

JOURNAL OF THE WOODWORK INSTITUTE

FALL/WINTER 2013

# ARCHETYPE



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# ARCHETYPE

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## VISION

**Assurance through Certification**

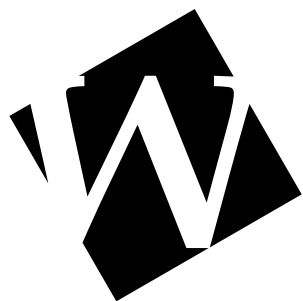
## MISSION

To promote to the architectural design community, its suppliers and contractors, the development and dissemination of information relative to uses, advantages, and utility of millwork products. To provide the leading standards and quality assurance programs for the architectural millwork industry through the new *Architectural Woodwork Standards*, our exclusive publication *The Programs and Services Manual*, **Certified Compliance and Monitored Compliance Programs**.

To be the premier, industry-driven, equal opportunity, non-profit trade association resource provider for our membership.

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#### ARCHITECT

Archetype International

#### GENERAL CONTRACTOR

Lacy Construction

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# BERNARD B. BARBER JR., RALPH B. McCLURE, & WILBUR L. JOHNSTON

## *Awards*

### *Bernard B. Barber Award of Excellence*

This award is presented for excellence in architectural millwork. Design professionals or WI members who are contractually tied to the project may apply.

Specifications must require Certified or Monitored Compliance to be eligible.

### *Ralph B. McClure Craftsmanship Award*

This award is given in recognition of WI member firms that have fabricated and/or installed quality millwork conforming to the Institute's standards.

### *Wilbur L. Johnston Award of Excellence*

This award honors specification writers for their use of our *Architectural Woodwork Standards*, and Certified or Monitored Compliance programs, within their specifications.

Applications are accepted year around; however, to be considered for 2014 applications must be received by May 31st.

Go to [woodworkinstitute.com/awards/index.asp](http://woodworkinstitute.com/awards/index.asp)



## Did You Know That Woodwork Institute Offers You These Benefits, Free of Charge?

- **Architectural Woodwork Standards**  
The Definitive Resource for  
Nationwide Standards
- **The WI Approach**  
The Institute's Exclusive  
Supplemental Text to the  
*Architectural Woodwork Standards*
- **Quality Control Options**  
Ensuring Your Projects Meet  
Your Expectations
- **Continuing Education Credits**  
Enabling You to Satisfy your  
Education Requirements
- **Engineering Consultation**  
Helping You Make Your  
Design a Reality

To find out how Woodwork Institute  
can Give You a  
Competitive Advantage,  
Contact our Administrative Office or  
visit us on the Web at  
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# Best of the Best 2013

## Ralph B. McClure Award for Craftsmanship

**C**ongratulations to the Woodwork Institute's Best of the Best Award Winners for 2013! This year one project received the *Ralph B. McClure Award for Craftsmanship*, and another project received the *Bernard B. Barber Award for Excellence*. Each of the projects are chosen by our Board of Directors based on quality of millwork, quality, and craftsmanship of the project.

The Woodwork Institute's *Ralph B. McClure Award for Craftsmanship* Program honors one Woodwork Institute member each year for their exceptional craftsmanship and/or installation of architectural millwork.

### Whittier Law School — The Kiesel Advocacy Center

#### APPLICANT

Mark Ramsey

#### ARCHITECT/DESIGNER

Archetype International

#### GENERAL CONTRACTOR

Lacy Construction

#### MILLWORK FABRICATOR

Tahiti Cabinets, Inc.





Woodwork Institute's most prestigious award, the **Bernard B. Barber Jr. Award for Excellence** honors design professionals for projects with outstanding interior and exterior architectural millwork. This award is named in honor of Mr. Bernard Barber, who dedicated more than 40 years of his life to the Woodwork Institute. Since the first Bernard B. Barber Jr. Award for Excellence was presented in 19965, more than 100 projects have received this recognition.

The **Ralph B. McClure Craftsmanship Award** and **Bernard B. Barber Jr. Award for Excellence** nominees may be submitted by any design professional or Woodwork Institute member who was contractually tied to the project. Specifications must require Certified or Monitored Compliance to be eligible. A full list of past winners and entry forms can be viewed on the WI's website at [www.woodworkinstitute.com/awards](http://www.woodworkinstitute.com/awards).



**Job Description:**

Whittier Law School's new Kiesel Advocacy Center — The construction included demolition of an existing court room and construction of a new 4,400 SF expanded moot court, judge's chambers, jury deliberation room, associated hallways, and entrance. The new facility moot court provides 134-student seating with voice and data at each chair. New HVAC, lighting, and high-end finishes throughout. Construction was completed without disruption of daily college class schedules. Archetype International provided both the architecture and interior design for this project.







### Special Considerations:

The Tahiti Team worked very hard and a lot of long hours to get this job from an Architectural drawing to an installed product. The Tahiti Team worked very closely with each other to make the schedule a reality. Every bump and hurdle that came in front of the team was overcome with a lot of thought and brainstorming.

This was a medium size job for us. We had over 3000 hours between office, shop, finish, delivery and install. There was almost a 100 hours in CNC time just in the acoustic ceiling panels. There were many meetings with Lacy Construction and Archetype International getting this job off the ground. A lot of the time was spent trying to figure out how to install the ceiling panels. We all put our heads together and figured out a way that worked for all of us. There were extenuating issues that had to be resolved with the mechanical and electrical that interfaced with the ceiling panel install.

One of the hurdles we had was the acoustic panels with all the holes and the grooves. The grooves were much easier than the holes. The holes had to be drilled one at a time because they were not on 32mm centers. There were 16 panels and

each panel had about a 1000 8mm holes and 1500 feet of 3mm grooves. Average panel size was 105" wide by 120." The sizes of the panels were an obstacle. Each panel consisted of 2 panels each which had to be assembled once they were in the air. One other hurdle we had was building all the die walls where one side was at one elevation and the opposite side of the die wall followed the slope of the handicap ramp and steps.

The time frame on the job was a real issue. All our panels were custom layed up, sequenced matched and from 2 logs that matched well. The species of veneers and hardwoods on the job were Maple and Mahogany.

The job was a very well run by Lacy Construction. They were great to work with especially with the job schedule. There were times when Lacy had to pull subs in to get certain areas done in order for us to get field dimensions so we could order lead time materials.

Whittier Law and Archetype International were both open to minor changes to construction to help the job go faster or for a smoother install.



**Long Valley Residential  
Property (New)**

**APPLICANT**

Dennis Reeves

**BUILDER/DESIGNER**

H2H Estate

**GENERAL CONTRACTOR**

H2H Estate

**MILLWORK FABRICATOR**

Dennis Reeves, Inc.









