



**STANDARD
FOR
MATERIALS AND FINISHES**



SPONSOR
BUILDERS HARDWARE MANUFACTURERS ASSOCIATION, INC.

AMERICAN NATIONAL STANDARD INSTITUTE

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AMERICAN NATIONAL STANDARD

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FOREWORD (Not a part of ANSI/BHMA A156.18)

The general classification of builders hardware includes a wide variety of items which are divided into several categories. To recognize this diversity, a sectional classification system has been established. Each Standard is the result of the collective efforts of members of the Builders Hardware Manufacturers Association, Inc. who manufacture the products included in each Section. The total product standards effort is, therefore, a collection of Section Standards, each covering a specific category of items.

In BHMA Standards, performance tests and, where it has been necessary, material and dimensional requirements have been established to ensure safety, security, and stability to which the public is entitled. There are no restrictions on design except for those dimensional requirements imposed for the reasons given above. It is also required that some hardware items fit certain specified cutout dimensions.

This Standard on materials and finishes contains a description of types of finishes and divides them into categories. A numbering system has been established which identifies base material and finish.

Performance test methods for finishes are included. Requirements and exemptions concerning appearance are contained in this Standard.

The finish test methods, code numbers and finish descriptions contained in this Standard are intended to apply to the builders hardware industry.

TABLE OF CONTENTS

1. SCOPE.....	5
2. DEFINITIONS.....	7
3. FINISH TEST METHODS AND CRITERIA	8
4. MATERIALS, CATEGORIES, AND FINISHES	10
5. FINISH NOMENCLATURE AND CODE NUMBERS	9
6. FINISH TEST REQUIREMENTS PER STANDARD	16
APPENDIX A USERS GUIDE	29

1. SCOPE

1.1 This Standard establishes tests for architectural finishes applied to various types of Builders Hardware with specific performance requirements by individual standards described in Section 6. Tests include salt spray, UV, perspiration, hardness, and humidity. This Standard also provides a numbering system to describe finishes by base material and coatings.

1.2 Tests described in this Standard are performed under laboratory conditions. In actual usage, results vary because of installation, maintenance and environmental conditions.

1.3 **Performance Requirements** Are established based on the individual ANSI/BHMA A156 Series requirements as listed in Section 6. Finish requirements can be different depending on the product type and standard. Finishes can be tested and listed to multiple standard finish requirements.

1.4 Door hardware shall be certified to the applicable ANSI/BHMA A156 Standard selected for the finish certification specified by the manufacturer to qualify for this certification. Related additional performance requirements are covered in ANSI/BHMA A156 Standards listed in 1.5.

1.5 Related additional performance requirements are covered in BHMA Publications:

- A156.1-2016 for Butts and Hinges
- A156.2-2017 for Bored and Preassembled Locks and Latches
- A156.3-2014 for Exit Devices
- A156.4-2019 for Door Controls – Closers
- A156.6-2016 for Architectural Door Trim
- A156.8-2016 for Door Controls – Overhead Stops and Holders
- A156.9-2016 for Cabinet Hardware
- A156.11-2019 for Cabinet Locks
- A156.12-2018 for Interconnected Locks and Latches
- A156.13-2017 for Mortise Locks and Latches
- A156.14-2019 for Sliding and Folding Door Hardware
- A156.15-2015 for EM Release Device Closer Holder
- A156.16-2018 for Auxiliary Hardware
- A156.17-2019 for Self Closing Hinges and Pivots
- A156.20-2017 for Straps and Tee Hinges
- A156.23-2017 for Electromagnetic Locks
- A156.26-2017 for Continuous Hinges
- A156.29-2017 for Exit Locks and Alarms for Exit Devices
- A156.31-2019 for Electric Strike and Frame Mounted Actuators
- A156.36-2016 for Auxiliary Locks
- A156.37-2014 for Multipoint Locks
- A156.39-2015 Residential Locksets and Latches
- A156.40-2015 Residential Deadbolts

2. DEFINITIONS

2.1 **Anodizing** (aluminum) An inorganic coating by electro-chemical process which converts the surface (aluminum) metal to (aluminum) oxide due to reactions at the anode in an acidic solution.

