

EDITION 2

ARCHITECTURAL WOODWORK STANDARDS

Architectural Woodwork Standards

2nd Edition

A Specification of Qualities, Methods, and Workmanship
Requisite to the Production and Installation of Architectural Millwork

Adopted and Published Jointly, Effective October 1, 2014,
As the Successor, Replacement, and Latest Edition of the
Architectural Woodwork Standards
By the Following Sponsor Associations:



Architectural Woodwork Institute (AWI)
46179 Westlake Drive, Suite 120, Potomac Falls, VA 20165
Phone: 571-323-3636 / Fax: 571-323-3630
www.awinet.org



**Architectural Woodwork Manufacturers
Association of Canada (AWMAC)**
Unit 02A, 4803 Centre Street NW, Calgary, Alberta T2E 2Z6, Canada
Phone: 403-981-7300
www.awmac.com



Woodwork Institute (WI)
P. O. Box 980247, West Sacramento, CA 95798-0247
Phone: 916-372-9943 / Fax: 916-372-9950
www.woodworkinstitute.com

Joint Standards Committee Members:

Myron Jonzon - Chair • Mike Bell - Vice Chair • Clare Smith - Secretary

AWI

Michael Bell - Florida
Randy Jensen - Alabama
William Munyan - North Carolina
Shows Leary - New York

WI

Bill Fenstermacher - California
Mike Hansen - California
Bruce Humphrey - California
Dennis Milsten - Washington

AWMAC

Kerry DePape - Saskatchewan
Myron Jonzon - Alberta
Jim Taylor - British Columbia
Martin Boutet - Quebec

Executive Editor:

Stanley R. (Rob) Gustafson, CAE, CSI
CEO - Woodwork Institute

© 2014 jointly by the Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturers Association of Canada (AWMAC), and Woodwork Institute (WI). All rights reserved under Pan American and International Copyright Conventions.

Price: \$125.00 USD

INTRODUCTORY STATEMENT

Like all architectural components of the construction process, woodwork design and configuration possibilities are limited only by the creativity of the design professional. We have included architectural wood products which through evolution have become fixtures of our daily lives and have developed a measurable guideline to ensure these products meet these standards.

While these Architectural Woodwork Standards (AWS) are to be applied to the production and installation of all architectural wood products, the performance of wood products once installed outside of a climate controlled (interior) environment (as identified in Section 2 of these standards) cannot be measured by these standards. Wood products installed in non-climate controlled environments will have varying degrees of performance and should be governed by contractual agreements between the manufacturers and the buyers.

It is the intent of these standards to assist the design professional to specify a variety of millwork products which meet the functional and esthetic requirements of their clients. Encompassing all products in these standards is not possible; but by understanding and applying these standards and implementing the services provided by the signatory Sponsor Associations, the design professional will best serve their client needs and can be confident their quality criteria will be achieved.

When design professionals reference the AWS for their projects, they also assume the obligation that the quality standards are met.

DISCLAIMERS

The Sponsor Associations shall not be responsible to anyone for the use of or reliance upon these standards. The Sponsor Associations shall not incur any obligation nor liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon these standards.

These *Architectural Woodwork Standards (AWS)* provide the minimum criteria for the concept, design, fabrication, finishing, and installation of architectural woodwork. Provisions for mechanical and electrical safety have not been included. References to life-safety requirements are included for information only. Governmental agencies or other national standards-setting organizations provide the standards for life-safety requirements.

While the AWS does establish Assembly and Installation standards for all wood products, the joint flushness and gap tolerance performance for wood products once installed outside of climate controlled (interior) environments (as identified in Section 2 of these standards) cannot be governed by these Standards.

Illustrations are intended to assist in understanding the standards and may not include all requirements for a specific product or unit, nor do they show the only method of fabrication. Such partial drawings shall not be used to justify improper or incomplete design and/or construction.

The appendix is provided as an additional resource to the manufacturer, design professional, educator, user, or certifying organization. The Appendix is only part of the standards when referenced.

This AWS includes citations and quotes from other industry Standards that are neither developed nor published by the Sponsor Associations. The reference to and usage of is not a validation of these citations and quotations outside the context of the AWS. Only when these citations and partial quotations are applied in concert with all other related provisions of this AWS are these citations and partial quotations recognized for application to architectural woodwork.

If a conflict is found in these standards, it shall be brought to the attention of the Joint Standards Committee (JSC) by way of the AWS Improvement Suggestion Form (found at end of Users Guide and the Inside Back Cover) and until specifically addressed, the least restrictive requirement shall prevail.



AWI

Architectural Woodwork Institute (AWI)

The Architectural Woodwork Institute is a nonprofit international trade association of architectural woodwork manufacturers, industry suppliers, and design professionals. AWI was established in 1953 as an expansion of the Millwork Cost Bureau and is dedicated to goals that include:

- Updating, maintaining and promoting the Architectural Woodwork Standards;
- Providing networking, industry specific education, and learning opportunities for both members and the design community.
- Researching innovative materials and methods of compliance, engineering, fabrication, finishing, and installation.
- And through AWI's network of over twenty-five chartered AWI chapters, operating regionally on principles of sharing knowledge, education, and networking.

AWI's education and networking events include:

- Face-to-face and online based seminars and workshops for AWI members, the construction industry, and design professionals (including AIA Continuing Education System (CES) credits).
- Best Practices Groups for owners and top management of manufacturing member companies.
- Fall Annual Meeting and Convention.
- Spring Meeting & Leadership Conference.

AWI's Publications and web content, include:

- Design Solutions – AWI's quarterly journal with circulation of over 20,000 architects and designers.
- AWI eCost Book - a web-based manufacturing labor hour calculation system.
- LEED® Resources – Simplifies the key points to assist woodworkers with LEED® point reporting process.
- Numerous member-centered education, resources and networking activities.
- AWI's Safety Solutions – a web-based resource for safety and OSHA compliance information.
- AWI's annual Cost of Doing Business Report – provides manufacturing members with financial performance benchmarks, wage and compensation data and business trends.

- For more information about AWI, please visit the AWI website www.awinet.org or call the AWI National Office at 571-323-3636.

The AWI Quality Certification Program

In 1995, AWI's Board of Directors established the Quality Certification Program (QCP) to give measurable confirmation that the architectural woodwork, specified as a QCP Certified Project meets the quality grade required and established in the Architectural Woodwork Standards.

Since 2007, the AWI Quality Certification Corporation (AWI QCC), an independent, international credentialing body, has been the sole administrator of the AWI Quality Certification Program. To fulfill its mission to inspect, report, enforce and assist in architectural woodwork standards compliance, the QCP annually performs more than 500 inspections of firms and projects throughout North America, Asia, Africa, and Europe.

The design professional's reputation depends on others when they specify architectural woodwork. The Quality Certification Program (QCP) provides the means to measure, confirm and report that the quality specified is the quality provided.

QCP provides design professionals and owners a means of verifying the skills and competence of the architectural woodwork manufacturers on a project-specific basis. Inspections, reports and documentation give the design professional and owner clear justification to reject any woodwork that does not meet contract documents. A major benefit of QCP is that it provides the means to prevent noncompliant woodwork from being installed on the job site.

