Architectural
Woodwork Standards

FINISHING

5

SECTION

SECTION 5
Finishing

table of contents

INTRODUCTORY INFORMATION

Introduction 110
Purpose 110
Factory / Field Finishing 110
Important Considerations 110
Specifications 110
Varying Costs 110
Intermixing Systems 110
Application 110
Curing 110
Prefinished Wood Panels 110
Panel Products 111
Barber Pole 111
Grain 111
Open 111
Closed 111
Color and Grain Enhancement 111
Color Match and Consistency 111
Sheen 111
Transparent 111
Blotchy Appearance 111
Techniques to Consider 111
Sanding 111
Wash Coat 112
Blue Stain 112
Fire Retardant Treated Wood and Coatings 112
AWS Finishing Systems 112
General Performance Characteristics Table. 113
Specific Performance Characteristics Table. 114
Usage and Performance Score Comparison Table 115
Specify Requirements For 116
Recommendations 116

COMPLIANCE REQUIREMENTS

GENERAL

Basic Considerations 117
Grade 117
Classifications 117
Compliance Requirements 117
Contract Documents 117
Aesthetic Compliance 117
Listing 117
Factory or Field 117
Industry Practices 117
Door Manufacturer 117
Finisher of Wood Components 117
Finishing Systems 117

PRODUCT

Scope 118
Typical Inclusions 118
Typical Exclusions 118
Default Stipulation 118
Rules 118
Errata 118
Basic Rules 118
Finisher 118
Samples 118
Aesthetic Rules 119
Overall Appearance 119
Application Techniques 119
Incompatibility 119
Paneling 119
Trim and Frames 119
Doors 119
Casework 119
Defects and Workmanship 119
First Class Workmanship 120

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

table of contents

COMPLIANCE REQUIREMENTS (continued)

PRODUCT (continued)

Material Rules 120
Priming and Sealing 120
Flow Properties 120
Chemical Resistance 120
Application Rules 121
Sanding 121
Factory Priming 121
Ventilation 121
Over spray 121
Removal 121
Cleaning 121
Scratches 121
Consistency 121
Film Thickness 121
Filler 121
Thoroughly Dry 121
Sapwood 121
Staining 121
Generic Coating Schedule 121
System Coating Schedule 122
System 1 122
System 2 122
System 3 122
System 4 122
System 5 122
System 6 123
System 7 123
System 8 123
System 9 123
System 10 123
System 11 124
System 12 124
System 13 124
After Finishing 124
Touch up 124

TESTS

Basic Considerations 125
Visual Testing 125
Testing for Consistency 125
Sheen Testing 125

5

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

SECTION 5
Finishing

introductory information

INTRODUCTION

Section 5 pertains to shop and field finishing of architectural woodwork. Thirteen finishing systems are outlined with application rules and methods of testing.

Quality assurance can be achieved by adherence to the AWS and will provide the owner a quality product at competitive pricing. Use of a qualified Sponsor Member firm to provide your woodwork will help ensure the manufacturer's understanding of the quality level required. Illustrations in this Section are not intended to be all inclusive, other engineered solutions may be acceptable. In the absence of specifications; methods of fabrication are the manufacturer's choice. The design professional, by specifying compliance to the AWS increases the probability of receiving the product quality expected.

PURPOSE

The purpose of finishing woodworking is twofold. First, the finish is used traditionally as a means to enhance or alter the natural beauty of the wood. Second, the finish shall offer protection to the wood from damage by moisture, contaminants, and handling. It is important to understand that a quality finish must offer acceptable performance and also meet the aesthetic requirements of the project.

The AWS illustrates a number of finishing systems. The finishing system provides a protective surface for the product. Some of these systems are in general use; others are intended for special conditions and can only be applied under a strictly controlled environment. The cost of the systems vary, the higher performing finishes usually being more costly than the lower performing finishes. Unnecessary cost could be added to a project through over specification.