## Honorable Mentions



### Balboa Naval Medical Center MRI (3)

**APPLICANT**  
Dennis Reeves

**BUILDER/DESIGNER**  
Griffcon Incorporated

**GENERAL CONTRACTOR**  
Griffcon Incorporated

**MILLWORK FABRICATOR**  
Dennis Reeves, Inc.



### Monterey Bay Aquarium Otter Cafe

**APPLICANT**  
Sharon de la Cruz

**ARCHITECT/DESIGNER**  
E.H.D.D.

**GENERAL CONTRACTOR**  
Rudolph + Sletten

**MILLWORK FABRICATOR**  
Mission Bell



### San Vicente Residential Property (Remodel)

**APPLICANT**  
Dennis Reeves

**BUILDER/DESIGNER**  
Riviera Maison

**GENERAL CONTRACTOR**  
Riviera Maison

**MILLWORK FABRICATOR**  
Dennis Reeves, Inc.

## Woodwork Institute's 2013 Wilbur L. Johnston Award of Excellence

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**T**he Woodwork Institute's Wilbur L. Johnston Award Program honors specification writers for exceptionally written project specifications in which Woodwork Institute Quality Assurance Options are a predominant feature. To view past winners of the Wilbur L. Johnston Award go to [www.wicnet.org/awards/wlj.asp](http://www.wicnet.org/awards/wlj.asp).

Named for Wilbur L. Johnston, a CSI fellow and Woodwork Institute Director of Architectural Services for 21 years, the Wilbur L. Johnston Award for Excellence is given to specification writers and architectural firms that have written outstanding millwork specifications utilizing Woodwork Institute standards.

### Procedure

The Field Staff select and recommend the recipients of the Wilbur L. Johnston Award for Excellence among the projects they have had the opportunity to review.

The following individuals and architects are this year's winners:

- |   |   |
|---|---|
| ★ <b>AP Architects</b> (Bakersfield)              | ★ <b>SCArchitect, Inc.</b> (Bakersfield)                |
| ★ <b>CO Architects</b> (Los Angeles)              | ★ <b>Taylor Teter Partnership, LLC</b> (Fresno)         |
| ★ <b>Darden Architects</b> (Fresno)               | ★ <b>VCBO Architecture</b> (Salt Lake City)             |
| ★ <b>HMC Architects</b> (San Jose/Fresno)         | ★ <b>WLC Architects</b> (Rancho Cucamonga)              |
| ★ <b>Kendall Young Associates</b> (San Francisco) | ★ <b>Zagrodnik + Thomas Architects, LLC</b> (San Diego) |

# Drawers – Construction and Specifications

By Steve Taylor

**D**rawers are an important operating part of any casework project. While they aren't complicated, there are levels of quality in both material and workmanship. The chart shows the materials, finishes, and construction methods permitted for each AWS Grade, as shown on page 16. While there are a lot of possible combinations, in practice only a few configurations are common. In most cases, the AWS defaults are reasonable choices, but there are cases where a specifier might want to require a particular combination.

## MATERIALS

### Drawer Sides

Drawer sides may be made of particle board, Medium-Density Fiberboard (MDF), Medium-Density Overlay (MDO), plywood, or solid lumber. In practice, MDO is virtually never used, and MDF only if so specified (and not always then.) That leaves particle board, plywood, and solid lumber.

Particle board is the most common material for drawer boxes. It is manufactured in narrow widths, with melamine faces and one edge, specifically for drawer boxes. Particle board is the least expensive material for drawer boxes, and it makes a satisfactory product for most uses. MDF, which is marginally stronger than particle board is also available in drawer side widths, isn't much more expensive, but isn't much better. Virtually all drawers for Custom Grade or Economy Grade casework are made of particle board with melamine surfacing.

'Baltic Birch' plywood was developed in Lithuania and Latvia during the Soviet era. Baltic Birch plywood is made of more, thinner, layers than commercial plywood, and there are no voids in the inner layers. This format has been copied by some American and Canadian manufacturers who market their products under various trade names. Although this type of plywood is popular, there is no common name for the product. We are

reduced to calling it "Seven or nine-ply hardwood plywood with no interior voids" in the AWS. Even that mouthful is only accurate as it applies to the half and five eighths inch thick plywood used for drawer sides: A characteristic of this type of plywood is that all the layers are the same thickness, so three-quarter inch and one inch thick plywood have more layers. For the purposes of this article, I will refer to Baltic Birch-type plywood as 'Thin-Ply Voidless Hardwood Plywood' which I will abbreviate to TPVHP.

Whatever we choose to call it, TPVHP is an excellent product for drawer boxes. Because of its dimensional stability and strength it might even make a better drawer than solid hardwood; it certainly makes a stronger drawer. Because there are no voids, the exposed edges of the drawer sides may be sanded and finished, leaving the interior plies exposed, or the edges may be veneered.

Hardwood lumber is the traditional material for drawer boxes, and is superior to any other except possibly – TPVHP. While TPVHP has an edge on hardwood in strength and dimensional stability, solid hardwood wins the sweepstakes for a beautiful drawer.

Drawers for Premium Grade casework are required to be TPVHP, solid hardwood, or MDO. Medium-Density Overlay is allowed for opaque finish wood casework, and isn't commonly used even for that. Generally, premium grade drawers are TPVHP or solid hardwood.



### Drawer Bottoms

Although the AWS doesn't expressly prohibit mixing and matching, drawer bottoms virtually always match the drawer sides: Particle board with melamine surfacing for Custom and Economy Grades, hardwood plywood Premium Grade. While I would say that the species and cut of the drawer bottoms should match the sides, I don't see anything in the book that would require that.

### Surfaces

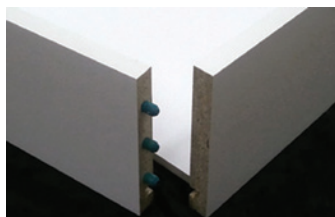
Low-pressure melamine overlay is virtually universal as the finish for Custom and Economy Grade drawer boxes. No other finish is as cost effective. For wood casework, Premium Grade drawers must be finished with a sealer and two topcoats. Premium Grade drawers in Plastic Laminate casework are required to be finished with melamine or laminate (typically cabinet liner.) This is the one place I think the AWS has it wrong. I understand that they are trying to make the drawer 'compatible' with the finish of the semi-exposed surfaces of the cabinet. The result is a drawer that is less attractive and more expensive without being better.

## JOINERY

While the AWS allows seven methods of drawer construction, in practice only three or four are found in the wild. Dowels are by far the most popular system. The computer controlled machinery that has become a requirement for commercial casework construction bores dowel holes with impressive speed and precision. Dowels make a strong joint, with no exposed fasteners. And dowels are a permitted method for all grades and materials.