Design professionals are encouraged to include QCP's suggested specification language in their contract documents:

Quality Standard: Unless otherwise indicated, comply with "Architectural Woodwork Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

Quality Assurance: Provide AWI Quality Certification Program (QCP) [labels] [certificates] indicating that woodwork [including installation] complies with requirements of grades specified. This project has been registered as AWI/QCP Number _____.

OR, the contractor, upon award of the work, shall register the work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling QCC toll free 1-855-345-0991.

In fulfilling its mission to inspect, report, enforce and assist in architectural woodwork standards compliance, the AWI Quality Certification Program retains a team of experienced compliance inspectors, each of whom have at least fifteen years of experience in the architectural woodwork industry. Each inspector has passed the initial qualification testing, receives ongoing training by the QCC and has agreed to adhere to the QCC conflict of interest policy.

The QCP licenses eligible woodworking firms to certify that a project's work complies with the project contract documents and the Architectural Woodwork Standards (AWS). QCP verifies compliance with the contract documents and the standards through the inspection process.

Compliance inspections are performed for each new QCP Licensee's first two registered certified projects, or any registered project where request has been made to QCP administration for a compliance inspection by the project's design professional, the general contractor or project owner. Each year QCP performs compliance inspections on dozens of randomly chosen registered QCP projects throughout North America.

Woodworking firms earn their licensee certification credentials by successfully completing comprehensive testing, rigorous inspections, and by submitting no less than ten trade references. Moreover, QCP Licensees must demonstrate the ability to fabricate, finish, and/or install work in accordance with the quality grade criteria set forth in the Architectural Woodwork Standards (AWS).

The AWI Quality Certification Program is endorsed by leading construction organizations that values quality, including the U.S. General Services Administration (GSA) and the American Subcontractors Association (ASA). For more information about the AWI QCP, please visit the QCP website www.awiqcp.org or call the QCP National Office toll free at (855) 345-0991.

Consult the awiqcp.org website for additional inspection services.

Architectural Woodwork Manufacturers Association of Canada (AWMAC)



The Architectural Woodwork Manufacturers Association of Canada (AWMAC)/Association des Manufacturiers de la Menuiserie Architecturale du Canada has its roots in the 1920s millwork industry in Vancouver, Canada. Evolving from regional associations, it has become a nonprofit national registered association. AWMAC's strength is the linkage between the national association, the regional AWMAC Chapters, and the manufacturer, supplier, educational, associate, and design professional members. Today, AWMAC is the national voice of the Canadian architectural woodwork industry and is committed to:

- Partnering with other associations to define and improve architectural woodwork standards.
- Collaborating with educational institutions to enhance the apprentice and technical programs and to ensure a quality human resource for the architectural woodwork industry.
- Communicating the traditional, new, and innovative architectural woodwork assembly methods and materials to governments, industry, design professionals, and their associations
- Publishing The Sounding Board, a newsletter, and the Salary/Business Conditions Survey.
- In conjunction with AWMAC, AWMAC Chapters provide:
 - Seminars from raw "green" products to installed architectural woodwork for architects, designers, and members.
 - Annual Awards that celebrate the best in quality, service, and design for manufacturers, associates, and design professionals.
 - Administration of the Guarantee and Inspection Service (GIS); initiated in 1990, the GIS Program (when specified by the design professional) monitors and guarantees projects that specify AWMAC standards.

GUARANTEE AND INSPECTION SERVICE (GIS)
AWMAC regional chapters manage the GIS monitoring program, initiated in 1990. AWMAC GIS Certified Inspectors review, inspect and report on pre-tender specifications if requested, sample units when specified and shop drawings. Inspectors also perform a comprehensive final inspection of the architectural woodwork for the project owner. The AWMAC GIS program offers, through its members in good standing, a two year AWMAC Guarantee Certificate on projects which have the recommended GIS wording specified in the tender documents.

GIS MANDATE

In order to ensure that the quality of materials and workmanship of the architectural woodwork specified are in compliance with the current AWMAC Architectural Woodwork Standards (AWS), the AWMAC Guarantee and Inspection Service program (GIS) must be specified and be considered an integral component of the scope of work.

GIS OBJECTIVE

The objectives of the Guarantee and Inspection Service are:

1. To assist the design authority in achieving "good architectural woodwork."
2. To offer the owner, customer, design authority, and woodwork contractor an assurance that strict monitoring of the architectural woodwork requirements on a given project will meet the specified AWMAC standards.

GIS WORDING FOR SPECIFICATIONS

Architectural woodwork shall be manufactured and/or installed to the current AWMAC Architectural Woodwork Standards and shall be subject to an inspection at the factory and/or site by an appointed AWMAC Certified Inspector. Inspection costs shall be included in the tender price for this project. (Contact your local AWMAC Chapter for details of inspection costs). Shop drawings shall be submitted to the AWMAC Chapter office for review before work commences. Work that does not meet the AWMAC Architectural Woodwork Standards, as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the owner.

If the woodwork contractor is an AWMAC Manufacturer member in good standing, a two (2) year AWMAC Guarantee Certificate will be issued. The AWMAC Guarantee shall cover replacing, reworking and/or refinishing deficient architectural woodwork due to faulty workmanship or defective materials supplied and/or installed by the woodwork contractor, which may appear during a two (2) year period following the date of issuance.

If the woodwork contractor is not an AWMAC Manufacturer member they shall provide the owner with a two (2) year maintenance bond, in lieu of the AWMAC Guarantee Certificate, to the full value of the architectural woodwork contract.

CONTACT

For more information about AWMAC and the GIS Program visit our website at www.awmac.com and contact your local AWMAC Chapter office.



WOODWORK INSTITUTE Woodwork Institute (WI)

Established in 1951 as a not-for-profit trade organization dedicated to the preservation of the use of wood as a building material, Woodwork Institute (WI) has grown to a national organization whose primary purpose is to assure excellence and craftsmanship in woodwork.

As the Institute has grown, so too has its Quality Control Options. As a means of establishing quality control, WI along with AWI and AWMAC has collaborated on the Architectural Woodwork Standards (AWS). This book is the essence of building and installing quality products.

Unique to WI are its certification programs which include the Certified Compliance Program (CCP), the Monitored Compliance Program (MCP) and the Certified Seismic Installation Program (CSIP).

As well, WI provides Independent Inspection Services (IIS) for projects and Expert Witness Services (EWS), when requested by a party to the contract.

DIRECTORS OF ARCHITECTURAL SERVICE (DAS)

Our Director's of Architectural Services provide a wealth of knowledge to the architectural community and the construction industry. Their primary focus is compliance verification (inspection services) through CCP, MCP and CSIP.

Concentrating on the design community, the DAS are available to review specifications, answer millwork related Requests for Information, consult on design issues and present seminars for continuing education units as required by the Architectural Institute of America (AIA). As well, the DAS are available to assist a design professional should they need an impartial opinion about millwork fabricated or installed on a project.

Focusing on fabricators and installers the DAS are available for free and unbiased consultation regarding specification interpretation, compliance issues, shop-drawing protocol, standards interpretation and other matters.

CERTIFIED COMPLIANCE PROGRAM (CCP)

The Certified Compliance Program is a discipline of quality control used in conjunction with the AWS which provides an unbiased means of ensuring conformance to a project's plans and specifications. CCP, together with the use of the desired Grade(s) in the specifications, informs all parties of the design professional's expectations, without bidder discrimination.

