



Designation: D3322 – 82 (Reapproved 2005)

Standard Practice for Testing Primers and Primer Surfacer Over Preformed Metal¹

This standard is issued under the fixed designation D3322; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the selection and use of procedures for testing primers and primer surfacers. The test methods included are listed in [Table 1](#).

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- [B117 Practice for Operating Salt Spray \(Fog\) Apparatus](#)
- [C540 Test Method for Image Gloss of Porcelain Enamel Surfaces³](#)
- [D16 Terminology for Paint, Related Coatings, Materials, and Applications](#)
- [D522 Test Methods for Mandrel Bend Test of Attached Organic Coatings](#)
- [D523 Test Method for Specular Gloss](#)
- [D609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and Related Coating Products](#)
- [D610 Practice for Evaluating Degree of Rusting on Painted Steel Surfaces](#)
- [D658 Test Method for Abrasion Resistance of Organic Coatings by Air Blast Abrasive³](#)
- [D660 Test Method for Evaluating Degree of Checking of Exterior Paints](#)

¹ This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.55 on Factory Applied Coatings on Preformed Products.

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³ Withdrawn.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

- [D661 Test Method for Evaluating Degree of Cracking of Exterior Paints](#)
- [D714 Test Method for Evaluating Degree of Blistering of Paints](#)
- [D823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels](#)
- [D870 Practice for Testing Water Resistance of Coatings Using Water Immersion](#)
- [D968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive](#)
- [D1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers](#)
- [D1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base³](#)
- [D1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes](#)
- [D1400 Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base³](#)
- [D1474 Test Methods for Indentation Hardness of Organic Coatings](#)
- [D1640 Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature](#)
- [D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials](#)
- [D1730 Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting](#)
- [D1731 Practices for Preparation of Hot-Dip Aluminum Surfaces for Painting](#)
- [D1732 Practices for Preparation of Magnesium Alloy Surfaces for Painting](#)
- [D1733 Method of Preparation of Aluminum Alloy Panels for Testing Paint, Varnish, Lacquer, and Related Products³](#)
- [D1735 Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus](#)
- [D1737 Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus³](#)
- [D2091 Test Method for Print Resistance of Lacquers](#)
- [D2092 Guide for Preparation of Zinc-Coated \(Galvanized\) Steel Surfaces for Painting³](#)
- [D2197 Test Method for Adhesion of Organic Coatings by Scrape Adhesion](#)

- D2201 Practice for Preparation of Zinc-Coated and Zinc-Alloy-Coated Steel Panels for Testing Paint and Related Coating Products
- D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
- D2246 Test Method for Finishes on Primed Metallic Substrates for Humidity-Thermal Cycle Cracking³
- D2248 Practice for Detergent Resistance of Organic Finishes
- D2454 Practice for Determining the Effect of Overbaking on Organic Coatings
- D2803 Guide for Testing Filiform Corrosion Resistance of Organic Coatings on Metal
- D3170 Test Method for Chipping Resistance of Coatings
- D3359 Test Methods for Measuring Adhesion by Tape Test
- D3456 Practice for Determining by Exterior Exposure Tests the Susceptibility of Paint Films to Microbiological Attack
- 2.2 Federal Test Methods:⁴
 - 141B/6011 Immersion Resistance
 - 141B/6271.1 Mildew Resistance
 - 141B/6321 Sanding Characteristics
- 2.3 U. S. Military Specification:⁴
 - MIL-P-46105 Primer Coating, Weld-Through, Zinc-Rich

3. Terminology

3.1 Definitions:

- 3.1.1 primer, n—the first of two or more coats of paint, varnish, or lacquer system (same as in Terminology D16).
- 3.1.2 primer surfacer, n—a pigmented coating for filling minor irregularities which is sanded to obtain a smooth uniform surface preparatory to applying finish coats. A primer surfacer is not usually applied over a primer.

4. Significance and Use

- 4.1 Primers and primer surfacers may be used over many different surfaces top coated with one or more of a variety of coatings and subjected to many kinds of wear and exposure.
- 4.2 The selection of the tests to be used for any given product or system must be governed by experience and by the requirement agreed upon between the producer and the user.

5. Panel Preparation

- 5.1 Treatment of Substrate—Preparation of test panels should include any cleaning treatment agreed upon between the purchaser and the seller or one of the following ASTM Practices: D609, D1730, D1731, D1732, D2201; Guide D2092; and Method D1733.
- 5.2 Substrate, Film Thickness, and Application Means—Conduct performance tests on the specified substrate on coatings having a film thickness agreed upon between the purchaser and the seller. Primers are generally applied to a dry film thickness of 8 to 38 μm (0.3 to 1.5 mil) and primer surfacers to film thickness of 17 to 50 μm (0.7 to 2.0 mil).

TABLE 1 Test Methods

Property	Section	ASTM Method	Federal Test Method Specification No. 141B
Abrasion resistance:			
Air blast abrasion tester	6.2	D658	...
Falling sand method	6.2	D968	6191
Adhesion:			
Scrape adhesion	6.3	D2197	6303.1
Parallel-groove adhesion	6.3	D2197	6302.1
Tape adhesion	6.3	D3359	...
Chemical resistance:			
Household chemical resistance	6.4.2	D1308	...
Detergent resistance	6.4.3	D2248	...
Hydrocarbon resistance	6.4.4	...	6011
Chip resistance	6.5	D3170	...
Color difference:			
Visual evaluation	6.6	D1729	4249.1
Instrumental evaluation	6.6	D2244	6123
Cracking resistance	6.7	D2246	...
Elongation:			
Conical mandrel	6.8	D522	...
Cylindrical mandrel	6.8	D1737	...
Filiform corrosion	6.9	D2803	...
Gloss	6.10	D523	6101
Hardness	6.11	D1474	...
Holdout	6.12	C540	...
Mildew resistance	6.13	...	6271.1
Outdoor exposure:			
Blistering	6.14.2	D714	6461
Cracking	6.14.2	D661	6471
Rusting	6.14.2	D610	6451
Checking	6.14.2	D660	6421
Print resistance	6.15	D2091	...
Salt spray resistance	6.16	B117	6061
Sanding properties	6.17	...	6321
Water resistance:			
High humidity	6.18.2	D1735	...
Water immersion	6.18.3	D870	...
Weldability	6.19	...	A

^A U.S. Military Specification MIL-P-46105 (MR).

⁴ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.dla.mil.

Unless otherwise agreed upon, apply primers and primer surfacers in accordance with Practices D823.

5.3 Measurement of Film Thickness—Since the properties of the primer or primer surfacer can vary considerably with the thickness of the coating, it is important to know the film thickness. Measure the film thickness in accordance with Test Methods D1400, D1005, or D1186.

5.4 Drying of Primer or Primer Surfacer:

5.4.1 Before tests are run, air dry or bake the primer or primer surfacer according to the schedule and temperature and age as agreed upon between the purchaser and the seller.

5.4.2 Overbake the primer or primer surfacer to determine the time/temperature effect on the physical and chemical properties. Do this in accordance with Practice D2454.

5.4.3 It may be desirable for some reason (handling, stacking, etc.) to determine the various stages and rates of film formation in the drying or curing of primers and primer surfacers at room temperatures. Do this as described in Test Method D1640.

6. Physical Properties of The Dry Film

6.1 Primers and primer surfacers are usually (but not always) topcoated. Therefore, many of the following tests should be run on the complete system (substrate/primer or primer