors	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate or close grain hardwood painted to blend; visible joints allowed on painted hinged edge only	Mill option
Lights, louvers, and mouldings for wood grain patterns	Compatible species, lumber or veneer with transparent finish, or painted metal vision frame or louver	Compatible species lumber or veneer for finishing or primed metal vision frame or louver	Mill option
Lights, louvers, and mouldings for solid colors	Matching HGS laminate, or close grain hardwood with paint finish, or painted vision frame or louver to match	Matching HGS laminate, or close grain hardwood for paint finish, or primed vision frame or louver	Mill option
Transom bottom horizontal edges for wood grain patterns	Matching HGS laminate, or matching species lumber or veneer with transparent finish to blend with face	Matching HGS laminate, or compatible lumber or veneer for transparent finish	Mill option
Transom bottom horizontal edges for solid colors*	Matching HGS laminate or close grain hardwood painted to match; no visible joints allowed	Matching HGS laminate, or matching species lumber or veneer for transparent finish; no visible joints allowed	Mill option

NOTE: All label ratings are available in any grade, subject to fabrication under label agreement.

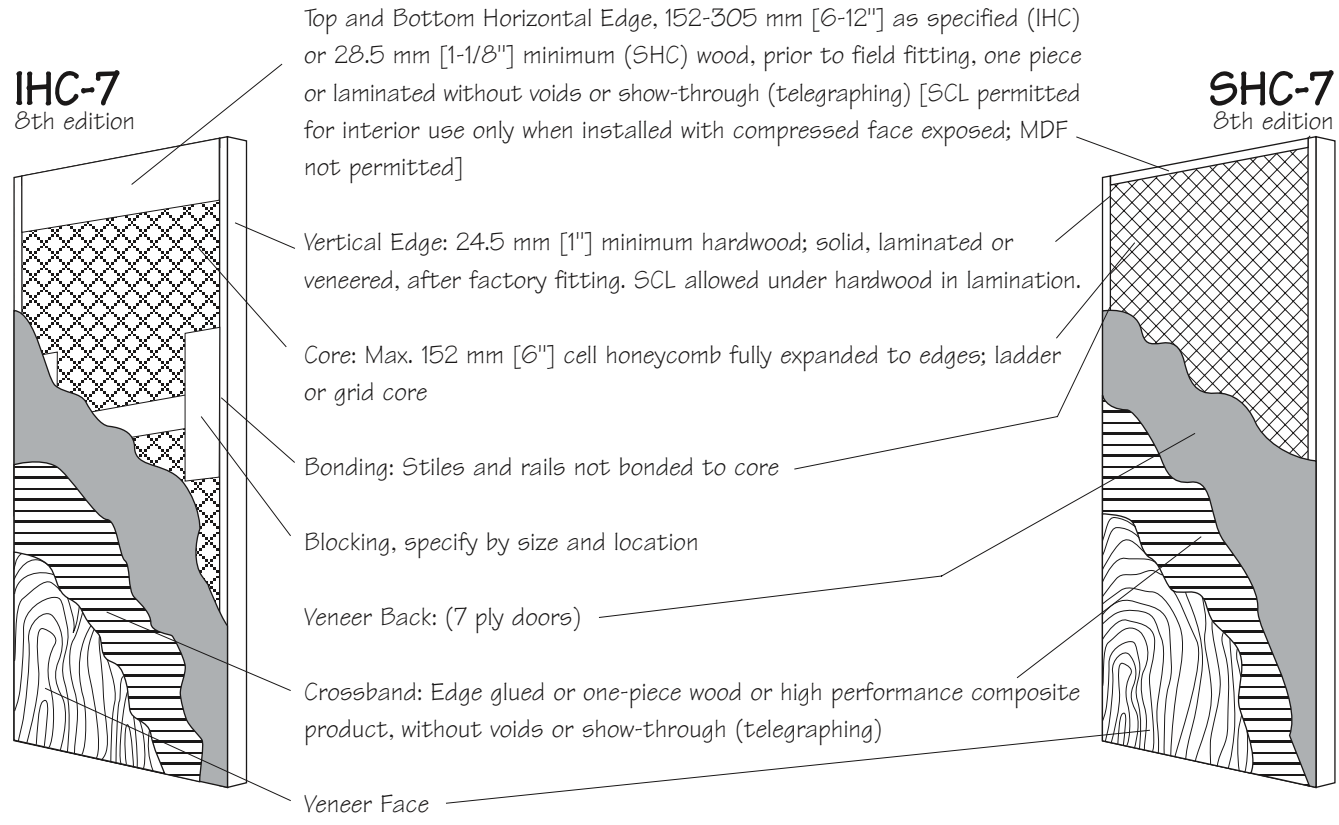
Label	Door Symbol	Rating	Wall Rating
45-minute	FD 3/4	3/4 hour	1 hour
60-minute	FD 1	1 hour	1 hour
90-minute	FD 1-1/2	1-1/2 hour	2 hour