By specifying CCP for both shop drawings and fabrication/installation of millwork products the design professional is assured that all items conform to the contract documents and the requirements of the AWS.

CCP does not restrict bidding or bidders. Anyone may use the CCP inspection service without the requirement of being a member or licensee.

Evidence of certification is provided by issuance of a Certified Compliance Certificate, listing the items certified, the applicable AWS Grade, and whether installation is included. Additionally, if so specified, shop drawings and each elevation of casework and/or countertops are labeled with an individually serial-numbered "Certified Compliance Label."

MONITORED COMPLIANCE PROGRAM (MCP)

The Monitored Compliance Program is a discipline of quality affirmation used in conjunction with the AWS which provides ongoing reviews/inspections of a project from its beginning through completion.

The design professional, in specifying MCP, is ensuring that strict conformance to his/her design intent is adhered to throughout the millwork fabrication and installation process.

Shop drawings, millwork products, finishing and installation (of all involved parties) will be progressively inspected for compliance to the contract documents and the specified AWS Grade(s). Reports will be issued to all involved parties at each review/inspection.

Evidence of compliance is provided by issuance of a Monitored Compliance Certificate, listing the items certified, the applicable AWS Grade(s) and whether installation is included. Additionally, if so specified, shop drawings and each elevation of casework and/or countertops are labeled with an individually serial-numbered "Compliance Label".

CERTIFIED SEISMIC INSTALLATION PROGRAM (CSIP)

Certified Seismic Installation Program is WI's most recent certification program. It is a standalone Quality Control and Seismic Compliance Option, but can be specified in conjunction with CCP or MCP. CSIP offers design professionals and property owners specified use of WI's seismic casework pre-approvals from the Office of Statewide Health Planning and Development (OSHDP) without additional engineering costs and/or requirements. It further assures:

- Proper backing has been installed in the walls when and where required.
- Certified acknowledgement that the project's seismic casework installation requirements meet OSHDP and/or the Division of State Architect (DSA) compliance requirements.

INDEPENDENT INSPECTION SERVICE (IIS)

The Independent Inspection Service is available on a fee basis with respect to issues pertaining to the architectural woodwork industry as defined within or covered by the AWS.

EXPERT WITNESS SERVICE (EWS)

Expert Witness Service is available on a fee basis with respect to issues pertaining to the architectural woodwork industry as defined within or covered by the AWS.

For more information please visit WI's website at www.woodworkinstitute.com or call the administrative office at (916) 372-9943.

The Following Associations Are Gratefully Acknowledged:

American Institute of Architects (AIA)
American National Standards Institute (ANSI)
American Society of Interior Designers (ASID)
American Society for Testing and Materials (ASTM)
Builders Hardware Manufacturers Association (BHMA)
Composite Panel Association (CPA)
Construction Specifications Canada (CSC)
Construction Specifications Institute (CSI)
The Engineered Wood Association (APA)
Hardwood Plywood & Veneer Association (HPVA)
Interior Design of Canada (IDC)
International Solid Surface Fabricators Association (ISSFA)
International Wood Products Association (IWPA)
Laminating Materials Association (LMA)
National Electrical Manufacturers Association (NEMA)
National Fire Protection Association (NFPA)
National Hardwood Lumber Association (NHLA)
Royal Architectural Institute of Canada (RAIC)
Scientific Equipment & Furniture Association (SEFA)
Stair Manufacturer Association (SMA)
Western Wood Products Association (WWPA)
Window and Door Manufacturers Association (WDMA)
Wood Moulding and Millwork Producers Association (WMMPA)

Architectural
Woodwork Standards

USER'S GUIDE

Sponsored by the Architectural Woodwork Institute, the Architectural Woodwork Manufacturers Association of Canada, and the Woodwork Institute (hereinafter called the Sponsor Associations), these joint standards represent the best of what all three organizations have to offer in defining the minimum requirements of material and workmanship for the fabrication and installation of architectural woodwork in a climate controlled interior environment. The joint standards are based on three definitive levels of materials and workmanship: Economy, Custom, and Premium Grade.

These standards are both a voluntary and a definitive document, intended to spell out the requirements for satisfactory performance when referenced as part of contract documents. Sections in the document are interrelated and are intended to be used together, not in part. For example, if a project specification requires compliance with Section 10, then compliance with Sections 1-5 along with the Appendix and the Glossary are also required, as applicable.

The **INSIDE FRONT COVER** provides an important **PRODUCT ADVISORY** regarding dimensional change problems in architectural woodwork and its review and consideration is recommended by the Sponsor Associations.

The **INSIDE BACK COVER** provides reference for access to an **AWS IMPROVEMENT SUGGESTION FORM** which can be filled out and submitted online through any of the Sponsor Associations web sites.

Each **SECTION** is organized into two distinct elements, that of:

- **Introductory Information** - Consisting of educational materials and resources relevant to the Section that are not standards or compliance requirements, and:
 - Specific specification requirements.
 - General recommendations.
- **Compliance Requirements** - Consisting of the standards requirements (rules) which are further organized into:
 - **Basic Considerations**, including grades, general subject matter and industry practices applicable to the scope of work.

- **Product**, covering minimum manufacturing (material, machining, and assembly) requirements.
- **Installation**, minimum installation requirements (not applicable to Sections 1-5).
- **Test** - covers the ways of verifying compliance with the standards (not applicable to Sections 1-4).

THE FOLLOWING ARE NOT PART OF THE AWS FOR COMPLIANCE PURPOSES:

- Introduction
- Table of Contents
- Introductory Information Portion of Each Material or Product/Installation Section
- Design Ideas
- Index

THE AWS IS SUBDIVIDED AS FOLLOWS:

- **Introduction** - Provides an Introductory Statement, Disclaimers and a brief description about the Sponsor Associations.
- **User's Guide** - Provides a tool to enhance your understanding of the philosophy behind the layout of these standards.
- **Table of Contents**
- **Preface** - Provides information in areas of importance that should be reviewed in advance of using the standards.
- **Section 1 - Submittals** - Addresses minimum submittal requirements, including shop drawings, samples, etc., and is further subdivided as follows:
 - **Table of Contents**
 - **Introductory Information**
 - Specify Requirements For
 - Recommendations
 - **Compliance Requirements**
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Section 6-12 Rules

- **Section 2 - Care & Storage** - Addresses minimum care and storage (environmental condition) requirements to be maintained before, during, and after the delivery, storage, and installation of product and is further subdivided as follows:

- **Table of Contents**
- **Introductory Information**
 - Specify Requirements For
 - Recommendations
- **Compliance Requirements**
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules

- **Section 3 - Lumber** - Addresses the minimum acceptable performance and appearance characteristics of lumber to be used within the standards' product Sections 6-12. This section does not attempt to establish raw material grades. It defines the minimum characteristics for lumber when used in a product governed by Sections 6-12 based on the specified Grade of work (Economy, Custom, or Premium) and is further subdivided as follows:

- **Table of Contents**
- **Introductory Information**
 - Specify Requirements For
 - Recommendations
- **Compliance Requirements**
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Hardwood Material Rules
 - Softwood Material Rules