2.2 **Blackened** A surface treated to be light absorbing, and darkened.

2.3 **Bright** A reflective mirror like surface.

2.3 **Coating** The application, of organic or inorganic materials to, or the conversion of the surface of the base material or substrate, for the changing of appearance, or for protection or both. The topcoat when applied establishes the type of coating for test purposes. When the top coat is transparent, it is often referred to as a clear coat.

2.3.1 **Organic Coating** Coating with primary ingredients from compounds rich in carbon and are non-metallic. Includes organic-inorganic hybrid coatings and excludes cyanides and carbonates common to plating bath solutions. Applied in one or more layers and includes primers and topcoats such as enamels, varnishes, paints, and powder coatings.

2.3.2 **Inorganic Coating** Coating with metallic or other non-carbonaceous materials or conversion of the surface to an oxide. Produced by heat or chemical action, with or without electrical assistance, that changes the top surface layer of a metal. Examples include electroplating, oxidizing, anodizing, enameling, hot-dip galvanizing, thermal spraying and vacuum coating.

2.4 **Corrosion** The result of breakdown or eating away of the base material or substrate, not to be confused with staining. Corrosion of brass or bronze material can be green, brown or pink; corrosion of steel or stainless-steel material is red rust, corrosion of aluminum or zinc base material is white.

2.5 **Match Plates** A set of twelve one inch medallions which represent the appearance of commonly used traditional architectural finishes (BHMA 605, 606, 611, 612, 613, 618, 619, 625, 626, 628, 629, 630). They are available from the Builders Hardware Manufacturers Association.

2.6 **Oxidizing** An inorganic coating by conversion of the surface of the base material to an oxide by addition of oxygen or removal of hydrogen.

2.7 **Plating** An inorganic coating with a metallic deposit by chemical, electro-chemical, mechanical or electro-mechanical means.

2.8 **Relieved** To set off by contrast through the partial removal of finish, creating a brushed, satin or antique effect.

2.9 **Satin** A smooth dull finish with or without a directional pattern.

2.10 **Significant Surfaces** Surfaces of a product that are visible or exposed after the product are installed.

2.11 **Stain** Any obvious color change other than corrosion, which cannot be removed by rinsing with water.

2.12 **Substrate** The surface to which a coating is applied; may be a coating or the base material.

2.13 **Unstable Finish** A finish that intentionally lacks sufficient protection to ensure consistent color, texture and appearance for the intended period of use.

3. TEST METHODS AND SPECIMEN CRITERIA

3.1 The tests detailed in this section are used to evaluate the performance of finishes in a consistent manner within a laboratory environment. As product components vary greatly in shape and size, the requirements for specimen selection considers variations in surfaces and details when test panels are optional for the evaluation. Additional information regarding test specimens and performance criteria is found within the respective product requirements in section 6.

3.1.2 **Exempt Surfaces** Surfaces on which a controlled deposit ordinarily cannot be obtained, such as holes, edges, recesses, bases of angles, and similar areas, are exempt from the requirements for significant surfaces.

3.1.3 **Exempt Finishes** Category B and equivalent finishes are not subject to testing but may be listed in the certified products directory to represent the manufacturer's product line.

3.1.4 **Test Specimens** Actual product components shall be used when compatible with the prescribed test methods, otherwise use a finished flat test panel or coupon using a substrate of the same base material of the actual product or component.

3.1.4.1 The flat panels or coupon shall have a minimum exposed area of 2.50 x 3.75 in (64 x 95 mm) and shall be 0.020 to .25 in (0.5 to 6.4 mm) thick.