When specifying, use the system name as set forth in the AWS. Involve your woodwork manufacturer early in the design process to evaluate the systems in relation to your project requirements. Choose performance characteristics which meet, but do not exceed, the needs of your project in the interest of value engineering.

The listing of a finish system in the AWS does not imply an endorsement of the materials and/or methods or compliance with federal and/or local Environmental Protection Agency or other requirements.

FACTORY or FIELD FINISHING

Both are permitted, provided there is no violation of applicable codes or regulations.

- **Factory finishing** is usually specified for high quality work where superior appearance and performance of the finish is desired. Benefits of factory finishing include consistency, control of film thickness, environmental compliance, and curing/drying of the finish in a controlled atmosphere. Its use assumes a maximum degree of manufacturer prefabrication so that site installation can be performed with a minimum amount of cutting, fitting, and adjustment to facilitate project completion.

- **Field finishing** is typically specified when there is not a demand or specific need for a superior appearance and is not necessarily part of the woodwork contract. This would normally be specified in the painting specification section. The finisher/painter is responsible for examining and accepting the woodwork as supplied prior to the commencement of finishing. The finisher/painter is responsible for meeting or exceeding the control sample for surface performance characteristics (such as color, texture, and sheen), including proper surface preparation, shading, and blending of color, and other requirements as defined in this standard when so referenced.

- **Wood parts on decorative laminate cabinets**: finish is required on all wood pulls, trims, applied molding, edge bands, drawer boxes, and interior wood parts of decorative laminate casework.

IMPORTANT CONSIDERATIONS:

- **Specifications** too often, call for finishes based on samples or guide language from a specialty manufacturer.

  Select the performance criteria which best meets the needs of your client from the finish tables. Finish chemistry, performance, value to performance ratio, and your finisher's abilities should be considered.

- **Varying costs** of finish systems typically relate directly to their performing characteristics.

- **Intermixing systems** will likely cause quality and/or performance problems; they are usually not compatible with each other.

  Examples include the over specification of polyurethane or polyester topcoats when they are neither necessary or available from a custom fabricator.

- **Application** of finish material in excess of manufacturer's film thickness recommendations can cause the finish to fail.

  Brush applied finishes are not recommended for factory finished architectural woodwork, and are not covered by the AWS.
  Application techniques and other variances make the execution of the finish system difficult to determine. These standards provide the minimum requirements. The desired end result is to provide a finish that is both durable and achieves the desired appearance.

- **CURING** of finish systems have a wide range of variance. Shortest cure time is UV cured coatings, and longest being water based air dry coatings. Heat and air movement will speed the recoat and cure time.

  For the most part the method should not concern the design professional or specification writer. It is the performance of the topcoat which is important.

  UV (ultraviolet light) is typically used for high volume, repetitive applications, and requires special reactors to cure. A number of prefinished panel products are coated with materials designed specifically for UV curing. A wide range of UV cured roll coat flat line panel finishes are available. Just as there are in the conventional spray/air cured coatings. Consult with the fabricator for performance tests and details

- **Prefinished Wood Panels** and decorative overlays have aesthetic and performance characteristics which meet or exceed the AWS, and should be evaluated, approved and specified by the design professional when desired.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

introductory information

- **Panel products** and/or wood doors require balanced coats of finishing materials for stability and to remain free of warp.

- **Barber pole** effect is most evident when veneer leaves are book matched. Because book matched veneer panels or door faces are made up by turning every other piece (leaf) of veneer over, like the pages of a book, the face of one leaf and the back of the next leaf is exposed. This exposes the "tight" and "loose" face of the leaves. One of the most striking examples of Barber Pole effect can be seen in book matched rift and quarter cut Oak. Check with your manufacturer when you are considering specifying rift or quartered veneers.

- **Grain** can significantly impact a finish's visual appearance and smoothness. If a filled finish is required it must be so specified. As a rule, close grain woods do not require filler. See Table.