- **Section 4 - Sheet Products** - Addresses the minimum acceptable performance and appearance characteristics of panel materials to be used within the standards' product Sections 6-12. This section does not attempt to establish raw material grades. It defines the minimum characteristics for panels when used in a product governed by Sections 6-12 based on the specified Grade of work (Economy, Custom, or Premium) and is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Application Rules
 - **TESTS**
 - Basic Considerations
- **Section 5 - Finishing** - Addresses the minimum acceptable performance and appearance characteristics for factory and field finishing used within the standards' product Sections 6-12 and is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
- **Section 6 - Millwork** - Addresses the minimum acceptable millwork fabrication and installation requirements for standing and running trim, door frames, window frames, sashes, blinds and shutters, screens, ornamental and miscellaneous millwork based on the specified Grade of work (Economy, Custom, or Premium) and is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - **INSTALLATION**
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - Product Specific Rules
 - **TESTS**
 - Basic Considerations
- **Section 7 - Stairwork & Rails** - Addresses the minimum acceptable millwork fabrication and installation requirements for wood stairs, integral trim, handrails and guardrails based on the specified Grade of work (Economy, Custom, or Premium) and is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - **GENERAL**
 - Basic Considerations
 - Grades
 - Industry Practices
 - **PRODUCT**
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - **INSTALLATION**
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - **TESTS**
 - Basic Considerations
 - **Section 8 - Wall/Ceiling Surfacing & Partitions** - Addresses the minimum acceptable millwork fabrication and installation requirements for wood veneer, solid wood, stile and rail wood, decorative laminate, solid surface and solid phenolic wall/ceiling and partition surfacing, based on the specified Grade of work (Economy, Custom, or Premium) and is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations

THE AWS IS SUBDIVIDED (continued)

- Section 8 - Wall/Ceiling Surfacing & Partitions (continued)
 - Compliance Requirements
 - GENERAL
 - Basic Considerations
 - Grades
 - Industry Practices
 - PRODUCT
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - INSTALLATION
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - TESTS
 - Basic Considerations
- Section 9 - Doors - Addresses the minimum acceptable millwork fabrication and installation requirements for passage doors of flush and stile & rail construction with wood and HPDL faces, based on the specified Grade of work (Economy, Custom, or Premium). This section is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - GENERAL
 - Basic Considerations
 - Grades
 - Industry Practices
 - PRODUCT
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - INSTALLATION
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - TESTS
 - Basic Considerations
- Section 10 - Casework - Addresses the minimum acceptable millwork fabrication and installation requirements for wood, decorative laminate and solid phenolic faced casework, based on the specified Grade of work (Economy, Custom, or Premium). This section is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - GENERAL
 - Basic Considerations
 - Grades
 - Industry Practices
 - PRODUCT
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - INSTALLATION
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - TESTS
 - Basic Considerations
- Section 11 - Countertops - Addresses the minimum acceptable millwork fabrication and installation requirements for tops, wall caps, splashes and sills of high pressure decorative laminate, wood, solid surface, solid phenolic, epoxy resin and natural/engineered stone, based on the specified Grade of work (Economy, Custom, or Premium). This section is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - GENERAL
 - Basic Considerations
 - Grades
 - Industry Practices
 - PRODUCT
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - INSTALLATION
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules
 - TESTS
 - Basic Considerations
- Section 12 - Historic Restoration Work - Addresses the minimum acceptable millwork fabrication and installation requirements for historic restoration work, including stripping, repairs and finishing. This section is further subdivided as follows:
 - Table of Contents
 - Introductory Information
 - Specify Requirements For
 - Recommendations
 - Compliance Requirements
 - GENERAL
 - Basic Considerations
 - Grades
 - Industry Practices

THE AWS IS SUBDIVIDED (continued)

- Historic Restoration Work (continued)
 - PRODUCT
 - Scope
 - Default Stipulation
 - Rules
 - Basic Rules
 - Material Rules
 - Machining Rules
 - Assembly Rules
 - Repair Rules
 - Stripping Rules
 - Finishing Rules
 - INSTALLATION
 - Preparation and Qualification Requirements
 - Rules
 - Basic Rules

• Appendix - Provides additional resources to the manufacturer, design professional, educator, user, or certifying organization and is only part of these standards when referenced. For your convenience where the APPENDIX is referenced it is flagged by the following icon:



• Design Ideas - Provides additional resources to the design professional, educator, or user. For your convenience where DESIGN IDEAS is referenced it is flagged by the following icon:



• Glossary - Provides definitions of terms used throughout these standards.

• Index

FORMAT WITHIN EACH SECTION:

The Introductory Information portion is in triple column, text book format with a non-shaded header including Section number, title, and Introductory Information statement recognizing that the included text is non-compliant in nature. There is also a black edge tab with Section number for ease of navigation.

SECTION 7
Stairwork & Rails

introductory information

INTRODUCTION

Section 7 includes information on wood stairs, integral trim, handrails, and guardrails and their related parts.

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 are acceptable. In the absence of specifications, methods of fabrication shall be the option of the manufacturer. The design professional, by specifying compliance to the AWS increases the probability of receiving the product quality expected.

DESIGN SUMMARY

This short summary is a collection of options and illustrations about the challenges of designing and building safe stairs. The AWS cannot and does not offer this data as advice on code compliance. Safe stairs and design and engineering to meet local codes remains the responsibility of the design professional.

• **Cost effective:** Custom woodwork competes favorably with mass produced millwork, and offers practically limitless variations of design and material. Most woodwork lasts the life of the building, quality counts.

• **No restrictions:** Custom architectural woodwork permits complete freedom of selection of the numerous hardwoods and softwoods available for transparent or opaque finish. Other unique materials available from woodwork manufacturers require no further finishing at all, such as plastic laminates and decorative overlays. These materials can be fashioned into a wide variety of profiles, sizes, and configurations. The design professional has the best of both worlds, high quality and freedom of choice.

ADVISORY

Contract documents, furnished by the design professional, should clearly indicate or delineate material, fabrication, installation, and applicable building code/regulation requirements.

Cross grain in band sawn or laminated members might cause objectionable color variation when finished.

TYPICAL STAIR RUNS:

- **STRAIGHT**

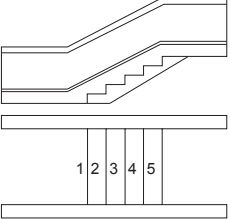


Figure: 07-002

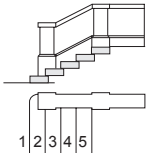


Figure: 07-003

Example: User's Guide - 001

Each page also includes a footer stating the page number, document name, edition, and effective publication date.

actual fabrication, if required by job conditions. Special situations such as designing for the disabled can readily be accommodated by the custom architectural woodwork manufacturer.




Figure: 07-001

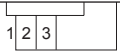


Figure: 07-004

172 Architectural Woodwork Standards

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

Example: User's Guide - 002

However in the Compliance Requirements portion the footer also includes an Errata statement advising "As may be updated by errata at awinet.org, awmac.com or aws-errata.com."

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

Architectural Woodwork Standards **175**

Example: User's Guide - 003

FORMAT WITHIN EACH SECTION (continued)

The Compliance Requirement Sections have a grey shaded header with Section number, title, and compliance requirements statement recognizing that the included text is part of the standards for compliance purposes. There is also a grey shaded edge tab with Section number for your ease of navigation.

All text is laid out in two column or table numerical, outline format, wherein each statement, issue, or rule becomes a specific, uniquely referenced item. Additional discussion or qualifications to an item are indented to the right, immediately below, or listed subsequently.