3.1.4.2 Exposed fasteners with decorative finishes shall be excluded from the evaluation, in lieu of testing flat panels or product components that represent the same production process and base material. Fasteners not exposed shall have a corrosion resistant finish and are also excluded.

3.1.4.3 A painted or powder coated finish in several different colors, where each color is composed of all the same materials except for variations in tints, is considered to be one finish type for test purposes.

3.2 **Measuring Equipment** - All instruments and equipment used in the conducting of tests for recording data shall be calibrated and maintained for effectiveness and continued accuracy. Calibration of equipment shall be traceable to National Institute of Standards and Technology (NIST).

3.3 **Salt Spray Test** This test shall be conducted in accordance with ASTM B 117-18 Standard Method of Salt Spray (Fog) Testing. Parts shall withstand exposure for the time specified in Section 6 without base material or substrate corrosion or blistering exceeding one spot visible to the unaided eye per one square inch (25.4 square mm) of significant surface and without any spot larger than 1/16 in (1.6 mm) in diameter. The spread of corrosion on significant surfaces that originate from holes, edges, recesses and bases of angles, shall not exceed 1/16 in. (1.6mm). Staining shall not exceed 5% of the significant surface area of the component under test and without any spot larger than 1/4 in. (6.4 mm) in diameter.

3.4 **Humidity Test** This test shall be conducted in a chamber with conditions as described in ASTM D1735-14, except with a 95% $\pm$ 5% relative humidity. The parts shall be allowed to stabilize at room temperature for 30 minutes before they are examined. Blistering or staining of the part shall not be visible to the unaided eye. The coating shall, within an additional 15 minutes from being removed from exposure, pass a pencil hardness test (see 3.5) as specified in section 6 and shall pass the method B Cross-Cut Tape Test as defined in ASTM D3359-17 Method for Measuring Adhesion by Tape Test using tape that meets the requirements of ASTM D3359-17 Section 6.3.

3.5 Pencil Hardness Test

3.5.1 Using a Hardness Test Fixture similar to the one shown in Figure 1, test the organic coating hardness with the applicable Berol Turquoise pencil lead of the hardness specified in Section 6. The pencil lead shall be exposed beyond the tip of the holder 1/8 to 1/4 in (3.2 to 6.4 mm). In accordance with 3.5.2, abrade the end of the lead flat and perpendicular to its axis with the means provided in the Hardness Test Fixture. Place a 3 lb. 10 oz $\pm$ 1 oz (1644 g $\pm$ 28.3 g) load on the pencil lead during test. The test part shall be grounded to the movable portion of the test fixture table. Push the organic coated surface of the test part across the lead for 1/4 to 1/2 in. (6.4 to 12.7 mm). Failure occurs if the coating is removed to the substrate, or near enough to the substrate to activate the Holiday detector alarm on the fixture.

3.5.2 Abrade the lead with #400 grit sandpaper and finish with light pressure to minimize grooves in the

abraded surface. The circular edge shall be sharp, not serrate, when inspected with 5X magnification after each abrading. Repeat the abrading as required until the inspected edge is sharp. By rotating the lead holder after each test either 180 or 120 degrees $\pm$ 1 degree, three tests maximum shall be performed per abrading.

3.5.3 In lieu of the BHMA Hardness Test Fixture a similar fixture is permitted to be used. The following details are required.

- a) Lead holder firmly held at 45 degrees $\pm$ 1 degree to test surface
- b) Weight and lead holder “float” vertically on a miniature slide
- c) Table moves on linear ball bearings
- d) Lead abrading means is provided for 90° dressing
- e) The BHMA Holiday Detector alarm circuit of [Figure 2](#)

3.6 Perspiration Test This test shall be conducted using a reagent made up by weight of 5% sodium chloride, 5% acetic acid, 3% butyric acid, 3% valeric acid and 84% distilled water. The reagent must be less than one year old and stored at 40 degree F $\pm$ 5 degrees F (4 degrees C $\pm$ 3 degrees C). A dam of epoxy or similar adhered material shall be used to contain the solution over an area between ½ and 1 square in. (323 and 645 square mm) with a minimum solution depth of 1/16 in. (1.6 mm). Apply the reagent; let stand for 15 minutes and wash off with cold water. The coating shall then pass a pencil hardness test in accordance with 3.5 using a pencil lead of 2B hardness. This constitutes one cycle. Repeat within the test area (avoiding the same line), the number of cycles specified in Section 6.