  For finishing purposes, the following woods are classified as:

Open Grain	
Ash	Mahogany, Philippine
Butternut	Oak, Red
Chestnut	Oak, White
Mahogany, African	Walnut
Mahogany, American	

Close Grain	
Alder, Red	Gum
Beech	Maple
Birch	Pine
Cherry	Poplar
Fir	

- **Color** and **grain enhancement** of a system, from the addition of a single stain, to a multiple step build of one color on another with wash coats in between for enhanced appearance is not included in the basic systems and needs to be specified.

  Aesthetically, systems may vary from no stain, to a single stain, to a multiple step application. Some samples will require multiple color and finish steps in order to meet the architect's requirements. The system specified may not include all steps necessary to match the architect's example or requirements.

  Color and grain enhancement of some finishes require the build of one color step on another. This will sometimes require an additional protective wash coat between color steps. Generally, this procedure adds to the depth and beauty of the finish. Each added step increases costs and shall be specified.

- **Color match** and **consistency** is often misleading. The best case achievable using a natural product like wood in a wide variety of lighting conditions is a good "blend" of color and tone throughout the project area. The natural color of the wood product is altered by the application of even a clear topcoat. Further alteration is achieved through the use of stains, glazes, bleaches, etc. Wood changes color; especially Cherry, Fir, American and African Mahogany, Walnut, Teak, and others. Filled nail holes will not change with wood. The apparent consistency of the color is a combination of light reflectance, cellular structure, natural characteristics, applied colors, and sheen.

  Color and "matching" of a sample are often highly subjective. Individual perception, ambient lighting, and reflectivity influence judgement. Design professionals are encouraged to consult directly with a manufacturer during the design and selection phase of each project.

- **Sheen** is the result of many factors, including finishing techniques, processes, stains, topcoats and the wood itself. Coating manufacturers use a variety of names for different sheens. An untrained eye can see a 10 point or greater difference in sheen.

  The following sheen ranges were developed by measuring the reflectance of a direct light source at a 60 degree angle with a gloss meter:

  - **Flat** = **8 - 14**
  - **Satin** = **15 - 25**
  - **Satin Gloss** = **26 - 49**
  - **Semi gloss** = **50 - 70**
  - **Gloss** = **71 - 90**

- **Transparent** finishes are applied in varying operations, typically consisting of some combination of hand sanding to remove job handling marks, staining, filling, sealing, sanding, and surface coating. Some exotic species have a high natural oil content and do not accept finishes similar to other hardwoods; because of this, the most common finish used is penetrating oil without any filling or sealing dyes or pigments in a stain.

- **Blotchy appearance** occurs because some wood species exhibit an uneven distribution of large and small pores in their structure. The occurrence of this is readily apparent in such hardwood species as Maple and Birch and, to a lesser degree, in Cherry. This irregular distribution of pores usually causes an uneven absorption of stain, hence, an apparent blotchy appearance in the finish. Reduction of the blotching condition can sometimes be achieved by proper sanding, wash coating (prior to staining) or by choosing non penetrating pigments, such as dyes, alcohol stains or glaze. When these steps are required or desired, they shall be specified in addition to finish system selection.

TECHNIQUES TO CONSIDER

While a blotchy appearance and the "barber pole effect" may occur in any species, due to the natural characteristics of wood, there are steps that can be taken to reduce these effects. The following are two of the techniques that are of particular importance.

- **Sanding** - While the selection of species, cut and match are major factors in the final appearance of a project, the first step, in controlling the quality of finished appearance, is proper sanding.

  An important element of this standard is the statement "just prior to staining." Specifications that indicate "factory shall finish sand prior to shipment" do not provide a correct solution for proper surface preparation. Such a directive fails to take into account the length of time panels will be stored at the job site, potential damage from handling and the effects of changes in the relative humidity. Proper sanding can only be done, just prior to staining/ finishing.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

TECHNIQUES TO CONSIDER (continued)

- **Sanding** (continued)

  The successful sanding of panels, or flush doors, is best accomplished with a hand block, powered pad sander, wide belt sander or stroke sander, exerting uniform pressure over the entire surface. Depending upon the condition of the surface it may be necessary to use successively finer grits of abrasive to properly prepare the surface, brushing off the surface between grits. The AWS sets forth the smoothness requirement for all Grades of work. Proper and complete surface preparation is the key factor in the successful finish procedure.