The following is an example of the "General" portion:

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">E C P</div> <div style="font-size: 8px;">Where the E, C, or P icon is not indicated, the rule applies to all Grades equally</div> </div>		<p>SECTION 7 Stairwork & Rails</p>
<p>compliance requirements</p>		<p>GENERAL/PRODUCT/INSTALLATION/TEST</p>
<p>Including: Wood Stairs, Integral Trim, Handrails, and Guardrails</p>		
<p>7.1 BASIC CONSIDERATIONS</p>		<p>7.1 BASIC CONSIDERATIONS (continued)</p>
<p>1 GRADE</p>		<p>7 To PREVENT TELEGRAPHING, inset solid wood edging when used must have similar moisture content as panel core, be glued securely and calibrated with panel core thickness prior to being laminated with a wood veneer on both faces.</p>
<p>1.1</p>	<p>These standards are characterized in three Grades of quality that may be mixed within a single project. Limitless design possibilities and a wide variety of lumber and veneer species, along with overlays, high pressure decorative laminates, factory finishes, and profiles are available in all three Grades.</p>	<p>8 INDUSTRY PRACTICES</p> <p>8.1 STRUCTURAL MEMBERS, grounds, in wall blocking, backing, furring, brackets, or other anchorage that becomes an integral part of the building's walls, floors, or ceilings, that are required for the installation of architectural woodwork are not furnished or installed by the architectural woodwork</p>

Example: User's Guide - 004

The Product and Installation portions add an additional table format to express particular requirements that are applicable only to a particular Grade or Grades of work.

- The Product portion is divided into Basic, Material, Machining, and Assembly sub-sections. They are intended to be read with the understanding that the more general rules are listed first in the Basic sub-section with the more specific or detailed rules following in other sub-sections.
- The concept of "Unless Specified Otherwise" is a significant aspect of these standards. When referenced in contract documents, these standards shall establish the minimum contractual compliance requirements for materials, fabrication, installation, and workmanship - in the absence of any specific contractual requirement to the contrary. If there is a conflict between the contract documents and these standards, the contract documents shall prevail.
- As a rule of thumb, unless otherwise noted, the statements or rules contained within the General, Product, Installation and Test portions of each section are equally applicable to all Grades of work.

- Otherwise, within the Product or Installation portions, when a rule applies specifically to a particular Grade or Grades of work, it is shown by a bold E, C, and/or P in the corresponding right-hand columns to indicate Economy, Custom, or Premium Grade, respectively. If there are no columns or letters, it applies to all grades.
- Headers or footers are used on a column-by-column and page to page basis to indicate where there is additional coverage of a topic on a previous or a subsequent page.

7.4.5 Material Rules			
▲ From previous column			
10 For OPAQUE FINISH:			
10	1	Medium density fiberboard (MDF) is permitted.	
10	2	Veneer is permitted; however:	
10	2	1 SPECIES shall be of manufacturer's choice, closed grain hardwood conforming to HPVA definitions and characteristics for:	
10	2	1 Grade - D.	E C P
10	2	2 Grade - C.	E C P
10	2	3 Grade - B.	E C P
11 For TRANSPARENT FINISH, VENEER:			
11	1	SPECIES of manufacturer's choice, hardwood conforming to HPVA definitions and characteristics for:	
11	1	1 Grade - B.	E C P
11	1	2 Grade - A.	E C P
11	1	3 Grade - AA.	E C P
11	2	SLICING of:	
11	2	1 Manufacturer's choice.	E C P
11	2	2 Plain sliced.	E C P
11	3	MATCHING ADJACENT LEAVES be:	
11	3	1 Manufacturer's choice.	E C P
11	3	2 Book matched.	E C P
11	4	MATCHING WITHIN PANEL FACE be:	
11	4	1 Running.	E C P
11	4	2 Balance.	E C P
11	5	MATCHING BETWEEN ADJACENT PANELS be:	
11	5	1 Manufacturer's choice.	E C P
11	5	2 Compatible for color and grain.	E C P
11	5	3 Well matched for color and grain, and:	E C P
11	5	4 END, SEQUENCE, and BLUEPRINT MATCHING shall be specified.	
Continues next column ▼			

Example: User's Guide - 005

- Unique to Sections 10 and 11, additional specific material, fabrication, and installation requirements have been provided for casework and/or countertops to be used in a laboratory-type setting. These requirements are only applicable if a project's contract documents specifically require compliance to such.

For further clarification or explanation, call your local Sponsor Association.

Architectural
Woodwork Standards

**TABLE
OF
CONTENTS**

TABLE OF CONTENTS

T

table of contents

INTRODUCTION

Introductory Statement & Disclaimers	2
Sponsor Associations	3
Contributing Association Acknowledgements	6

USER'S GUIDE

Product Advisory	Inside Front Cover
AWS Improvement Suggestion Access	Inside Back Cover
Section Organization	8
Non-Compliance Portions	8
AWS Subdivision	8
Format Within Each Section	11

PREFACE

Architectural Woodwork Standards	18
Variations in Natural Wood Products	19
Moisture and Architectural Woodwork	20
Architectural Woodwork Specifications	20
Architectural Woodwork Drawings	21
Systems of Measurement	22
Forest Management Certification	22
Casework Refinishing/Refacing/Refurbishing	22
Warranty/Guarantee Language	22

SECTION 1 - Submittals

Table of Contents	24
Introductory Information	25
Compliance Requirements	27
General	27
Product	28

SECTION 2 - Care & Storage

Table of Contents	36
Introductory Information	37
Compliance Requirements	41
General	41
Product	41

SECTION 3 - Lumber

Table of Contents	44
Introductory Information	46
Compliance Requirements	58
General	58
Product	60

SECTION 4 - Sheet Products

Table of Contents	70
Introductory Information	73
Compliance Requirements	89
General	89
Product	90

SECTION 5 - Finishing

Table of Contents	108
Introductory Information	110
AWS Finishing Systems	112
Compliance Requirements	117
General	117
Product	118
Tests	125

SECTION 6 - Millwork

Table of Contents	128
Guide Specifications	131
Introductory Information	132
Compliance Requirements	145
General	145
Product	147
Installation	160
Tests	164

table of contents

SECTION 7 - Stairwork & Rails		SECTION 11 - Countertops	
Table of Contents	168	Table of Contents	336
Guide Specifications	171	Guide Specifications	341
Introductory Information	172	Introductory Information	342
Compliance Requirements	175	Compliance Requirements	350
General	175	General	350
Product	176	Product	352
Installation	183	Installation	364
Tests	187	Tests	370
SECTION 8 - Wall/Ceiling Surfacing and Partitions		SECTION 12 - Historic Restoration Work	
Table of Contents	190	Table of Contents	374
Guide Specifications	194	Guide Specifications	376
Introductory Information	195	Introductory Information	377
Compliance Requirements	212	Compliance Requirements	379
General	212	General	379
Product	214	Product	380
Installation	225	Installation	382
Tests	231		
SECTION 9 - Doors		APPENDIX	
Table of Contents	234	Table of Contents	386
Guide Specifications	238	Reference Source Directory	387
Introductory Information	239	Reference Source Listings	388
Compliance Requirements	251	Preservative & Water-Repellent Treatments	390
General	251	Fire-Retardant Coatings	390
Product	254	Fire Codes	390
Installation	270	ADA Requirements	390
Tests	274	Rated Fire Door Assemblies	390
		Building Code Requirements	390
SECTION 10 - Casework		Seismic Fabrication and Installation Requirements	390
Table of Contents	278	Adhesive Guidelines	391
Guide Specifications	284	Specific Gravity & Weight of Hardwoods	392
Introductory Information	285	Joinery Details	394
Compliance Requirements	295	SEFA Chemical and Stain Resistance	396
General	295	Casework Integrity	398
Product	301	Casework Refinishing/Refacing/Refurbishing Guidelines	403
Installation	327	Fractional/Decimal/Millimeter Conversion Table	404
Tests	333	Miscellaneous Conversion Factors	405