Dovetails have been the traditional 'high-end' method of building drawer boxes for at least 500 years. They remain a viable option. Just as CNC machinery has made dowels ubiquitous for casework construction, similar computer controlled machinery has brought down the cost of dovetail drawer boxes. While they are still more expensive than doweled drawers a hardwood drawer box with dovetailed corners is a thing of beauty and nearly indestructible. Dovetails may also be encountered in drawer boxes made of TPVHP, and the result is also an excellent drawer.

Lock joints and Dowel Screws (Confirmat-type screws) also make an acceptable drawer



Hardwood drawer box with dovetailed corners courtesy of Drawer Box Specialties.

box. Their use is generally limited to shops that don't have the equipment required for doweled construction. The other methods permitted by the AWS are rarely used, and may be considered to be obsolete.

## DRAWER GUIDES

Selection of drawer guides could easily be a topic for a whole article. Briefly: The first question is; full or three-quarter extension. The AWS requires full-extension guides for file drawers, but not for other categories.

The AWS requirements for drawer guides are reasonable except that they don't really consider the parameters of a "General Purpose Drawer." Clearly, a drawer that is thirty-six inches wide or eight inches deep may need more than a 75 pound capacity guide. Also, keep in mind that BHMA test are based on an 18-inch drawer guide; capacity will be reduced if the drawer is deeper. Finally, not all drawer guides are engineered for wide drawers. A wide drawer may rack and bind if the wrong guides are used.

## YOUR SPECIFICATION

For Custom Grade casework the default drawer box required by the AWS is a satisfactory compromise between quality and cost. For Premium Grade casework I think it worthwhile to consider the choice between TPVHP and solid hardwood. TPVHP is stronger, but hardwood is more attractive. I personally would clearly specify a clear finish on drawers for all Premium Grade casework; it makes no sense to me to put melamine or cabinet liner on TPVHP or hardwood. It is also worth considering dovetail construction for projects where you really want the very best.

Steve Taylor can be contacted at [taylor specifications services@gmail.com](mailto:taylor specifications services@gmail.com).

## Drawers – Construction and Specifications

Drawer Matrix				
	Economy	Custom	Premium	Notes (Apply only to items in the row with an asterisk.)
SIDES				
Particle Board	Yes	Yes	No	Opaque finish wood casework only.
MDF	Yes	Yes	No	
MDO	Yes	No	Yes*	
TPVHP <sup>1</sup>	Yes	Yes	Yes	
Hardwood Lumber	Yes*	Yes*	Yes*	Not permitted for LP Casework.
Thickness: Min-Max	7/16" - 5/8"	15/32" - 5/8"	15/32" - 5/8"	3/4" sides allowed for drawers over 30 inches wide.
BOTTOMS				
Particle Board	Yes	Yes	Yes*	Only for LP Casework.
MDF	Yes	Yes	Yes*	Only for LP Casework.
MDO	Yes	No	Yes*	Only for opaque finish wood casework.
TPVHP	Yes	Yes	Yes	
Hardwood Lumber	No	No	No	
Minimum Thickness	Thirteen sixty fourths; thirty one thirty seconds for drawers more than 30 inches wide.			
FINISH				
Melamine	Yes	Yes	Yes*	LP Casework Only
Cabinet Liner or PLAM	Yes	Yes*	Yes*	LP Casework Only
MDO	Yes	No	Yes*	Opaque finish wood casework only.
Transparent Finish	Yes	Yes	Yes*	For solid wood or TPVHP drawers.
Opaque Finish*	Yes	Yes*	Yes*	For solid wood or TPVHP drawers. Opaque finish wood casework only.
Finish Requirements				
Sealer Req.	Yes	Yes	Yes	
Top Coat	Not Req.	Yes	Yes	
Second Top Coat	Not Req.	Not Req.	Yes	
JOINERY				
Dovetail	Yes	Yes	Yes	Strong and beautiful but expensive.
Dowels	Yes	Yes	Yes	No exposed fasteners. A popular method.
Lock Joint	Yes	Yes	Yes	Strong and Accurate
Dowel Screws	Yes	Yes	No	Good for particle board or MDF
Rabbeted	Yes	No	No	
Nailed butt joint	Yes	No	No	
Miter Fold	Yes	No	No	
DRAWER GUIDES				
Pencil Drawers	50 lb. Capacity			
General Purpose Drawers	75 lb. Capacity			
File Drawers	100 lb. Capacity			
Lateral File Drawers more than 24" wide	150 lb. Capacity			
Lateral File Drawers more than 30" wide	200 lb. Capacity			

<sup>1</sup> TPVHP: Thin-Ply Voidless Hardwood Plywood such as Baltic Birch Plywood or ApplePly.



# Wood Veneers on Fire-Rated Core

By Mitch Taylor

Some time ago, Woodwork Institute wrote about issues with discoloration of wood veneer paneling, particularly with veneers on fire-retardant cores. With more cases of discoloration out there, it's time to update some of the information from our previous article.

The problems observed have been discoloration or staining of the veneers. It can manifest in different ways; sometimes it appears similar to a bleaching effect, sometimes as a dark splotch, and sometimes as a greenish tint. This seems to depend on the species involved. The common factor in these cases is the use of NAUF Fire Retardant MDF or Particleboard core. The earlier reports seemed to involve mainly exotic veneers, but more recently it has been observed in domestic white oak, cherry, ash, eucalyptus, and other species. The staining is inconsistent with some panels showing no problems while adjacent panels from the same set of veneers are badly discolored. This makes the cause of the problem extremely difficult to trace.

There has been much speculation as to the cause of the discoloration. Possible factors brought up by the manufacturers include the type of glue, the pressing process (hot or cold), the processing of the logs before slicing, and a number of other variables. A theory that seems to be gaining traction in the millwork industry is that ammonia is being released from the ammonium sulfates used in the current fire-retardant cores. Ammonia causes a staining in many woods, particularly high-tannin woods. The amount of staining seems to be affected by the grain direction in which way the pores are running, and also seems to be influenced by the thickness of the glue line. The manufacturers of fire retardant core materials have put a disclaimer on their product sheets, which absolves them of liability but does little to help solve the problem. Their suggestion is to do a test pressing

## Wood Veneers on Fire Rated Core



to find out if there's an issue. However, in many cases the discoloration doesn't show up until three to six months after the product is made. The test pressing is of little use in this situation.