- **Wash Coat** - A wash coat is a thin coat of material, usually clear lacquer or vinyl sealer (6 to 10 parts thinner to one part sealer, topcoat). A wash coat can fulfill several purposes such as: to stiffen the small wood fibers that are raised by the staining operation, so they can be cut off easily with fine sandpaper (320 grit), to seal the stain, particularly if it is a bleeding type, to aid in the wiping and clean up of filler, and to minimize excessive penetration of stain or filler to minimize blotchiness. As with any finish process, samples should always be prepared to ensure that the desired finish is achieved.

IRON STAIN

Iron stain occurs in some species of veneers when natural tannic acid in the wood comes in contact with iron and or moisture. Enough moisture may occur during heavy rains or high humidity in buildings not yet temperature controlled.

To prevent iron stain, never use steel wool on the bare wood. Fine particles of the wool will cling to the wood and cause trouble later. If you use shellac (a solvent for iron), it should not be stored in iron containers. To remove iron stain prior to finishing, we recommend a solution of oxalic acid crystals. The solution is made by dissolving 12 ounces of crystals in one gallon of lukewarm water. Use a plastic or rubber container. Wear rubber gloves while working with the solution. Apply it to the stained areas with a brush or sponge.

To remove the oxalic acid, use a sponge and a bucket filled with lukewarm water. Squeeze the sponge to remove excess water and wipe the entire surface of the Oak wood to remove the acid residue. Rinse the sponge frequently in clean lukewarm water as you wipe. Pour out the water and add 1 qt. of fresh lukewarm water to the bucket. Add 2 tbsp. baking soda to the water and stir with a spoon to dissolve. Insert a fresh sponge into the solution and squeeze out the excess water. Wipe the entire surface of the Oak to neutralize any remaining acid residue and stop the bleaching process. Allow the surface to dry and sand with 150 to 180 grit sandpaper. The entire surface should be treated to avoid spotting. Failure to rinse the treated area adequately may have a damaging effect on the finish subsequently applied, or may cause damage to nearby glass, porcelain or other surfaces in confined areas. Damage may not result immediately, but may result during storage or after installation.

FIRE RETARDANT TREATED WOOD and **COATINGS**

Fire retardant treatments may affect the finishes intended to be used on the wood, particularly if transparent finishes are planned. The compatibility of finishes should be tested before they are applied.

“Fire retardant” coatings usually are of the intumescent type. They may be water based or solvent based, but both contain ingredients which, under the influence of heat, produce gases and char like products, resulting in the formation of a thick nonflammable crust that effectively insulates combustible cores from heat and flame. However, these ingredients are for the most part water sensitive and therefore reduce durability and range of usage of the coatings.

These coatings only delay the spread of fire and help contain it to its origin. To be of appreciable value, fire retardant coatings must be applied in strict conformance with the manufacturer’s instructions. These finishes are not particularly durable and their use should be restricted to application over interior surfaces.

The need for, and effectiveness of, fire retardant and fire resistant finishes depends on the type of construction, nature of occupancy, and other technical features of the building. Because these finishes are considerably more expensive and have reduced durability, their use should be carefully limited to those areas where confining fire spread is the overwhelming consideration; for example, interior entrances, hallways, stairwells and ceilings.

AWS FINISHING SYSTEMS

Apply to both transparent or opaque applications, unless otherwise indicated: Specification of a system requires listing both the system number and the name, along with any desired enhancements.