TABLE OF CONTENTS

T

table of contents

DESIGN IDEAS

Table of Contents	408
Introduction	408
Base and Base Cap Patterns	409
Picture Mold Patterns	412
Casing Patterns	413
Panel Mold Patterns	416
Crown Mold Patterns	417
Bed Mold Patterns	419
Handrail Patterns	420
Chair Rail Patterns	421
Architectural Ornamentation	423
Stile & Rail Door Design Examples	436
Casework Design Examples	440
Cabinet Design Series (CDS)	469
GLOSSARY	490
INDEX	512

SECTIONS 1 - 12, the APPENDIX, and DESIGN IDEAS
have further detailed Tables of Content..

Architectural
Woodwork Standards

PREFACE

PREFACE

P

ARCHITECTURAL WOODWORK STANDARDS

PURPOSE

Provide design professionals with logical and simple means to comprehensively specify elements of architectural woodwork for use in climate controlled environments.

Provide compliance criteria to ensure that manufacturers/installers bidding on a project compete on an equal basis and are obligated to perform work of equal quality.

Provide industry information, terminology, and test criteria to properly determine compliance.

OVERVIEW

These standards are based on three Grades of quality that may be mixed within a single project. Limitless design possibilities and a wide variety of lumber and veneer species, along with overlays, high-pressure decorative laminates, factory finishes, and profiles are available in all three Grades.

- **ECONOMY GRADE** defines the minimum quality requirements for a project's workmanship, materials, or installation and is typically reserved for woodwork that is not in public view, such as in mechanical rooms and utility areas.
- **CUSTOM GRADE** is typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
- **PREMIUM GRADE** is selectively used in the most visible and high-profile areas of a project, such as reception counters, boardrooms, and executive areas, providing the highest level of quality in materials, workmanship, or installation.

These standards cannot address every contingency; however, this document is the most comprehensive architectural woodworking standard available.

When these standards are referenced, the client is protected, and the manufacturer/installer has a clear direction for what is required.

These standards are not restrictive; they merely establish the minimum rules by which all parties shall conform. Issues not clearly defined in the contract documents or in these standards will be resolved by selection, fabrication, finishing, and/or installation at the option of the manufacturer or installer.

FIRST-CLASS WORKMANSHIP

It is intended that architectural woodwork specified to meet these standards will conform to "First-Class Workmanship" as defined within these standards and the glossary.

DEFAULT STIPULATION

When these standards are referenced as a part of the contract documents and no Grade is specified, Custom Grade will be the default stipulation. In the absence of material specifications, it will be the manufacturer's option to select materials suitable for opaque finish.

EXCEPTION

These standards are a guide from which the design professional is free to deviate.

When the design professional, as part of the contract documents, deviates from these standards, the contract document takes precedence over the Standards. Such deviations cannot be adjudicated using the Standards as a basis.

These standards are intended for typical commercial, institutional and/or residential applications and environments and might not perform as expected in abusive or other environments where special design considerations should be taken.

DISCLAIMERS

The sponsors of these standards shall not be responsible to anyone for the use of or reliance upon these standards.

The sponsors of these standards shall not incur any obligation nor liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon these standards.

These standards provide the minimum criteria for the concept, design, fabrication, finishing, and installation of architectural woodwork. Provisions for mechanical and electrical safety have not been included. References to life-safety requirements are included for information only.

Governmental agencies or other national standards-setting organizations provide the standards for life-safety requirements.

Illustrations are intended to assist in understanding these standards and might not include all requirements for a specific product or unit, nor do they show the only method of fabrication. Such partial drawings shall not be used to justify improper or incomplete design and/or construction.

APPENDIX

Is provided as additional resources to the manufacturer, design professional, educator, user, or certifying organization and is only part of these standards when referenced. For your convenience where referenced it is flagged by the following icon:



DESIGN IDEAS

Are provided as additional resources to the design professional, educator, or user. For your convenience where referenced it is flagged by the following icon:



CITATIONS and QUOTES

Other industry standards, neither developed nor published by the Sponsor Associations, are used within the Architectural Woodwork Standards. The reference to and usage of is not a validation of these citations and quotations outside the context of the AWS. Only when these citations and partial quotations are applied in concert with all other related provisions of this Architectural Woodwork Standard are these citations and partial quotations recognized for application to architectural woodwork.

CONFLICT

If found in these standards, it shall be brought to the attention of the Joint Standards Committee (JSC) by way of the AWS Improvement Suggestion Form (for which access is referenced on the inside back cover) and until specifically addressed, the least restrictive requirement shall prevail.

IMPROVEMENT

The Sponsor Associations encourage your suggestions for changes, revisions, and/or improvements to these standards. Access reference to the AWS Improvement Suggestion Form can be found on the inside back cover or on each of the Sponsor Associations' websites (www.awinet.org, www.awmac.com, or www.woodworkinstitute.com). Simply follow the form's instructions.

TOLERANCES

The tolerances found within the AWS fall into two categories in Sections 6 – 11:

- Factory fabricated joinery, assembly and construction - found in the Product portion
- Field installation joinery and assembly - found in the Installation portion

Specific locations where the tolerances apply are found in the Tests portion of each Section.

Most fabrication and installation assemblies include solid wood to solid wood joints, solid wood to wood veneer joints, solid wood to wood based products (HPDL, LPDL, Solid Phenolic and panel products), solid wood to non-wood based products (which can be drywall, glass, metal, stone, acrylics, and other surfaces), and non-wood to non-wood joints.

Tolerances found in the AWS include:

- Flatness of wood based panel products
- Solid wood to solid wood joints and assemblies
- Solid wood to wood veneer joints and assemblies
- Wood veneer to wood veneer joints and assemblies
- Solid wood to wood based product joints and assemblies
- Solid surface to solid surface joints and assemblies

Because of the differences of expansion and contraction of non-wood products compared to solid wood and wood based products, the AWS does not apply tolerances regarding flatness or joinery to these non-wood based products.

IMPORTANT PRODUCT ADVISORY REGARDING DIMENSIONAL CHANGE PROBLEMS IN ARCHITECTURAL MILLWORK

This advisory concerns prevention of dimensional problems in architectural woodwork products as the result of uncontrolled relative humidity. It is further intended as a reminder of the natural dimensional properties of wood and wood-based products such as plywood, particleboard, and high pressure decorative laminate (HPDL) and of the routine and necessary care and responsibilities which must be assumed by those involved.

For centuries, wood has served as a successful material for architectural woodwork, and as history has shown wood products perform with complete satisfaction when correctly designed and used. Problems directly or indirectly attributed to dimensional change of the wood are usually, in fact, the result of faulty design, or improper humidity conditions during site storage, installation, or use.