So far, the best solution for this problem has been the use of additional barriers between the core and the face veneer. One system has been the use of five-ply panel construction, with a crossband ply of a closed-pore veneer under the face veneer. The crossband is required on both sides of the panel to provide balanced panel construction. One disadvantage of this system is the possibility of grain telegraphing through the face layer, particularly if thin-face veneers are used. Alternatively, a phenolic backer may be used as a barrier. The use of either method should be detailed in the project specifications to ensure proper implementation. Some of the millwork companies have indicated that the problem is primarily with FR MDF, and not with FR Particleboard. However, there have been a number of more recent reports of issues with FR Particleboard, and the manufacturers have their disclaimer on that product was well.

The first step in reducing the chance of problems is to make sure to only call for fire-retardant cores when it is absolutely necessary. When they are required, specify the use of either a veneer crossband or phenolic backing. Make sure the manufacturer has experience in projects involving fire-retardant cores. Finally, don't hesitate to call on one of Woodwork Institute's representatives for review of the specifications, or to ask for the latest information.



*Mitch Taylor's family has been in the woodworking business since 1929. In 1983, Steve, Ross, and Mitch started Taylor Brothers Stair Co. Mitch continued to run the cabinet and millwork department for several years before the business shifted almost entirely to stairs in 1990. Taylor Brothers worked on many high-end residential and commercial projects in the Southern California area, with some larger projects in Oregon, Washington, Texas, and Hawaii. Mitch was involved in all aspects of the business, from sales and estimating to design and fabrication. The most interesting part was the design and engineering, particularly on projects requiring unique solutions to difficult situations and design parameters. It was a source of pride to be known for doing projects no one else was willing or able to take on.*

*In 2003, Taylor Brothers closed. Mitch went to work with SMI Millwork, where Bob Stolo decided to keep the stair business going and started Taylor Stair Co. as a new company. Mitch set up a new shop, keeping the same standards and tradition of quality set by Taylor Millwork and Taylor Brothers. He ran the shop at Taylor Stair up until 2011, and supervised the construction of many fine residential and commercial projects, including stairs, paneling and millwork.*

*Mitch has enjoyed the transition to working for Woodwork Institute, and continues it's efforts to further the high quality standards set by the institute through the AWS. The Taylor family has a tradition of service with Woodwork Institute dating back to the 1950s and the first Manual of Millwork, and he intends to carry on in that spirit. To contact Mitch email him at [mitch@woodinst.com](mailto:mitch@woodinst.com).*





# The Standard for Performance

How Specifiers Use the BHMA Standards to Ensure Safety and Access

By Michael Tierney

Product Standards Coordinator  
Builders Hardware Manufacturers  
Association (BHMA)

All photos courtesy BHMAA

Schools, hospitals and government buildings all share some characteristics that make them a logical group to examine when considering the use of builders hardware. These facilities house sensitive information, and are designed to be used for long periods of time, and have certain public responsibilities. By relying on the Builders Hardware Manufacturers Association (BHMA) Standards for builders hardware, specifiers and building managers can ensure they are prioritizing safety and security where needed

The BHMA Standards are an important tool for architects, designers, specifiers, and engineers who work on projects such as schools, hospitals, and government building to ensure that their buildings are accessed and utilized the way they were intend.

# Standards of Performance

## What is BHMA?

The Builders Hardware Manufacturers Association (BHMA) is the leading national trade association for the builders hardware manufacturing industry. BHMA is composed of U.S. manufacturers of builders hardware in categories such as:

- Cabinet Hardware and Hinges
- Sliding and Folding Door Hardware
- Power Doors and Components

BHMA is the only U.S. organization that through the American National Standards Institute (ANSI) creates standards for builders hardware. ANSI/BHMA Standards are the written criteria that define the appropriate operation, test values and safety criteria for builders hardware products. BHMA also sponsors third-party certification of hardware products to ensure hardware quality and performance through its development of standards.

The Standards test and certify the products for daily use that make a facility function, and that are vital to staff and visitors including locks, hinges, exit devices, and gaskets.

## What are the BHMA Standards Used For?

As quasi-public buildings, hospitals, schools, and government facilities must balance safety and security with openness and use, and the BHMA Standards make this task a success.

So what do the BHMA Standards reveal about a piece of builders hardware? First, they provide specific information on the way materials are tested for certification. What is relevant in the lab should prove relevant to real-world use.

All of the BHMA Standards have certain elements in common:

- Designated criteria of performance for the product
- What level of criteria the product performs
- What to expect in use of the product
- What tests the product passed

The most important features are scrutinized and evaluated: security, durability, strength, finish, and operation. The results that are garnered from the tests that evaluate these properties allow a specifier to answer the questions, “How does it work?” and “How do I want it to work?”

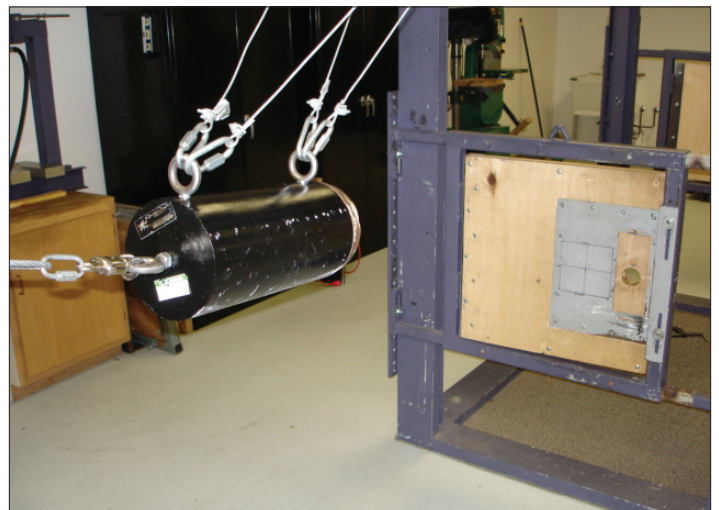
The three steps of the certification process are:

1. Independent Testing
2. Statement of Compliance
3. Third-party follow-up Testing and Auditing

When a product has been certified and tested under the BHMA Standards, it will then be listed in the *BHMA Certified Products Directory*, along with applicable model and type numbers.



BHMA Product Certification signifies to buyers of builders hardware that a product meets the ANSI/BHMA Standards



The main third-party testing facilities include Underwriters Laboratories, Architectural Testing Inc. and Intertek Testing Services



Most BHMA Standards provide a numbering system that applies uniformly to all of the tested builders hardware. A specifier who acquaints themselves with the Standards can look at a hinge standard, and see the specific numbers assigned to it, and know what level of performance it is expected to achieve. This gives a common language to the industry, and depending on the standard, can include a lot of information.