SYSTEM - 1, Lacquer, Nitrocellulose

SYSTEM - 2, Lacquer, Pre Catalyzed

SYSTEM - 3, Lacquer, Post Catalyzed

SYSTEM - 4, Latex Acrylic, Water Based

SYSTEM - 5, Varnish, Conversion

SYSTEM - 6, Oil, Synthetic Penetrating (available in transparent only)

SYSTEM - 7, Vinyl, Catalyzed

SYSTEM - 8, Acrylic Cross Linking, Water-Based

SYSTEM - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane

SYSTEM - 10, UV Curable, Water Based

SYSTEM - 11, Polyurethane, Catalyzed

SYSTEM - 12, Polyurethane, Water Based

SYSTEM - 13, Polyester, Catalyzed

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

Table: 5-001 **- GENERAL PERFORMANCE CHARACTERISTICS of AWS FINISHING SYSTEMS:**

	SYSTEM NUMBER and **DESCRIPTION**												
	Lacquer, Nitrocellulose	Lacquer, Pre Catalyzed	Lacquer, Post Catalyzed	Latex Acrylic, Water Based	Varnish, Conversion	Oil, Synthetic Penetrating (available in transparent only)	Vinyl, Catalyzed	Acrylic Cross Linking, Water-Based	UV Curable, Acrylated Epoxy, Polyester or Urethane	UV Curable, Water Based	Polyurethane, Catalyzed	Polyurethane, Water Based	Polyester, Catalyzed
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
General Durability	2	2	3	2	4	1	4	2	5	5	5	3	5
Repairability	5	4	3	3	3	5	4	4	1	3	2	4	1
Abrasion Resistance	2	4	4	3	4	1	4	4	5	4	5	4	5
Finish Clarity	5	4	5	2	3	5	3	4	5	5	3	4	4
Yellowing in Time	1	2	3	5	4	2	1	4	3	5	4	4	3
Finish Flexibility	1	2	3	3	4	5	4	3	2	3	4	4	1
Moisture Resistance	3	3	4	1	4	1	5	3	5	4	5	4	5
Solvent Resistance	1	2	4	1	5	1	5	3	5	5	5	4	5
Stain Resistance	2	4	5	3	5	1	5	4	5	5	5	4	5
Heat Resistance	1	2	5	1	5	1	5	3	5	5	5	4	5
Household Chemical Resistance	3	4	5	3	5	2	5	4	5	5	5	4	5
Build/Solids	2	3	3	3	4	1	4	3	5	4	4	3	4
Drying Time	5	5	5	2	4	2	5	4	5	5	3	5	2

5 = Excellent to 1 = Poor. The numerical ratings are subjective judgments based on the general performance of generic products. Special formulations and facilities will influence some of the performance characteristics.

NOTES for *Table: 5-002 on following page.*

Testing was evaluated in an ISO 9000-certified laboratory using the following ASTM test criteria: Chemical Resistance Testing - ASTM D1308 (latest edition), Wear Index - Abrasion Resistance Testing - ASTM D4060 (latest edition), Cold Check Resistance - ASTM D1211 (latest edition), Cross Hatch Adhesion - ASTM D3359 (latest edition).

Baseline data for application prior to testing: A. 45-55% humidity at 70-80 degrees Fahrenheit; B. Water-borne coatings must be cured in a dehumidified atmosphere and can be assisted with infrared light and good air movement.

Performance indicator numbers are used, with the following definitions:

For chemical resistance and wear index - abrasion resistance:

5 - No effect from the test.
4 - Minimal effect or slight change and little repair required.
3 - Some effect; noticeable change, and the coating will recover with minimal repairs.
2 - Moderate effect, performance adversely affected and repairs required.
1 - Poor performance and film failure is imminent and repairs difficult.

For cross-hatch adhesion:

5 - Edges of the cuts are completely smooth; none of the squares of the lattice are detached.
4 - Small flakes of the coating are detached at intersections; less than 5% of the area is affected.
3 - Small flakes of the coating are detached along the edges and at the intersections of cuts; 5 to 15% of the area is affected.
2 - Coating has flaked along the edges and on parts of the squares; 15 to 35% of the area is affected.
1 - Coating has flaked along the edges of the cuts in large ribbons and whole squares have detached; 35 to 65% of the area is affected.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