3.7 Ultraviolet Light and Condensation Test This test shall be conducted in accordance with ASTM G154-16 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials except as follows. For all products, use UVA-340 lamps with a typical irradiance: 0.77 W/m²/nm. The test cycles and duration are specified in Section 6. For organic coatings used on multiple base materials, testing of only one material is required. The retained specimen shall be stored in a controlled environment and protected from UV exposure. Start the test at the beginning of a UV cycle and end it at the conclusion of a condensation cycle. Test specimens shall be the actual product or component unless finished product or component cannot be adopted to the UV test equipment (see 3.1.4). The test specimen shall be mounted as specified in ASTM G 154. Any of the cut edges of the panels are permitted to be sealed with silicone sealant or vinyl electrical tape. At the conclusion of the test, the retained panel and the tested panels shall be viewed in accordance with 3.7.1 and shall appear the same. Visual failure modes shall be any chipping, flaking, cracking, color loss or change (from clear to white, yellow or brownish). At the completion of the ultraviolet Light and Condensation Test, the panel shall pass F pencil hardness when tested in accordance with 3.5.

3.7.1 Viewing Method for Ultraviolet Light and Condensation Test

3.7.1.1 Comparative finishes shall appear the same when viewed two feet apart and three feet away, on the same relative plane.

3.7.1.2 Viewing Conditions. Place the specimen on a neutral background (middle gray to white) and illuminate it with natural or artificial daylight in 3.7.1.3.

3.7.1.3 Light Source. The artificial daylight source shall approximate the color and spectral quality of average daylight as represented by CIE illuminant D65 (as shown in appendix A) in accordance with ASTM D 1729- 2016.

3.8 Taber Abrasion Test This Test shall be conducted in accordance with ASTM D4060-14 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrader. A uniform thickness of the coating to be tested shall be applied to a .060 in. (1.5 mm) minimum thick coupon using the manufacturer's normal coating materials and processes. The coating thickness of specimen shall reflect the average coating thickness of the manufacturer's products. The wheel shall be a CS-10 calibrase with a 1000 gram load. Reface the wheel every 500 cycles. Failure constitutes wearing through the coating to the coupon prior to completing the number of cycles specified in Section 6. Detection shall be by a BHMA Holiday Detector ([Figure 2](#)) or by visual inspection when the conductivity test is not applicable with non-conducting substrates not with conductive coatings.

4. CATEGORIZATION BY BASE MATERIAL & FINISH

4.1 Materials Except for the generic classifications of materials shown, there shall be no restrictions other than those specified in section 6. The following identification numerals are used and often appear as the first numeral in the product type numbers used in individual ANSI/BHMA A156 Series Standards and identify the predominant material from which the product is made:

0	Optional material	5	Stainless steel
1	Cast, forged or extruded brass or bronze	6	Malleable iron
2	Sheet, coil or strip brass or bronze	7	Cast iron
3	Cast, forged or extruded aluminum	8	Steel
4	Sheet, coil or strip aluminum	9	Zinc alloy

Note: All reference in this document to "bronze" shall exclude the nickel silver alloy known as "white bronze".

4.2 Categories BHMA code numbers for finishes fall into one of five categories defined as follows:

A. Category A finishes are represented by BHMA match plates. They are applied to the base material or are the base material defined by the description in 5.3 and the nominal values are referenced in the appendix.