### How to Read the BHMA Certifications

Below is an example of a hinge specification. The Type Numbers will read as the following:

A2412

A - Section A

2 - Material (Wrought Brass or Bronze)

4 - Type (Half-Surface Hinge)

1 - Description (Anti-friction Bearing)

2 - Grade (Grade 2)

After consulting the BHMA Certification number of a project, a specifier or engineer is able to determine if the product will perform the task required.

Grades are determined by tests designed to measure a product's performance capabilities. They assist the specifier in determining which product is most appropriate for a project. Performance assurance is especially important for products that impact life safety and security.

For those less familiar with builders hardware, definitions for the products and technical jargon are included throughout the standards.

These standards may also be applied after the fact to help a facility manager determine if a product is operating correctly, and to ensure it was installed and made for the right purposes. For example, when an exit device is pushed, it should not require more than 15 pounds of force, as stated in the standards. Many of the standards for builders hardware come with illustrations for better specification.

Builders hardware is one of the few functional hardware categories that is specified because it impacts life safety and security. Builders hardware is subject to repeated use and wear, yet must withstand constant operation.



The ANSI/BHMA Standards ensure high quality product meets the market.



Safety is a primary concern of the ANSI/BHMA Standards.

# Standards of Performance



Each ANSI/BHMA Standard goes through a review process roughly every three years to ensure it is up to date

BHMA Standards are not designated for use by facility, but certain facilities tend to rely on certain standards.

## Hospitals

Hospitals have a large number of practical and operational matters to take into consideration during design planning. They must be functional for the staff and personnel in the high traffic areas, and must provide easy access for patients with limited mobility. There are health concerns such as how to minimize infections. Also, a highly populated building such as a hospital must meet safety and fire requirements. Builders hardware and the BHMA Standards are important to all these tasks.

Low-power operated doors are common throughout many hospitals. BHMA Standard 156.19, deals particularly with *Power-Assist* and *Low Energy Power-Operated Doors*. These doors allow for easy access of sick patients to navigate the hospital. They also have the added benefit of making it unnecessary to touch a handle, thereby helping to reduce the potential for the spreading infections and germs. Push-pull passage locks offer a similar benefit. They are often used on patient rooms to give privacy, but they can be opened without a lever so that a nurse or others can exit or enter the room with their hands full.

Hospitals also commonly rely on Standard 156.24, that applies to *Delayed-Egress Locks*. For a patient who suffers from

dementia and needs a certain level of security in a hospital, wandering can be prevented by using the features of a delayed-egress lock. However, the hospital must balance egress during an emergency situation with the security needed to keep a patient safe. A delayed-egress lock does this by activating an alarm to notify personnel that the door is being used, but will open within ten seconds to allow for exiting during an emergency. Specifiers must be acutely aware of situations like this in a hospital, and the BHMA Standards are essential to properly executing this process.

Hospitals often use the National Fire Protection Association (NFPA) 101, *Life Safety Code*, that includes references to the BHMA Standards including those for exit devices and low-power operated doors.

## Schools

Schools face a set of challenges in their design and operation, but they are not necessarily that different than those posed by other buildings being discussed.

Similar to other public buildings, schools must meet requirements for assembly areas. Exit devices are commonly seen throughout the schools, and are also known as “panic devices.” Mostly used in auditoriums and gymnasiums, they are required for educational occupancies that can be highly crowded and difficult to escape.

Many schools utilize door closers, especially as they are required on fire doors. When there is a fire, a door that is located in an area to prevent a fire from spreading needs a closer to ensure that it is closed. The testing for Grade 1 door closers endure 2 million cycles, to ensure that the best products do not fail when they are needed in an emergency. The full array of requirements for their performance is described in ANSI/BHMA A156.3, *Exit Devices*.

BHMA Standard for schools include ANSI/BHMA A156.2, *Bored and Preassembled Locks and Latches*, and ANSI/BHMA A156.13, *Mortise Locks*. These board and mortise locks provide a special classroom function. They enable the door to be locked from the outside with a key, so that a teacher cannot be locked out of a room.





When tested for compliance with ANSI/BHMA Standards, products undergo repetitive tests to ensure the product holds up under repeated use.

For schools, nothing less than Grade 1 products will suffice, meaning the products that have been tested and are certified to perform at the highest level under the toughest conditions. All builders hardware in schools need exceptional durability and strength for the large amounts of use children will put on the products. Tests such as the vertical-load test are not much different than the stresses that these products will face.

### Government Buildings

Government buildings can include any number of buildings like local police stations to town halls and municipal buildings. A key focus on these buildings is security to both sensitive materials and to personnel. Top-grade builders hardware, such as certified BHMA locks ensure top-level security.

A BHMA standard utilized for government buildings is A156.30, *High-Security Cylinders* with features over and above typical cylinders. Products under this standard must pass three different categories of test:

1. Key control
2. Destructive tests
3. Surreptitious test

Key control means limiting accessibility to key blanks – no markings as to the bittings or serial numbers, and blank keys. It also applies to electronic locks that control the audit trail and time zoning. For destructive tests, the locks undergo drilling and impact tests over and above the normal amount. Surreptitious tests seek to ensure that a lock will provide safety against picking. They ensure high levels of resistance to picking and bumping that are common lock-breaking techniques.

BHMA compliant hinges have anti-friction bearings so they hold up for long-lasting use. For higher security use, hinges with non-removable pins that perform at the Grade 1 level are tested to withstand 2.5 million cycles.

Besides high-security cylinder locks, all of the lock and exit device standards have security concerns designed into them. Latching products have security operating hardware standards as well.

While government buildings are focused on security, they also have access needs to ensure smooth functioning in places that are often visited by the public. Power-operated doors produced to ANSI/BHMA A156.10, *Power-Operated Pedestrian Doors* and ANSI/BHMA A156.19, *Power-Assist and Low Energy Power-Operated Doors* provide access by opening automatically. In some doorways levers have replaced knobs.

Government buildings often must follow International Code Council (ICC) Standards A117.1, for accessible routes. The operable part of a door in this case must be operable with one hand, and should not require tight grabbing or twisting of the wrist. Buildings following this code need to consult the BHMA Standards for lever locks, exit devices or power-operated doors to ensure compliance.

### But How Does it Look?

BHMA is primarily concerned with safety and performance, but builders hardware is also expected to be functional and attractive. It is imperative to make sure the finish holds up on any components that are seen, and are subject to constant usage.

# Standards of Performance

BHMA ensures this under A156.18, *Materials and Finishes*. Products that have certifications for their finishes undergo testing, such as salt spray, UV resistance, hardness, humidity, and solvent resistance to ensure a product will not scratch, corrode, or discolor. A product that is frequently touched will have higher requirements than a product not in constant contact with users, such as a door closer.