Wood is a hygroscopic material, and under normal use and conditions all wood products contain some moisture. Wood readily exchanges this molecular moisture with the water vapor in the surrounding atmosphere according to the existing relative humidity. In high humidity, wood picks up moisture and swells. In low humidity, wood releases moisture and shrinks. As normal minor fluctuations in humidity occur, the resulting dimensional response in properly designed construction will be insignificant. To reduce humidity related problems, the appropriate recommendations from Section 2 of the AWS should be considered. Uncontrolled extremes can likely cause problems.

Oxidation is a reaction of acids in wood (e.g., tannic acid), with iron, oxygen, and moisture, whether this be relative humidity or direct moisture. Control of moisture is a simple way to protect wood products from stains as a result of oxidation.

Together with proper design, fabrication, and installation, humidity control is obviously the important factor in preventing dimensional change problems.

Architectural woodwork products should be manufactured as designed from wood that has been dried to an appropriate average moisture content and maintained at this condition up to the time of delivery. Subsequent dimensional change in wood is and always has been an inherent natural property of wood. These changes cannot be the responsibility of the manufacturer or products made from it. Specifically:

- Responsibility for dimensional change problems in wood products resulting from design rests with the designer/architect/specifier.
- Responsibility for dimensional change problems in wood products resulting from improper relative humidity exposure during site storage and installation rests with the general contractor.
- Responsibility for dimensional change problems in wood products resulting from humidity extremes after occupancy rests with engineering and maintenance.

VARIATIONS IN NATURAL WOOD PRODUCTS

Wood is a natural material with variations in color, texture, and figure. These variations are influenced by the natural growing process and are uncontrollable by the manufacturer.

The color of wood within a tree varies between the "sapwood" (the outer layers of the tree that continue to transport sap), which is usually lighter in color, and the "heartwood" (the inner layers in which the cells have become filled with natural deposits).

Various species, veneer cuts, and/or lumber milling options produce different grain patterns (figures) which influence the selection process. There will be variations of grain patterns within any selected species.

The manufacturer cannot select solid lumber cuttings within a species by grain and color in the same manner in which veneers might be selected.

Color, texture, and grain variations may occur in architectural woodworking.

MOISTURE AND ARCHITECTURAL WOODWORK

The moisture content of wood is crucial. If wood is not properly dried and/or seasoned, the best of workmanship cannot prevent moisture-related defects such as surface checks, cracking, bowing, twisting, and glue-line failure that might occur during production and afterward. In severe cases, a product can even be destroyed; unfortunately, most moisture defects are irreversible.

Wood is a hygroscopic material, expanding when it takes on moisture, shrinking when it loses moisture. How much moisture will be absorbed or how fast lumber will dry depends upon the present moisture content of the wood, the wood species, the relative humidity, and the temperature of the surrounding air. The drying process of lumber has to be slow enough to avoid stress between the surface and the core because too much stress results in surface checks, cracks, split ends, and other drying effects.

If wet and dry pieces of wood are placed in an area, they will absorb or lose moisture until all pieces have the same final moisture content (Equilibrium Moisture Content or EMC). For instance, if you make furniture, cabinets, picture frames, or clocks for inside a home, an office, or other heated live-in area, all wooden parts will eventually dry to approximately 6-12% wood moisture (extreme climate zones might have slightly higher or lower values).

For lasting quality and beauty, use only wood with a moisture content between 6-12%. Moisture-related defects might occur if only one piece has a higher or lower moisture content than 6-12%. Without control of the moisture content, occurrences of moisture related defects increases dramatically.

Many manufacturers reduce the occurrences of moisture problems by buying only kiln-dried wood. Kiln-dried wood should have a moisture content between 6-12%. Even though the wood might be dried properly when it leaves the dry kiln, it can change in moisture content during manufacturing, transportation, or storage. Manufacturers might inadvertently further complicate the problem by assembling a project with materials that have dissimilar moisture contents.

To reduce the risk of moisture damage, the U.S. Department of Agriculture, Forest Service, Forest Products Laboratory recommends in their General Technical Report 113 that:

- Large assemblies, such as ornamental beams, cornices, newel posts, stair stringers, and handrails, should be built up from comparatively small pieces.
- Wide door and window casing and base molding should be hollow-backed.
- Backband trim, if mitered at the corners, should be glued and splined before erection.
- Large solid pieces, such as wood stile and rail paneling, should be designed and installed so that the panels are free to move across the grain. Narrow widths are preferable.

ARCHITECTURAL WOODWORK SPECIFICATION GUIDELINES

Specifications, along with the architectural drawings, are the road map for a project's success. Use of these standards will greatly reduce the text of your specifications and their development time. They eliminate the need to worry about every fabrication and material detail.

- **Budget constraints** should be communicated up front so that all parties can work together toward a successful resolution.
- **Requirements for each GRADE** are specifically defined within these standards; however, **special requirements** or **unusual applications** will need to be noted.
- **Compliance programs**, which all Sponsor Associations offer, are cost-effective and help enforce your contract documents. They ensure the performance and compliance of your architectural woodwork project's contract documents. With some, written status reports are issued during the project's progression, affording you timely notification of noncompliant findings.
- **Avoid conflict** in your specifications that might allow for interpretation other than what was envisioned. Use of certain words can make a big difference:

- Requiring compliance to Example A AND Example B means that the end result will be in full compliance with both.
- Requiring compliance to Example A OR Example B means that compliance to either is acceptable.

- **Enforce your contract documents** and their intent; however, be open-minded to proposed changes and cost savings. Materials and their availability are in constant flux; therefore, listen and be open to change when it does not affect your design intent.
- **Pre-qualify your bidders** to ensure their performance ability. Seek out and take advantage of our industry's knowledge and experience.
- **Guide specifications** for some and/or all of the AWS Product Sections are offered by the Sponsor Associations on an individual association basis:

- The **ARCHITECTURAL WOODWORK INSTITUTE (AWI)** offers an online specification writing guide tool – **AWI Build-a Spec** to provide design professionals and specification writers with the ability to author architectural woodwork specifications that are complete and accurate in reference to the Architectural Woodwork Standards. Building a specification that reflects the exact project has never been easier and empowers the author to leverage their specification with the full power of the AWS. This allows upfront clarification of design intent while generating enforceable Architectural Woodwork specifications. This is not meant to compete with other specification writing tools, but rather supplement them with an enhanced application of detailed fine woodworking standards.

This specification writing guide tool can be found at www.awinet.org

- The ARCHITECTURAL WOODWORK MANUFACTURERS ASSOCIATION OF CANADA (AWMAC) offers Construction Specifications Canada (CSC) / Devis de Construction Canada (DCC) Master Formatted, guide specifications in digital, interactive, Word file formats .doc (Word 2003) and .docx (Word 2007).

Included in the guide specifications is wording for AWMAC's national quality control program, the Guarantee and Inspection Service (GIS) which is administered locally in Canada by AWMAC's chapters.