NOTES: Pair matching not available. Species, color, and finishing for entire wood and/or metal trim package to be specified. Light openings allowed up to size tested by manufacturer. Louvers not allowed in 45-, 60-, and 90-minute doors.

* Includes other non-wood grain patterns.

1300-T-18

Veneer, Hollow Core



Criteria	Premium	Custom	Economy
Veneer face	"AA" grade, edge glued joints	"A" grade, edge glued joints	"B" grade, edge glued joints
Veneer match	Book, slip or random Center Balanced Pair and set match Door and transom end or continuous matched	Book, slip or random Running Pair match Door and transom end or continuous matched	Mill option
Vertical edges	Same species and grade as face, lumber or veneer over hardwood (ME); sanded ease; no visible joints allowed	Same species as face, lumber or veneer (ME); or compatible hardwood (CE); sanded ease; visible joints allowed on hinge edge	Mill option ; sanded ease. Visible joints allowed
Lights, louvers and mouldings	Same species and grade lumber, or veneered, or metal vision frames	Compatible species lumber or metal vision frames	Mill option

NOTES: Veneer match in excess of standard must be specified. Maple edges allowed for Natl. and White Birch. In the absence of specifications the manufacturer may choose between the alternatives within or above the Grade. 9-ply doors are available and should be evaluated and specified or approved by the design professional when desired.

1300

1300-T-19

Smoothness of Exposed Surfaces

Finishes applied on the jobsite are not covered by these standards Because wood doors are often subject to more handling during the construction process, final sanding to meet these requirements will take place at the manufacturer. Additional sanding and cleaning may be required prior to field finishing. This final preparation is the responsibility of the field finisher.

Smoothness Table	Premium		Custom		Economy	
	Transparent	Opaque	Transparent	Opaque	Transparent	Opaque
Sharp edges (Arris)	Eased with fine abrasive		Eased with fine abrasive		Mill option	
Top flat surfaces	150 grit		120 grit		100 grit or 15 KCPI	
Moulded surfaces	120 grit		minimum 20 KCPI			
Shaped surfaces	120 grit		minimum 20 KCPI			
Turned surfaces	120 grit		100 grit			
Sanding cross scratches	None allowed	Not to exceed 6.4 mm [.25"]	None allowed	Not to exceed 6.4 mm [.25"]		

NOTE: No tearouts, knife nicks, or hit-or-miss finish allowed. No knife marks allowed where sanding is required. Surface variations as a result of multiple tool passes treated as turned surfaces above. Glue and filler, if used, must be inconspicuous and sanded as smoothly as the surrounding surface. Sanding before final stain and/or finish should be a consistent grit and scratch pattern, as it influences blend of color and sheen between components. Top Flat Surfaces are those which which can be sanded with a drum or wide belt sander. Turnings are customarily sanded on the lathe, and will exhibit cross scratches.

Before finishing, all exposed portions of architectural woodwork shall have handling marks or effects of exposure to humidity or moisture removed by a thorough uniform final sanding. The sanded surface shall then be cleaned and dust free, prior to proceeding with the first step in the finishing process. Veneer sand-through, with veneer sanded to the point where cross banding or core is visible, and/or core telegraphing (variation from a true plane in excess of 0.25 mm [0.010"] in any 76 mm [3"] span) is not allowed in any Grade.