How can a specifier know if a BHMA certified product from one that is not? All products that have been tested for performance will bear the “BHMA Certified” logo on their product or packaging. They can be viewed online in the *BHMA Certified Product Directory* at <http://buildershardware.com/certified-products/directory>.

## Conclusion

Balancing the need for both access and security is no feat in any building or facility. However, it is an important task to complete correctly, and one where the details can make or break a design. This is why the BHMA Standards are such an important resource. When utilized properly, they will allow the flow of people through a building the way it was designed to, so that everyone can work safely and with peace of mind.

*The following article was published with the permission from BHMA. An earlier version of this article appeared in the March 2013 issue of The Construction Specifier.*

*Michael Tierney coordinates the development and revision of 35 Builders Hardware Manufacturers Association performance standards covering a broad range of products from gaskets to hinges to power operated doors. He is a Principle member on Technical Committees for the National Fire Protection Association, the A117 Committee for Accessible Buildings, ASTM, and ANSI. He is also the chairman of the ANSI TAG 162 for Doors and Hardware.*

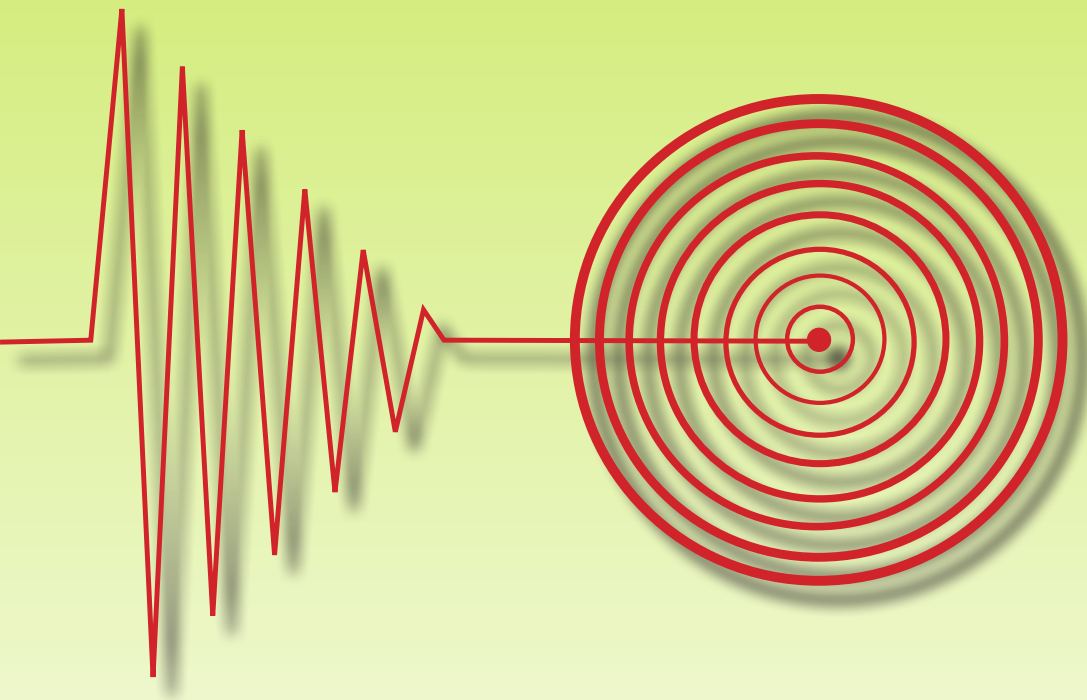
*Mr. Tierney became the Standards Coordinator for the Kellen Company in 1999 following a 20-year career in manufacturing management at United Technologies, Honeywell, Black and Decker, and Yale Security. His extensive experience in management, manufacturing processes, engineering, and quality assurance, qualifies him for the task of writing product standards through the American National Standards Institute (ANSI) consensus approval process. Mr. Tierney holds a Bachelor of Science degree from the University of Connecticut, and resides in Bolton, Connecticut.*





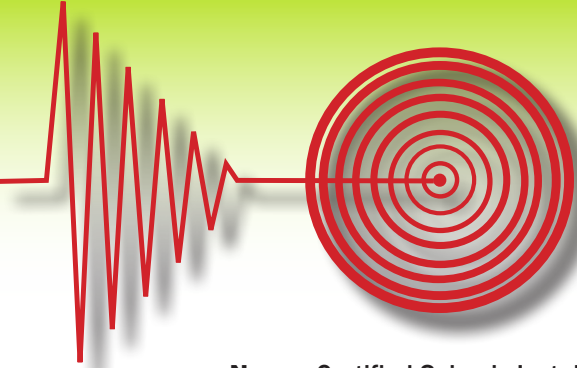
**WOODWORK  
INSTITUTE**

**Certified Seismic  
Installation Program (CSIP)  
(OSHDP and DSA Compliant)**



**May be used on existing projects if acceptable  
to the Design Professional.**

**For more information call your WI Director of Architectural Services  
or our office at (916) 372-9943**



# Certified Seismic

**Name:** Certified Seismic Installation Program (CSIP)

**Effective Date:** June 1, 2012

**Status:**

**Stand-alone Quality Control Option**, meaning it could be specified separately or in conjunction with our CC or MC programs.

**Benefits To:**

**Design Professionals and Property Owners:**

- Specified use of WI's seismic casework pre-approvals from the Office of Statewide Health Planning and Development (OSHPD), without any additional engineering costs and/or requirements Compliant to both OSHPD and DSA requirements
  - Assurance that proper backing was installed in the walls for compliant casework installation
  - Assurance that casework was installed in accordance with WI's seismic casework pre-approvals within OSHPD and/or Division of State Architect (DSA) compliance requirements
  - Certified acknowledgement that the project's seismic casework installation requirements have been met
- Installers:**

- A consistent cabinet installation methodology
- Ease of specification compliance
- Discounted pricing through WI Member and/or Member Licensee status

**Applicability: (OSHPD and DSA Compliant)**

WI's OSHPD's pre-approvals are adequate for casework installation within the State of California at any height within the building where the SDS is not greater than 1.93 and includes:

- Concrete or concrete masonry unit (CMU) wall construction
- Wood or metal stud wall construction with either continuous 3 x 6 or 16GA in wall blocking respectively
- Casework construction of plywood, particleboard, MDF, or Solid Phenolic Core (SPC) in compliance with the minimum requirements of the Architectural Woodwork Standards (AWS), including:
- Base cabinets, up to 36" tall x 24" body depth x 48" wide, including peninsula and those with mechanical chase
- Wall cabinets up to 48" tall x 18" body depth x 48" wide

- Tall storage cabinets up to 96" tall x 24" body depth x 48" wide
- Peninsula base cabinets up to 36" tall x 36" body depth x 48" wide
- Mechanical chase base cabinets up to 42" tall x 36" body depth and 48" wide

**DSA Compliance** – In accordance with the California Department of General Services (DGS), Division of State Architecture (DSA), Interpretation of Regulation Manual (IR), Section A-5, entitled Acceptance of Products, Materials, and Evaluation Reports (rev 10/05/12, 2007, 2010 CBC) – WI's Office of Statewide Health Planning and Development (OSHPD) OSHPD Preapproval of Anchorages (OPA) OPA-2649-10 meets the eligibility criteria when used in accordance with IR A-4 (Geologic Hazard Report Requirements, rev 10/11/11, 2007, 2010 CBC).