B. Category B finishes are those that are unstable and are applied to the base material or are the base material defined by the description in 5.3. These finishes cannot and do not match from one alloy or form of material to the next and from one manufacturer to the next.

C. Category C includes ornamental finishes that do not have a representative match plate are applied to the base material and meet the description in 5.3. Examples are blackened, relieved or highlighted.

D. Category D finishes are functional protective finishes and appearance is not a factor.

E. Category E finishes shall be equivalent in appearance when compared with the corresponding Category A, B or C finishes. They shall be viewed using the method in A-4.2. BHMA provides certain Category A and Category B match plates including 605, 606, 607, 611, 612, 613, 618, 619, 625, 626, 627, 629 and 630. Contact individual manufacturers for other finish samples. Category B finish match plates shall be kept fresh and shall be considered so if not held over six months and are kept in the original container and the viewing surface not touched.

4.3 Finishes

4.3.1 There are separate numbers for finishes as they are applied to each separate base material except when brass or bronze is permitted to be used interchangeably without affecting the final finish, and with some painted finishes which apply to several base materials. When a manufacturer designates a finish code i.e. 605 it does not necessarily denote that all significant surface trim is made from that base material. The customer is encouraged to consult with the manufacturer to determine specific materials used in each component.

4.3.2 All BHMA product types as described in the ANSI/BHMA A156 Series Standards are not available in all finishes. Consult individual manufacturers' catalogs.

5. FINISH NOMENCLATURE AND CODE NUMBERS

5.1 Finish Nomenclature Finishes shall be specified using the categories listed in 4.2. A finish designation with a letter suffix E indicates the finish code that the BHMA match plate is derived from. Example: 605 means that all the significant surfaces are produced from the same base material (brass) that the match plate is derived from. However, 605E means that the finish is to be compared to the 605 match plate for appearance only regardless of the base material or finish process used.

5.2 Only finishes produced by three or more manufacturers are listed and are numbered starting with 600. New sequential numbers shall be added as necessary to represent finishes or processes when requested by at least three manufacturers (to prevent unnecessary proliferation of numbers in the standard and yet provide BHMA descriptions for common industry finishes). Numbers 001 through 599 are reserved for individual manufacturers to use, as they desire for their own unique finishes, alternatively they may use their own designation and description. Before submittal, the manufacturer shall check the Certified Product Directory for previously selected BHMA designations and the respective descriptions to avoid duplication. Once a 600 series or greater number is assigned, the original three manufacturers may continue to use the 001 through 599 number or their designation and description.

5.3 Tables of Finish Descriptions and Equivalents

BHMA CODE NUMBER	FINISH DESCRIPTION	BASE MATERIAL	CATEGORY	NEAREST FORMER US EQUIVALENT
	Custom Finish			
000	Specified by Manufacturer	Any	B, C, D or E	
	Primed for Painting			
600	Primed for painting	Steel	D	USP
674	Primed for painting	Zinc	D	USP
715	Primed for painting	Aluminum	D	USP
	Bright Janned			
601	Bright Janned	Steel	D	US1B
	Zinc Plated			
603	Zinc plated	Steel	D	US2G
604	Zinc plated and dichromate sealed	Steel	D	
663	Zinc plated with clear chromate seal	Steel	D	
	Bright Brass			
605	Bright Brass, clear coated	Brass	A	US3
632	Bright brass plated, clear coated	Steel	E	US3
666	Bright brass plated, clear coated	Aluminum	E	US3
677	Bright brass plated, clear coated	Zinc	E	US3
697	Bright brass plated, clear coated	Plastic	E	US3
707	Bright brass anodized	Aluminum	E	US3
716	Bright gold anodized	Aluminum	E	US3
721	Bright brass uncoated	Architectural Bronze	B	US3
723	Bright brass appearance vacuum applied	Brass/Bronze	E	US3
724	Bright brass appearance vacuum applied	300 Series SS	E	US3
729	Bright brass appearance vacuum applied	Zinc	E	US3
	Satin Brass			
606	Satin brass, clear coated	Brass	A	US4
633	Satin brass plated, clear coated	Steel	E	US4
667	Satin brass plated, clear coated	Aluminum	E	US4
678	Satin brass plated, clear coated	Zinc	E	US4
696	Satin brass painted	Any	E	US4
688	Satin aluminum, gold anodized	Aluminum	E	US4
698	Satin brass plated, clear coated	Plastic	E	US4
720	Mill finish brass uncoated	Architectural Bronze	B	US4
728	Satin brass uncoated	Architectural Bronze	B	US4
730	Satin brass appearance vacuum applied	Brass/Bronze	E	US4
731	Satin brass appearance vacuum applied	300 Series SS	E	US4
BHMA CODE NUMBER	FINISH DESCRIPTION	BASE MATERIAL	CATEGORY	NEAREST FORMER US EQUIVALENT