1300-T-20

Tightness and Flushness of Plant Assembled Joints

Plant Assembled Joint Table	Premium		Custom		Economy	
	Interior	Exterior	Interior	Exterior	Interior	Exterior
Maximum gap: Test A	0.4 mm [.015"] wide by 20% of joint length	0.6 mm [.025"] wide by 30% of joint length	0.6 mm [.025"] wide by 20% of joint length	1.3 mm [.050"] wide by 30% of joint length	1.3 mm [.050"] wide by 20% of joint length	1.9 mm [.075"] wide by 30% of joint length
Maximum gap: Test B	0.4 mm [.015"] x 76 mm [3"], and no gap may occur within 1829 mm [72"] of a similar gap	0.6 mm [.025"] x 152 mm [6"], and no gap may occur within 762 mm [30"] of a similar gap	0.6 mm [.025"] x 152 mm [6"], and no gap may occur within 1524 mm [60"] of a similar gap	1.3 mm [.050"] x 203 mm [8"], and no gap may occur within 660 mm [26"] of a similar gap	1.3 mm [.050"] x 203 mm [8"], and no gap may occur within 1219 mm [48"] of a similar gap	1.9 mm [.075"] x 254 mm [10"], and no gap may occur within 610 mm [24"] of a similar gap
Maximum gap: Test C	0.4 mm [.015"]	0.6 mm [.025"]	0.6 mm [.025"]	1.3 mm [.050"]	1.3 mm [.050"]	1.9 mm [.075"]
Maximum gap between fixed components shall be tested at points designed to join; where members connect or touch.						
Flushness Variation	0.03 mm [.001"]	0.4 mm [.015"]	0.1 mm [.005"]	0.6 mm [.025"]	0.6 mm [.025"]	1.3 mm [.050"]

1300-T-21

Factory Prefitting and Premachining

Factory prefitting and premachining is offered and shall be done when specified in the contract documents. No machining will be provided for surface-mounted hardware.

When premachining is specified, the hardware schedule related to individual door shall be made available to the woodworker at the time of bidding or tender. When such schedule is not available, or if it does not specify the type of lock, the woodworker shall be obligated only to machine for:

- Three standard butt hinges for doors up to 2290 mm [7'-6"], and one additional hinge for every additional 760 mm [30"] increment or portion thereof.
- Cylindrical lock

The woodworker shall be supplied with:

- Complete approved hardware schedule and required templates
- Complete approved set of metal frame shop drawings including exact locations of hardware preparation in metal frames

Labeled fire doors must be machined by a licensed facility under their label service agreement.

1300-T-22

Crossband Material Requirement

Minimum Requirements for all Grades

Crossbands shall be edge-glued or one piece wood veneer or high performance composite product, without voids or showthrough (telegraphing). High performance composite crossbands shall have a minimum Internal Bond of 200 psi (ASTM D 1037 testing) and thickness between 1 mm and 2.5 mm [$\frac{1}{16}$ " and $\frac{1}{10}$ "]. Most medium density fiberboard and particleboard will not meet this criteria. Most high density fiberboard and hardboard being used for crossbands do meet the criteria.

1300-T-23

Adhesives

Veneer gluelines are Type I or Type II assemblies. Type I assemblies are generally more resistant to the effects of moisture than Type II. Type II assemblies are acceptable for most applications. Woodworkers and door manufacturers have benefited from recent advances in adhesive technology. The modern adhesives are durable, safe, and effective. Consult with your door manufacturer for special-purpose applications.



Compliance Criteria

1300-C-1

Warp

Warp is any distortion in the door itself, and it does not refer to the door in relation to the frame or the jamb in which it is hung. Warp is measured by placing a straight edge or a taut string on the concave face and determining the maximum distance from the straight edge or string to the door face. The accompanying table and drawing illustrate the standard and test.