Table: 5-002 **- SPECIFIC PERFORMANCE CHARACTERISTICS for AWS FINISHING SYSTEMS for TRANSPARENT and OPAQUE TOPCOATS:**

	SYSTEM NUMBER and DESCRIPTION												
	Lacquer, Nitrocellulose	Lacquer, Pre Catalyzed	Lacquer, Post Catalyzed	Latex Acrylic, Water Based	Varnish, Conversion	Oil, Synthetic Penetrating (available in transparent only)	Vinyl, Catalyzed	Acrylic Cross Linking, Water-Based	UV Curable, Acrylated Epoxy, Polyester or Urethane	UV Curable, Water Based	Polyurethane, Catalyzed	Polyurethane, Water Based	Polyester, Catalyzed
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Vinegar	3	4	5	4	5	3	5	5	5	5	5	4	5
Lemon Juice	3	4	5	4	5	3	5	5	5	5	5	4	5
Orange Juice	3	4	5	4	5	3	5	5	5	5	5	4	5
Catsup	3	4	5	4	5	2	5	5	5	5	5	4	5
Coffee	3	4	5	4	5	2	5	5	5	5	5	4	5
Olive Oil	2	3	5	3	5	2	5	5	5	5	5	4	5
Boiling Water	3	4	5	4	5	3	5	5	5	5	5	4	5
Cold Water	5	5	5	5	5	3	5	5	5	5	5	4	5
Nail Polish Remover	1	2	3	2	4	1	2	2	5	5	4	3	4
Household Ammonia	3	4	5	4	5	2	4	2	5	5	5	4	5
VM&P Naphtha	3	4	5	4	5	1	4	5	5	5	5	4	5
Isopropyl Alcohol	1	2	3	1	5	2	4	3	5	5	5	4	5
Wine	3	4	5	4	5	2	4	5	5	5	5	5	5
Windex™	3	3	4	3	5	2	3	4	5	4	5	4	5
409 Cleaner™	3	3	4	4	5	1	4	4	5	5	5	4	5
Lysol™	3	5	5	4	5	2	4	3	5	5	5	4	5
33% Sulfuric Acid	3	4	5	3	5	1	4	5	5	5	5	4	5
77% Sulfuric Acid	1	2	3	1	1	1	2	1	4	3	4	3	4
28% Ammonium Hydroxide	1	2	3	1	5	1	4	2	5	5	5	3	5
Gasoline	1	2	5	2	5	1	4	5	5	5	5	4	4
Murphy's Oil Soap™	5	5	5	5	5	2	4	4	5	5	5	5	5
Vodka 100 Proof	3	4	5	4	5	2	4	3	5	5	5	4	5
1% Detergent	3	4	5	4	5	3	4	5	5	5	5	5	5
10% TSP	3	4	5	4	4	1	5	2	5	5	5	5	5
SUBTOTAL	**65**	**86**	**110**	**82**	**114**	**46**	**100**	**95**	**119**	**117**	**118**	**97**	**117**
Wear	2	3	4	2	5	1	4	4	5	5	5	5	4
Cold Check	5	5	5	5	5	5	5	5	5	5	5	5	5
Adhesion	5	5	5	5	5	5	5	5	5	5	5	5	5
TOTAL SCORE	**77**	**99**	**124**	**94**	**129**	**57**	**114**	**109**	**134**	**132**	**133**	**112**	**131**

NOTES are on previous page.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

introductory information

The following system overview tables are intended to give an overview of and help identify the correct standard or specialty finishing system to meet a project's needs; however, they are only relative to the topcoat, not any prior color or filler coats.

Differences between systems of 10 points or fewer are not generally considered significant enough to justify the typical added expense of a higher-rated system. This systems listing does not imply an endorsement of the materials or compliance with applicable codes and regulations. Due to changing environmental regulations and finish technologies, design professionals need to discuss finish options with a manufacturer located in the area of the project.