732	Satin brass appearance vacuum applied	Zinc	E	US4
	Oxidized Satin Brass			
607	Oxidized satin brass, oiled rubbed	Brass	B	
634	Oxidized satin brass plated, oil rubbed	Steel	E	
683	Oxidized satin brass plated, oil rubbed	Zinc	E	
733	Oxidized Satin brass appearance vacuum applied	Brass/Bronze	E	US4
734	Oxidized Satin brass appearance vacuum applied	300 Series SS	E	US4
735	Oxidized Satin brass appearance vacuum applied	Zinc	E	US4
	Oxidized Satin Brass, Relieved			
608	Oxidized satin brass, relieved, clear coated	Brass	C	
635	Oxidized satin brass plated, relieved, clear coated	Steel	E	
651	Oxidized satin brass plated, relieved, clear coated -	Zinc	E	
	Satin Brass, Blackened, Satin Relieved			
609	Satin brass, blackened, satin relieved, clear coated	Brass	C	US5
638	Satin brass plated, blackened, satin relieved, clear coated	Steel	E	US5
752	Satin brass plated, blackened, satin relieved, clear coated	Zinc	E	
	Satin Brass, Blackened, Bright Relieved			
610	Satin brass, blackened, bright relieved, clear coated	Brass	C	US7
636	Satin brass plated, blackened bright relieved, clear coated	Steel	E	US7
	Bright Bronze			
611	Bright bronze, clear coated	Bronze	A	US9
637	Bright bronze plated, clear coated	Steel	E	US9
679	Bright bronze plated, clear coated	Zinc	E	US9
705	Bright bronze plated, clear coated	Aluminum	E	US9
708	Bright bronze anodized	Aluminum	E	US9
726	Bright bronze plated, clear coated	Brass	E	US9
736	Bright bronze appearance vacuum applied	Brass/Bronze	E	US9
737	Bright bronze appearance vacuum applied	300 Series SS	E	US9
738	Bright bronze appearance vacuum applied	Zinc	E	US9
	Satin Bronze			
612	Satin bronze, clear coated	Bronze	A	US10
639	Satin bronze plated, clear coated	Steel	E	US10
668	Satin bronze plated, clear coated	Aluminum	E	US10
680	Satin bronze plated, clear coated	Zinc	E	US10
694	Medium bronze painted	Any	E	
699	Satin bronze plated, clear coated	Plastic	E	US10
709	Satin bronze anodized	Aluminum	E	US10
725	Satin bronze plated, clear coated	Brass	E	US10
739	Satin bronze appearance vacuum applied	Brass/Bronze	E	US10
740	Satin bronze appearance vacuum applied	300 Series SS	E	US10
741	Satin bronze appearance vacuum applied	Zinc	E	US10

BHMA CODE	FINISH DESCRIPTION	BASE MATERIAL	CATEGORY	NEAREST FORMER	US
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