Copies of DSA's IR A-4 and A-5 may be found at:  
[www.dgs.ca.gov/dsa/Resources/IRManual.aspx](http://www.dgs.ca.gov/dsa/Resources/IRManual.aspx)

**Cost:**

**Basic CSIP fee of \$1,500 (including two hours of inspection time)**, subject to the following discounts:

- 10% for WI Member (\$1,350), or
- 5% for WI Member (Probationary) (\$1,425), or
- 15% for WI Licensee (Non-member) with a WI SB-E Type License (\$1,275), or
- 25% for WI Member/Licensee with a WI SB-E Type License (\$1,125), or
- 20% discount when specified in conjunction with either WI's CC or MC Programs (\$1,200), plus the following additional discounts as applicable:
  - 10% for WI Member (\$1,080), or
  - 5% for WI Member (Probationary) (\$1,140), or
  - 15% for WI Licensee (Non-member) with a WI SB-E Type License (\$1,020), or
  - 25% for WI Member/Licensee with a WI SB-E Type License (\$900), or
- Additional inspection time, if required, will be charged at \$200/hour, in quarter hour increments, subject to:
  - Applicable WI Member and/or Licensee discounts



# Installation Program (CSIP)

## Specification Requirement:

Should a Design Professional wish to take advantage of the Woodwork Institute's Certified Seismic Installation Program (CSIP), project specifications shall require conformance to the Architectural Woodwork Standards (AWS) and contain the following wording:

- All wood or metal frame wall construction shall be constructed with continuous in wall blocking of either 3x6 flat Douglas Fir or 16GA x 6" wide, 50 KSI sheet metal provided in accordance with the location requirements included on the cabinet fabricator/installer's shop drawings. Responsibility for blocking installation shall be that of the wall fabricator.
- All casework installation shall be certified by the Woodwork Institute in accordance with their Certified Seismic Installation Program (CSIP) and their OSHPD Pre-approvals, including:
  - A CSIP Certificate indicating that all of the casework installation fully meets the requirements of the AWS, CSIP, and WI's OSHPD Pre-approvals.
- It is the responsibility of the installer to include within their bid, any and all costs for WI's CSIP certification. Certification is a prerequisite for final acceptance. For further information, please visit [www.woodworkinstitute.com](http://www.woodworkinstitute.com)

## Casework Installer Requirements:

The party responsible for installation of casework for any project requiring CSIP certification shall:

- Contact the Woodwork Institute and coordinate CSIP certification with them prior to submittal of shop drawings.
- Ensure that the casework shop drawings:
  - Are in compliance with the AWS's minimum requirements as established in Section 1
  - Include, in accordance with the minimum requirements WI's OSHPD Pre-approvals:
    - Casework Elevations showing the center line height and horizontal locations of all required, continuous, internal wall blocking furnished by others,
    - A casework fastener schedule, clearly showing the type, size, location and maximum spacing.
- At wood or metal stud walls, prior to application of wall surfacing, Casework Installer shall examine, approve and acknowledge blocking compliance to

WI's OSHPD Pre-approval requirements, while providing documentation of such through:

- An inspection report showing rooms/walls inspected type of blocking (wood or metal), confirmation of compliance or statement of non-compliance, inspectors name, date, and signature, with:
  - Photo documentation (referenced by room/wall) of at least 25% of the walls inspected, and inspection report shall identify which walls include photo documentation.
- Contact WI and arrange for final inspection of the casework installation by a WI Director of Architectural Services (DAS), and:
  - If Installation is found compliant, the DAS will authorize issuance of the CSIP Certificate.

Although it is not required, WI recommends, that those fabricators with the appropriate equipment pre-bore their cabinet backs with the proper number, spacing and location of the installation fastener locations in accordance with WI's OSHPD Pre-approvals to avoid field error.

## WI License Requirements:

In order to qualify for the WI Licensee fee discount for CSIP certification, WI Licensee shall hold a WI SB-E Type License, which:

- Will be grandfathered to all existing WI Licensees with a Type B-E License, provided they complete the required examination and execute the additional SB-E Licensee Agreement.
- Will be offered to existing WI Licensee firms **without** a WI-Type B-E License and new WI Licensee applicants under normal application protocols.

**CSIP is not applicable to the Institute's WI Licensee Sub-Sub discount**

**DISCLAIMER:** The Woodwork Institute is an independent inspection service that determines whether work conforms to specific standards or requirements. The Institute does not certify or guarantee the safety or performance of any manufactured products, components, or installation thereof, or any standard or process related thereto, regardless of whether they comply with the *Architectural Woodwork Standards*, the *Certified Seismic Installation Program* approved OSHPD (OPA-2649-10) drawings and/or contract documents under said Standard/Program. Additionally, the Institute does not guarantee or certify the services, fitness for purpose, advice, materials or products provided by any third party, including contractors, architects, designers and engineers.

# Woodwork Institute / C.E. Bernhauer, Jr.

## SCHOLARSHIP FOUNDATION

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**F**irst announced by the Woodwork Institute in 1997, the Woodwork Institute / C.E. Bernhauer, Jr. Scholarship Foundation was the brain-child of the Institute's Chief Executive Officer Emeritus, Mr. Bernard (Bernie) B. Barber, Jr. The program honors Mr. C.E. (Ed) Bernhauer, Jr., of Fresno Planing Mill, a longtime active and supporting member of the Institute. Mr. Bernhauer served as Treasurer and chaired the Technical Committee (responsible for publication and maintenance of the Manual of Millwork) from 1984 until his untimely death in 1993.

Established within the state of California as a non-profit, charitable corporation separate from the Woodwork Institute, the Foundation is run by a voluntary Board of Directors/Officers with no obligatory ties to the Institute. Granted both Federal and State of California charitable tax exempt status, contributions are fully deductible as charitable gifts under both Federal and California tax codes.

The Foundation's corpus stands in excess of \$80,000 and it awarded \$4,500 in scholarships during 2007. With the intent of offering scholarships substantial enough to be meaningful while allowing for multiple awards, the Foundation's Board has set the minimum individual scholarship award at \$500, and the maximum at \$2,500.