Table: 5-003 **- USAGE and PERFORMANCE SCORE COMPARISONS for AWS FINISHING SYSTEMS for TRANSPARENT and OPAQUE TOPCOATS:**

	TYPICAL USAGE	SCORE	WHY AND WHY NOT
1 - Lacquer, Nitrocellulose	Use in climate controlled environment for trims, furniture, paneling, and ornamental work.	77	Why - Repairable; widely available; quick-drying Why not - Lack of durability and resistance to most solvents and water; yellows over time.
2 - Lacquer, PreCatalyzed	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts (except treads), frames, windows, blinds, shutters, and doors.	99	Why - Repairable; stain-, abrasion-, chemical-resistance. Why not - Some yellowing; moderate build.
3 - Lacquer, PostCatalyzed	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts (except treads), frames, windows, blinds, shutters, and doors.	124	Why - Repairable; finish clarity; stain-, heat-, abrasion-,chemical-resistance. Why not - Some yellowing; moderate build.
4 - Latex Acrylic, Water Based	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts (except treads), frames, windows, blinds, shutters, and doors.	94	Why - Low VOCs; finish clarity (some formulations); stain resistance; yellowing resistance. Why not - Low durability; solvent- and heat-resistance; slow drying time.
5 - Varnish, Conversion	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts, frames, windows, blinds, shutters, and doors.	129	Why - Durable; widely available; good build. Why not - Occasional lack of finish clarity.
6 - Oil, Synthetic Penetrating	Use in climate controlled environment on furniture or trims requiring a close-to-the-wood look or very low sheen.	57	Why - Close-to-wood, antique look; low sheen. Why not - Labor-intensive to apply and maintain, refreshing finish required from time-to-time; low resistance properties to most substances.
7 - Vinyl, Catalyzed	Use in climate controlled environment, often on kitchen, bath, office furniture, and laboratory casework.	114	Why - Durable; widely available; fast drying. Why not - Occasional lack of finish clarity.
8 - Acrylic Cross Linking, Water-Based	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts, frames, windows, blinds, shutters, and doors.	109	Why - Fine durability; excellent abrasion-, solvent-, stain-, and chemical-resistance; moderately fast-drying; resists moisture Why not - Possibility of discoloration over time.
9 - UV Curable, Acrylated Epoxy, Polyester or Urethane	Use in climate controlled environment, doors, paneling, flooring, stair parts, and casework, where applicable; consult your finisher before specifying.	134	Why - Low VOCs; durable; near 100% solids usage; quick-drying (cure), may qualify as Green Guard. Why not - Difficult to repair with UV finish, as this requires a handheld UV lamp; availability varies; easy repair with lacquers or conversion varnish.
10 - UV Curable, Water Based	Use in climate controlled environment, doors, paneling, flooring, stair parts, and casework where applicable; consult your finisher before specifying.	132	Why - Low VOCs; quick-drying (cure), maybe Green Guard. Why not - Difficult to repair with UV finish, requires handheld UV lamp; availability varies; easy repair with lacquers or conversion varnish.
11 - Polyurethane, Catalyzed	Use in climate controlled environment; some formulas available for exterior environments; floors, stairs, high-impact areas; some doors; generally not good for casework, paneling, windows, blinds, and shutters.	133	Why - Durable; good build. Why not - Slow-drying; very difficult to repair; some formulations hazardous to spray-personnel without air make-up suits.
12 - Polyurethane, Water Based	Use in climate controlled environment for furniture, casework, paneling, ornamental work, stair parts, frames, windows, blinds, shutters, and doors.	112	Why - Improved durability; excellent abrasion-, solvent-, stain-, and chemical-resistance; moderately fast-drying; resists moisture. Why not - Tannins in some wood species may cause discoloration over time.
13 - Polyester, Catalyzed	Use in climate controlled environment for furniture, casework, paneling, ornamental work, blinds, shutters, and some doors.	131	Why - Durable; good build; can be polished. Why not - Not widely available; slow-curing; requires special facilities and skills; very difficult to repair; brittle finish flexibility.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

