



**AMERICAN NATIONAL STANDARD**  
**FOR**  
**MATERIALS AND FINISHES**



**SPONSOR**  
**BUILDERS HARDWARE MANUFACTURERS ASSOCIATION, INC.**  
**AMERICAN NATIONAL STANDARDS INSTITUTE, INC.**  
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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 BHMA recognizes that new finishes, methods and materials will be developed. With this in mind, the Association plans to update, correct and revise this Standard on a regular basis.

Only finishes produced by three or more manufacturers are listed and are numbered starting with 600. Numbers 001 through 599 are reserved for individual manufacturers to use, as they desire for their own unique finishes.

The finish test methods, code numbers and finish descriptions contained in this Standard are intended to apply to the builders hardware industry. However, the Standard is suitable for use in other industries.

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## 1. SCOPE

1.1 This Standard establishes finish test methods and code numbers for finishes on various base materials. It includes criteria for viewing comparative finishes to the BHMA match plates and establishes five categories of finishes.

## 2. DEFINITIONS

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

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

2.3 **Coating** Coating is 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** Coatings with a material containing carbon compounds, excepting cyanides and carbonates, and including mixtures of organic and inorganic materials.

2.3.2 **Inorganic Coating** Coating with metallic or other non-carbonaceous materials or conversion of the surface to an oxide.

2.3.2.1 **Plating** Coating with a metallic deposit by chemical, electro-chemical, mechanical or electro-mechanical means.

2.3.2.2 **Oxidizing** Coating by conversion of the surface of the base material to an oxide by addition of oxygen or removal of hydrogen.

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

2.3.3 **Vacuum Applied Coating** Electrochemical or electrophysical (PVD or physical vapor deposition) deposition, operated in a vacuum to deposit an adherent, dense, thin film 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.

2.6 **Finish Matching** Equivalent in color, texture, and appearance.

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

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

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

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

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

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

### 3. FINISH TEST METHODS AND CRITERIA

3.1 These test methods do not predict the performance life of the finishes in actual use but are used as a quality control method to ensure consistent finish quality. Consult the applicable BHMA Product Standards for minimum exposure times and other values.

3.1.1 **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.

3.1.2 **Exempt Finishes** Category B and equivalent finishes 634, 640, 683, 703, 704, 727 are not subject to testing but may be listed in the certified products directory to represent the manufacturer's product line.

3.1.3 **Test Specimens** Actual product components shall be used except where otherwise specified. Components without surfaces which are compatible with the prescribed test methods, shall use a finished flat test panel using substrate of the same base material of the actual product or component. The flat panels 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. 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 **Salt Spray Test** This test shall be conducted in accordance with ASTM B 117-11 Standard Method of Salt Spray (Fog) Testing. Parts shall withstand exposure for the time specified in the applicable ANSI/BHMA A156 Series Standard 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.

3.3 **Humidity Test** This test shall be conducted in a chamber with conditions as described in ASTM D1735-08, except that this test shall be conducted in a chamber having 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, pass a pencil hardness test (see 3.4) as specified in the applicable ANSI/BHMA A156 Series Standard and shall pass the method B Cross-Cut Tape Test as defined in ASTM D 3359-09 Method for Measuring Adhesion by Tape Test.

#### 3.4 Pencil Hardness Test.

3.4.1. Berol Turquoise pencil lead of the hardness specified in the applicable ANSI/BHMA A156 Series Standard, if applicable, shall be placed in a Hardness Test Fixture similar to the one shown in Figure 1 with 1/8 to 1/4 in (3.2 to 6.4 mm) of lead exposed beyond the tip of the holder. The test part shall be grounded to the test fixture chassis. Abrade, in accordance with 3.4.2, the end of the lead flat and perpendicular to its axis with the means provided in the Hardness Test Fixture. Using a 3 lb. 10 oz  $\pm$  1 oz (1644 g  $\pm$  28.3 g) weight bearing on the pencil lead and as provided in the Fixture, push the coated surface under test toward and beneath the lead for ¼ to ½ 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.

3.4.2 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.

3.4.3 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

**3.5 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 which is less than one year old and has been 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 3.4 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 the applicable ANSI/BHMA A156 Series Standard.

**3.6 Ultraviolet Light and Condensation Test** This test shall be conducted in accordance with ASTM G154-06 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/m<sup>2</sup>/nm. The test cycles and duration shall be specified in the applicable ANSI/BHMA A156 Series Standards. Three test specimens shall be tested for each finish and one additional specimen shall be retained for comparison at the end of the test. For 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. Refer to 3.1.2 when finished product or component cannot be adopted to the UV test equipment. 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 4.3.3 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 Ultra Violet Light and Condensation Test, the panel shall pass F pencil hardness when tested in accordance with 3.4.

**3.7 Taber Abrasion Test** This Test shall be conducted in accordance with ASTM D4060-10 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser. 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 calabrase 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 the applicable ANSI/BHMA A156 Series Standard. Detection shall be by a BHMA Holiday Detector (see Figure 2) or by visual inspection when the conductivity test is not applicable with non-conducting substrates nor with conductive coatings.