The Master Format sections covered by the guide specifications are:

- 064100 Architectural Wood Casework
- 064200 Wood Paneling
- 064600 Wood Trim
- 081400 Wood Doors
- 123553 Laboratory Casework

Downloads are available at: <http://www.awmac.com/aws-guide-specifications>

- The WOODWORK INSTITUTE (WI) offers CSI (Construction Specifications Institute) Master Formatted, guide specifications in digital, interactive, Word and plain text formats. Word file formats include .rtf (rich text format), .doc (Word 2003) and .docx (Word 2007). Specifically, WI offers guide specifications, including CCP, MCP and CSIP quality control options, for:

- Wood Standing and Running Trim
- Wall Paneling
- Wood Passage Doors
- Casework, including Green and Laboratory
- Countertops

Downloads are available at: http://www.woodworkinstitute.com/publications/aws_guide_specs.asp.

ARCHITECTURAL WOODWORK DRAWINGS - GUIDELINES

For design professionals, the proper use of these standards will greatly reduce drafting time. It is not necessary to produce standard joinery details on your drawings. Requirements for each GRADE are defined throughout these standards; however, SPECIAL REQUIREMENTS or UNUSUAL APPLICATIONS need to be noted and detailed.

CASEWORK AND COUNTERTOPS:

Indicate the CONSTRUCTION TYPE desired:

- FRAMELESS construction.
- FACE FRAME construction (not recommended for decorative laminate faced or solid phenolic casework, and standards are not provided for such).

These standards define the following basic casework CONSTRUCTION TYPES:

- Wood Faced - FRAMELESS
- Wood Faced - FACE FRAME
- Decorative Laminate Faced - FRAMELESS
- Solid Phenolic Constructed - FRAMELESS

Casework elevations are not necessary if the CASEWORK DESIGN SERIES (CDS) numbers, which can be found in DESIGN IDEAS are utilized; however, a floor plan indicating each design number selection and relative dimensions is required.



When casework elevations are shown, they should indicate:

- The basic overall dimensions.
- Dimensions of items required to be of predetermined or controlled size.
- Dimensions required for installation of items of equipment.
- Whether sliding or hinged doors are desired, including swing if hinged.
- Thickness of cabinet doors if other than nominal 3/4" (19 mm) is required.
- If and where locks are required.
- Required details not shown in these standards or those that involve installation of unusual equipment.

- Shelf location and whether fixed or adjustable.
- Material and load capacity required.
- Type of countertop.

STANDING AND RUNNING TRIM

Elevations should indicate the placement of standing and running trim, including cross section details along with overall dimensions should be shown for all trim types. If a finish schedule is used in lieu of elevations, it should be comprehensive enough to clearly indicate all of the above.

ARCHITECTURAL WALL AND CEILING SURFACING

Elevations should indicate the placement of architectural wall surfacing, including each panel size, along with edge, corner, reveal, ceiling, and base treatments.

Door and/or other woodwork matching should be so indicated. Reveals, dimensions and locations should be as specified; however, a minimum of 1/4" (6.4 mm) wide reveal is recommended. If a finish schedule is used in lieu of elevations, it should clearly indicate all of the above.

DOORS

Include a comprehensive door and hardware schedule indicating the location, type, size, and handling of each door, along with applicable requirements for:

- Pair and/or transom matching
- Room and/or panel matching
- Transom panel or Dutch door edge and/or shelf treatment
- Special core blocking
- Glass and louver cutouts
- Undercut tolerances
- Flame spread, acoustical, x-ray, and/or other ratings/requirements
- Hardware

Include elevations of typical door types to indicate glass and louver cutout sizes and locations.

PREFACE

P

SYSTEMS OF MEASUREMENT

These standards are written with the U.S. Customary System of Measurement followed by the metric system in brackets.

The system of measurement used in the original design of a project's architectural drawings will dictate which system of measurement within these standards is used for verification of compliance.

The metric number is typically a "soft" conversion of the U.S. Customary System of measurement. In order to make the metric number more conceptually coherent and consistent, most conversions for less than 3" (76 mm) in dimension are "soft" converted to the nearest 0.1 mm; for measurements above 3" (76 mm), the "soft" value is converted to the nearest 1 mm.

Exceptions to this convention will occur as, for example, 1220 mm is commonly used for 48", as opposed to 1219 mm.

FOREST MANAGEMENT CERTIFICATION:

The Sponsor Associations acknowledge and have adopted the International Wood Products Association's (IWPA) Statement on Certification as modified below.

- We acknowledge the interest in certified timber products and verification of good forest management.
- A number of certification and verification systems are in operation or in development today, and we make no judgment against or endorsement of any single plan.
- Certification can serve as an audit of work already being done toward improved forest management. An absence of certification, however, does not mean there is a lack of quality forest management.
- We wish to recognize the efforts that many countries and companies are making with regard to improved forest management practices. Further, we strongly endorse the right of individual countries and companies that become involved with certification or the verification of forest management to pursue the development of their own internal auditing system or the selection of one that is already established.


- Global consensus has not been reached regarding the scope and viability for any single system of certification to be appropriate for all locations and conditions. Efforts are being made to develop an international framework of mutual recognition between credible and market-oriented sustainable forest management standards and certification systems.

The development of a mutual recognition process should ensure that these various certification or verification systems:

- Do not discriminate against different forest types.
- Should be regularly reviewed and updated.
- Should be transparent.
- Should be cost-effective.

We strongly endorse the development of a mutual recognition system and support any and all efforts that will further enhance management of the world's forests and the growth of global and sustainable trade in wood products.

CASEWORK REFINISHING/REFACING/REFURBISHING

Is typically required to be done in the field and is not covered by these standards; however, guidelines can be found in the  APPENDIX.

WARRANTY/GUARANTEE LANGUAGE

There have been repeated requests for "industry standard" warranty or guarantee language, both on the part of design professionals and woodwork manufacturers. It is not the purpose or intent of this publication to give legal advice with regard to warranties. Such language varies from governing body to governing body.

CAUTION: You might use the following language as a starting point; however, the sponsors of these standards assume no liability whatsoever from its use. It is advised that warranty language be reviewed by competent counsel for the state or province in which it is intended.

Architectural woodwork is guaranteed to be of good material and workmanship and free from defects that render it unserviceable for the use for which it is intended. Natural variations in the color or texture of the wood are not to be considered defects. The quality of architectural woodwork is safeguarded while it is in the manufacturer's possession. To be protected by this guarantee, products must not be stored in damp warehouses or placed in moist or freshly plastered buildings. The woodwork must not be subjected to abnormal heat or dryness. Permanent-type heat and air conditioning must be in operation a sufficient length of time to "cure" the building before any woodwork or doors are delivered to the site. (Temporary-type heat sources might either add excessive moisture or create excessive dryness, depending upon the type of fuel. Thus, temporary heating can be a source of woodwork problems and should be avoided).

Adhere to the requirements in Section 2 for range and maintenance of relative humidity. Acclimatize delivered woodwork to the job site for a minimum of 72 hours before installation.

Woodwork must be inspected upon arrival, and all claims or complaints must be filed before painters' finish is applied. Doors must be properly sealed on all surfaces, including top and bottom edges, to prevent absorption of moisture. The manufacturer will not be responsible for defects resulting from neglect of these precautions.

The manufacturer agrees, within a period of (insert year) year(s) after delivery date, to repair or replace (in the white, unfinished, if so furnished originally) without charge any woodwork that is defective within the meaning of this guarantee. The manufacturer does not agree to be responsible for any work that was not originally performed by them. The manufacturer (insert does or does not) agree to pay charges for finishing or installing replaced woodwork. This guarantee is not effective if goods are repaired or replaced without first obtaining the manufacturer's written consent.