introductory information

SPECIFY REQUIREMENTS FOR

- **FIRE RESISTANCE**
- **CHEMICAL RESISTANCE**
- Use of **FILLER, WASH COAT**, or **STAIN**
- **FILLED FINISH**
- **AWS** finishing system for transparent or opaque application:
  - **SYSTEM - 1**, Lacquer, Nitrocellulose
  - **SYSTEM - 2**, Lacquer, Pre Catalyzed
  - **SYSTEM - 3**, Lacquer, Post Catalyzed
  - **SYSTEM - 4**, Latex Acrylic, Water-Based
  - **SYSTEM - 5**, Varnish, Conversion
  - **SYSTEM - 6**, Oil, Synthetic Penetrating (available in transparent only)
  - **SYSTEM - 7**, Vinyl, Catalyzed
  - **SYSTEM - 8**, Acrylic Cross Linking, Water-Based
  - **SYSTEM - 9**, UV Curable, Acrylated Epoxy, Polyester or Urethane
  - **SYSTEM - 10**, UV Curable, Water-Based
  - **SYSTEM - 11**, Polyurethane, Catalyzed
  - **SYSTEM - 12**, Polyurethane, Water-Based
  - **SYSTEM - 13**, Polyester, Catalyzed

RECOMMENDATIONS

- If **FIELD FINISHED,** include in Division 09 of the specifications:
  - "Before finishing, all exposed portions of woodwork shall have handling marks or effects of exposure to moisture removed with a thorough, final sanding over all surfaces of the exposed portions, using appropriate grit sandpaper, and shall be cleaned before applying sealer or finish."
  - "Concealed surfaces of all architectural woodwork that might be exposed to moisture, such as those adjacent to exterior concrete walls, shall be primed."
- **REVIEW** the GENERAL portion of Sections 3 and 4 for an overview of the characteristics and the minimum acceptable requirements of lumber and/or sheet products that might be used herein.
- Avoid **BRUSH-APPLIED** finishes for architectural woodwork; they are not covered by these standards.
- Avoid **BLEACHED VENEERS** because of potential finishing problems.
- Avoid **JOBSITE FINISHING** because a factory-controlled finishing environment offers a superior finished product; however, jobsite finishing is permitted, provided there is no violation of applicable codes and regulations.
- Avoid **EXTERIOR WOOD DOORS** finished in a dark color that will absorb heat when exposed to direct sunlight or without adequate overhead soffit protection.
- For **CHEMICAL RESISTANCE**, these standards have adapted SEFA's (Scientific Equipment and Fixture Association) standard list of 49 chemicals/concentrations, their required methods of testing, and their minimum acceptable results as the minimum acceptable chemical-resistance requirement for finishes used at exposed and semi-exposed surfaces, when such is required by specification.
  - **SEFA's** chemical listing, methods of testing, and minimum acceptable results can be found in **APPENDIX**.

- **FIRE-RETARDANT** or **RESISTANT FINISHES** are subject to applicable codes and regulations, the use of fire-rated cores in lieu of fire-retardant finishes is recommended.
- Some **PRE-FINISHED** wood panels or decorative overlays have aesthetic and performance characteristics that meet or exceed these standards without using a listed or recommended finish system.
  - Such products should be evaluated and/or specified by the design professional.

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014

You can now download for ***FREE*** a copy of the Architectural Woodwork Standard, ED 2 for a complete AWS document including compliance requirements, product information and more.

To Access

STEP 1
Create and sign up for an account on the **AWI Publications Store**.

STEP 2
Navigate to "Standards Download' under the Category filter, and select ***"+ADD TO CART"*** on either the:

Architectural Woodwork Standard, ED 2 Redline (Digital Download)
OR
Architectural Woodwork Standard, ED 2, 2014 Redline with Current Standards Watermark As of 6/01/2020 (Digital Download)

The watermarked version of the AWS helps you to navigate the Standards based on the release of the recognized AWI Standards. ***OR**, See a **Roadmap to the AWI Standards** to help you navigate them as well.

Get Started

©2014 AWI | AWMAC | WI 2nd Edition, October 1, 2014
As may be updated by errata at **awinet.org, awmac.com,** or **aws-errata.com**