



Standard Specification for Performance of Enameling System, Baking, Metal Joiner Work and Furniture¹

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1. Scope

1.1 This specification covers the performance of a baking primer and enamel on metal for use on fabricated metal products, including marine furniture and joiner work.

1.2 The values stated in inch-pound units are to be regarded as standard. The metric (SI) units, given in parentheses, are for information only.

1.3 Painting facilities shall comply with all applicable Federal and State regulations regarding emissions and waste disposal.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

A1008/A1008M Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable

A653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

B117 Practice for Operating Salt Spray (Fog) Apparatus

B209/B209M Specification for Aluminum and Aluminum-Alloy Sheet and Plate

D522 Test Methods for Mandrel Bend Test of Attached Organic Coatings

D1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base (Withdrawn 2006)³

D1400 Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base (Withdrawn 2006)³

D3359 Test Methods for Rating Adhesion by Tape Test

D3363 Test Method for Film Hardness by Pencil Test

2.2 American Institute of Steel Construction Manual:⁴

AISC Wire and Sheet Metal Gages Equivalent Thickness in Decimals of an Inch, U.S. Standard Gauge (USSG) for Uncoated Hot and Cold Rolled Sheets and Galvanized Sheet Gage (GSG) for Hot-Dipped Zinc Coated Sheets

2.3 Code of Federal Regulations:⁵

40 CFR 60 Subpart EE—Standard of Performance for Surface Coating of Metal Furniture

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *air dry touch-up enamel*—an air drying enamel that matches the factory applied enamel in color and gloss and is compatible with it.

3.1.2 *baking finish*—an enamel that requires baking at temperatures above 150 °F (65 °C) for the development of desired properties.

3.1.3 *blister*—an enclosed raised spot on the paint surface caused by moisture or solvent trapped under the surface.

3.1.4 *cleaning*—the first phase of the metal pretreatment prior to painting.

3.1.5 *cure*—to condense or polymerize a material by heating, resulting in the full development of desired properties.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American Institute of Steel Construction (AISC), One E. Wacker Dr., Suite 700, Chicago, IL 60601-2001, <http://www.aisc.org>.

⁵ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.



3.1.6 *degreasing*—to remove grease from a surface using chemical solvent, steam or other method. See *cleaning*.

3.1.7 *dry film thickness (DFT)*—the actual thickness of the cured paint system. It is measured in mils or thousandths of an inch, that is, 0.001 in. (25.4 μm).

3.1.8 *enamel*—a paint characterized by the ability to form an especially smooth film.

3.1.9 *galvanized steel*—zinc coated steel sheet in conformance with Specification **A653/A653M**, Coating Designation A1.

3.1.10 *gloss*—the degree to which a painted surface reflects light.

3.1.11 *joiner work*—doors, frames, ceilings, bulkheads, window casings, and all trim pieces in accommodation spaces aboard ship.

3.1.12 *low gloss*—finish that shows a gloss of 25 to 35 when measured with 60° glossmeter. A ceiling gloss is 6 to 16 when measured the same way.

3.1.13 *pretreatment*—usually restricted to mean the chemical treatment of unpaired surfaces before painting.

3.1.14 *smooth*—even surface finish, glass-like to touch.

3.1.15 *textured*—regular or irregular surface finish.

4. Ordering Information

4.1 Unless otherwise specified, a smooth, low-gloss enamel finish will be applied.

4.1.1 Color of enamel top coat.

4.1.2 *Finish*:

4.1.2.1 Smooth.

4.1.2.2 Textured.

4.1.3 *Gloss* (measured with 60° glossmeter):

4.1.3.1 Low gloss—25 to 35.

4.1.3.2 Ceiling gloss—6 to 18.

5. Materials and Manufacture

5.1 *Metal substrate*—This specification is intended for use on metal furniture and joiner work of either steel or aluminum.

5.2 For a smooth, low-gloss finish, the furniture or joiner work manufacturer shall follow the procedures in the order and as listed in Sections 6 through 7.

5.3 If a textured finish is specified, the furniture or joiner work manufacturer shall follow the procedures in the order and as listed in Sections 6 through 8.

6. Cleaning and Degreasing

6.1 All exterior and interior surfaces, both visible and concealed, and all joints shall be thoroughly cleaned and degreased.

6.2 The cleaning/rinsing process shall remove dirt, oil grease, moisture, and other foreign matter.

6.3 No detrimental residue from this process shall remain deposited on any surface.

7. Enameling

7.1 All surfaces contributing to the appearance of the final product shall be enameled to a smooth, low-gloss finish in colors specified in the ordering documents.

7.2 Enamel shall be applied in an amount sufficient to produce a minimum dry film thickness of 1.5 mils (0.0015 in. (38.1 μm)) for joiner doors and frames. For other joiner materials and furniture, 1 to 1.5 mils (0.001 to 0.0015 in. (25.4 to 38.1 μm)) is acceptable.

7.3 The enamel required under this specification shall be a thermosetting type, requiring a high baking schedule for proper cure. This enamel shall satisfy the requirements of Section 9.

8. Texturing (Optional)

8.1 If a textured finish is required by ordering documents, the enamel chosen shall be capable of producing a suitable raised textured finish when using equipment and techniques recommended by the manufacturer.

8.2 All requirements for enameling of the textured finish shall remain as written for the smooth, low-gloss finish except that the gloss shown in 9.2.3.2 shall be 6 minimum to 16 maximum for ceiling panels. Other items may vary according to paint specified.

9. Performance Criteria

9.1 *Test Panel Description*—Test panels shall be 4½ in. (114 mm) minimum width and 7½ in. (191 mm) maximum length of material and thickness as listed below:

9.1.1 *Cold rolled steel sheet*—In accordance with Specification **A1008/A1008M**, USSG 20 gauge 0.0359 in. (0.91 mm) thick.

9.1.2 *Galvannealed steel sheet*—In accordance with Specification **A653/A653M** with coating designation A1, GSG 20 gauge 0.0396 in. (1.01 mm) thick.

9.1.3 *Type 5052-H32 aluminum alloy*—In accordance with Specification **B209/B209M**, 0.040 in. (1.02 mm) thick.

9.2 Prepare test panels for testing, test, and evaluate in accordance with the following requirements:

9.2.1 *Dry Film Thickness*—Measure the total dry film thickness, either prime coat or prime coat plus enamel, on metal test panels or products in accordance with Test Method **D1400**. Where only steel products are being enameled, the dry film thickness shall be measured in accordance with Test Methods **D1186**.

9.2.2 *Primer*:

9.2.2.1 *Preparation of Primer Test Panels*—Clean, pre-treat, and coat two metal test panels with primer on both sides and on all edges in the production cycle. After baking the primed test panels, scribe one side of each panel with two diagonal scribe lines that extend through the prime coat down to the base metal. For scribing, use a sharp instrument and a suitable straightedge. Hold the scribing tool perpendicular to the surface of the test panel, and make two intersecting diagonal scribe marks. Begin each scribe line at a point approximately ½ in. (13 mm) from a corner and continue to a point approximately ½ in. (13 mm) from the diagonally opposite corner. The