For recognizing major donors, the Foundation created the Journeyman Recognition Level of \$250 or more, the Premium Level of \$500 or more, and the Masters Level of \$1,000 or more, in donations during any one-year period. To date, we have over 60 major donors within these levels.

The Foundation's vision is to promote a better educated workforce within the architectural millwork industry and its related fields by providing financial aid for individuals pursuing careers in those industries. We greatly appreciate those that have helped us thus far.

### **Please Join Us**

This is your open invitation to join us in our efforts of providing an ongoing source of financial aid for individuals seeking further education and career enhancement in the architectural millwork or related industries.

- Pass this information along to someone you feel would benefit from our scholarship opportunities;

or

- Make a commitment to help us build and achieve our corpus goal through a monetary donation.

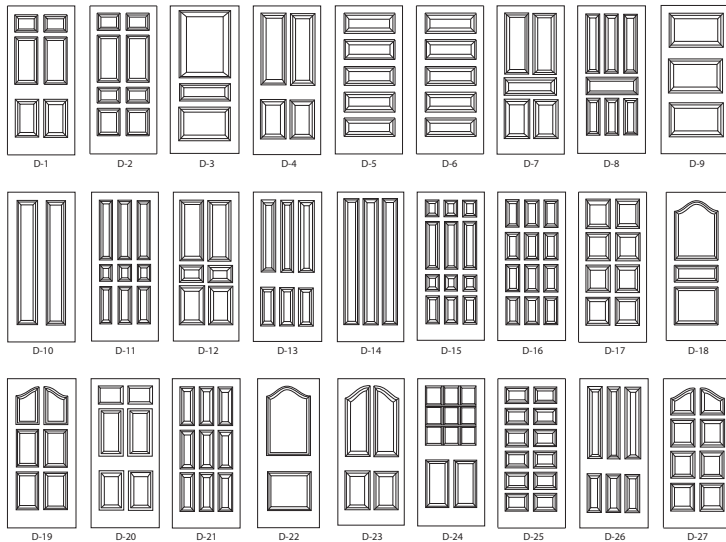
**To find out more or request a scholarship application, contact the Administrative Office,  
(916) 372-9943, PO Box 980247, West Sacramento, CA 95798-0247.**

**Applications must be received no later than April 1, for scholarship monies funded that year.**

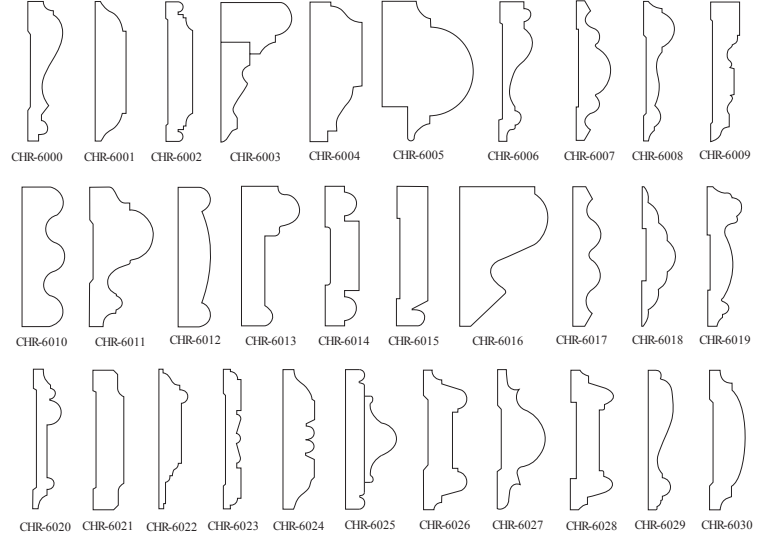


- Door Designs
- Molding Designs

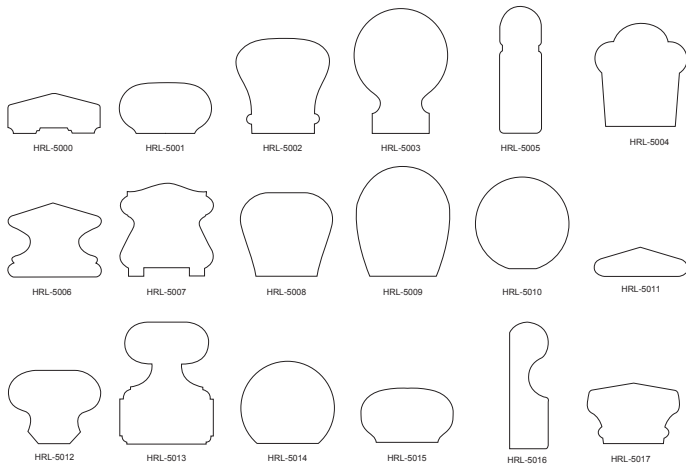
AWS Stile & Rail Door Drawings



AWS Chair Rail Drawings



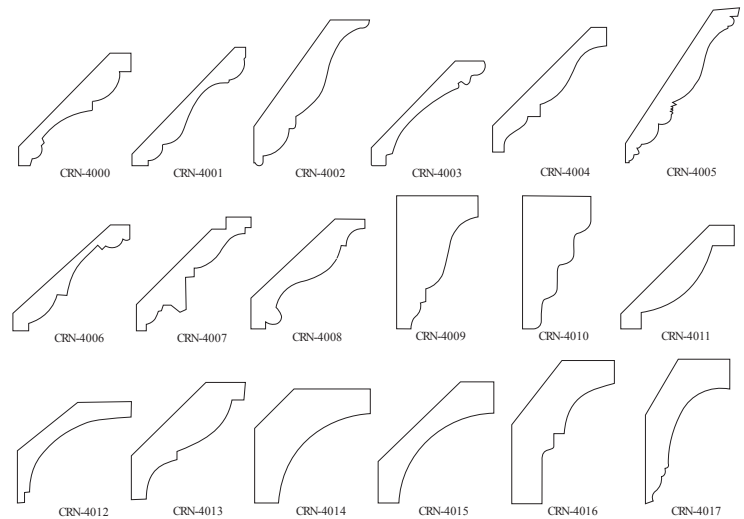
AWS Guard/Handrail Drawings



NOTE: Handrails may not be compliant with current building codes. Check with your local AHJ.

Page 1 of 2

AWS Crown Mold Drawings



Page 1 of 3

\*Examples of some of the Door and Molding drawings (\*.dxf) above.  
For full set of drawings go to [www.woodworkinstitute.com](http://www.woodworkinstitute.com).

\*\*Handrails may not be compliant with current building codes.  
Check with your local AHJ.



**Woodwork Institute**

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