Door Thickness	Door Size	Warp a defect when maximum deviation exceeds
35 mm [1-3/8"]	914 x 2134 mm [3'-0" x 7'-0"] or smaller	6.4 mm [1/4"]
44 mm [1-3/4"] or thicker	1067 x 2134 mm [3'-6" x 7'-0"] or smaller	6.4 mm [1/4"]
44 mm [1-3/4"] or thicker	Larger than 1067 x 2134 mm [3'-6" x 7'-0"]	6.4 mm [1/4"] in any 1067 x 2134 mm [3'-6" x 7'-0"] section

NOTE: 35 mm [1-3/8"] doors are not recommended for sizes in excess of 914 mm x 2134 mm [3'-0" x 7'-0"]

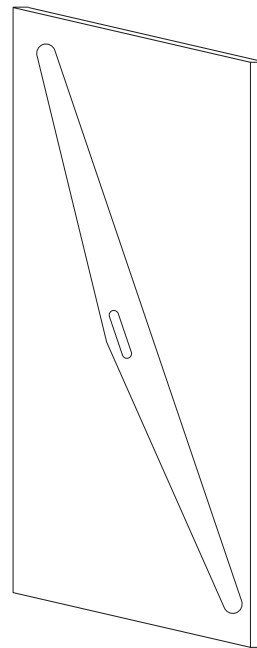


Illustration of Warp Test - Figure 1300-26

1300-C-2

Show-through or Telegraphing

Telegraphing is any distortion in the face veneer of a door caused by variations in thickness between the core materials and/or the vertical or horizontal edge bands. In any Grade, variation from a true plane in excess of 0.010" in any 3" span is considered a defect. The accompanying drawing illustrates the typical condition. The selection of high gloss finishes should be avoided because they tend to accentuate natural variations in material and construction.

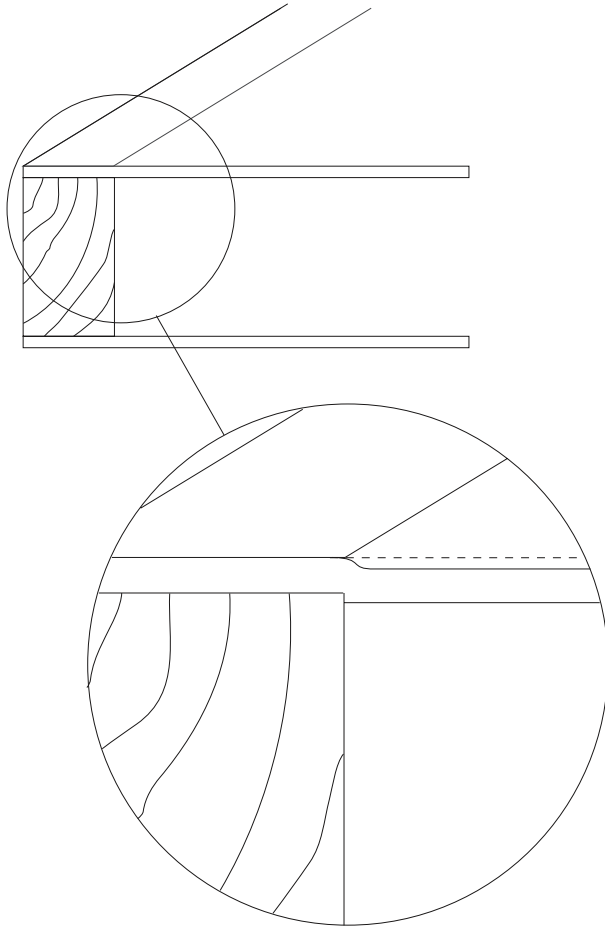


Illustration of Show-through Test - Figure 1300-27

1300-C-3

Squareness Tolerance

All four corners of a door shall be square (right angles) when the dimensions of the door agree with size tolerances previously defined. Allowable deviation shall be within 3 mm [$\frac{1}{8}$ "] when the length of the diagonal from the upper left corner to the lower right corner is compared with that of the upper right corner to the lower left corner of any one face without damage to the face or door corner.

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