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Standard Guide for Application and Evaluation of Brush and Roller Applied Paint Films[1]

This standard is issued under the fixed designation D7073; 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 guide describes procedures for the application of brush or roller, or both, applied paint films to sealed wallboard for evaluating application properties.

1.2 Because both the application and panel evaluation are subjective, this guide should be used only for comparative testing within one laboratory using one operator for each set of applications, as the ratings assigned by different laboratories may not agree.

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

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1475 Test Method For Density of Liquid Coatings, Inks, and Related Products

D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials

D3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings

D4707 Test Method for Measuring Paint Spatter Resistance During Roller Application

D5068 Practice for Preparation of Paint Brushes for Evaluation

D5069 Practice for Preparation of Paint-Roller Covers for Evaluation of Architectural Coatings

D5301 Practice for Physical Characterization of Paint Brushes

D5913 Test Method for Evaluation of Cleanability of Paint Brushes

E1347 Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry

2.2 *Other Document:*

Pictorial Standards of Paint Roller Spatter, shown in the *Pictorials Standards of Coating Defects*[3]

3. Summary of Guide

3.1 The test paints are applied with either a brush or a roller at an agreed upon spreading rate onto sealed test panels using both one and two coat applications and after drying, the panels are evaluated for various application properties.

4. Significance and Use

4.1 Laboratory measurement of application properties of architectural coatings generally employ a blade-type applicators that lay down films of highly uniform thickness. Applicators, such as brushes and rollers, typically apply films that lack uniformity due to variations in rheology, film build, flow and leveling properties resulting in the practical hiding of most paints being less than that measured on films applied with a blade-type applicator. This guide provides an indication of the actual application properties of the paint, as applied by a contractor or consumer.

5. Apparatus

5.1 *Container,* to hold paint, for example, a quart can.

5.2 *Good Quality Paint Brush,* 50 to 100 mm (2 to 4 in.) in width with a chiseled tip.

NOTE 1—The applicator should be aware that a brush can be a mixture having several chemically different filaments or bristles, or both, in several cross sections, with different thickness and length. Use the same type and make of paint brush for all applications. See Practice D5301 for guidance.

5.3 *Good Quality Paint Roller,* typically 75 to 225 mm (3 to 9 in.) in length.

NOTE 2—Rollers constructed from woven fabric with a short nap 4.8 to

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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] Available from Federation of Societies for Coatings Technology (FSCT), 492 Norristown Rd., Blue Bell, PA 19422-2350, http://www.coatingstech.org.

6.4 mm (3⁄16 to 1⁄4 in.) are used in typical laboratory testing of interior paints.

NOTE 3—It is critical for proper performance to break-in the brush or roller before application following procedures outlined in Practice D5068 or D5069. Until a brush or roller cover is broken-in (saturated with paint), only part of the paint loaded onto the applicator can be transferred to the surface being painted.

5.4 *Paint Tray.*

5.5 *Paint Roller Frame,* of the same size as the paint-roller cover being used.

5.6 *Balance,* to weigh brush to the nearest 0.1 g.

5.7 *Weight/Gallon Cup,* or any other type of pycnometer suitable for determining paint density to 0.1 lb/gal.

5.8 *Spray Gun,* any commercially available and typically used to spray paint walls.

6. Materials

6.1 *Test Paints.*

6.2 *Paint-Out Panels,* typically laminated fiberboard or upson/universal board a minimum of 610 by 610 mm (24 by 24 in.) or preferably larger, with at least one smooth side. The size and type of test panel to be used will be governed by the brush/roller size and intended use of the paint. Alternately, a 1220 by 1220 mm (48 by 48 in.) panel of paper-faced gypsum wallboard can be used.

6.3 *Latex-Base Primer,* as agreed upon by user or recommended by manufacturer of the paints.

6.4 *Masking Tap, Clamps or any Suitable Fastener,* to secure the panel to a flat surface.

6.5 *Control Paint* (optional)—Since there are no standard panels, photographs, or paints for this practice, an agreed-upon paint of know application properties can be included with the test paints as a control.

7. Sampling and Conditioning

7.1 Sample test paint in accordance with Practice D3925.

7.2 Condition the test paints in accordance with Conditioning and Testing section of Specification D3924.

7.3 All testing should be performed under the same conditions.

8. Panel Preparation

8.1 Apply the latex primer, preferably by spray, to the entire face of a smooth side of the test panel so as to coat it uniformly at a spreading rate of approximately 11 m^2/L (450 ± 25 ft^2/gal) or as recommended by the manufacturer. An alternative method used is to leave between 1⁄4 or 1⁄3 of the bottom area of the panel unprimed to evaluate the effects of painting over primed and unprimed areas.

NOTE 4—Typically a portion of the primer paint is tinted to a gray color having a reflectance of approximately 30 ± 5 units as measured with a reflectometer in accordance with Test Method E1347. A white primer can typically be tinted with a water-based universal black colorant using approximately 2 % by weight of colorant to a quart of the primer. A 3 in. stripe of the tinted primer is applied by roller across the width of the test panel in the center of the primed area. This is the section that can be used for the visual evaluation of practical or wet hiding.

8.2 Air dry and examine the panel for uniformity of the primer application. If the appearance of the panel is satisfactory, proceed with the application of the test paints.

8.3 Mount and secure the primed panel in a vertical position at a convenient height with the length of the panel horizontal to a surface that is vertical or within 5° of vertical (top sloping away from the operator).

9. Application of Paint Films

9.1 After the brush or roller has been properly broken-in (see Note 3), the test paint may be applied either following the manufacturer's recommended spreading rate, or using the same spreading rate for all paints under test or according to agreement between purchaser and user. A spreading rate of 11.0 m^2/L (400 ± 25 ft^2/gal) is suggested if there is no other preference.

NOTE 5—Paints may also be applied freely until the gray stripe on the test panel is visually covered (wet hide). Report the amount of paint needed to obtain wet hide and the spreading rate to obtain wet hiding as shown below.

9.2 Apply the paint to the entire panel. Note the ease of application of the test paint. Also note any foaming and spattering of the paint when using a roller. Determine the density of the test paint using a pycnometer (weight per gallon cup) following procedures outlined in Test Method D1475. After recording the amount of paint applied to the test panel and report the spreading rate, calculated as follows:

$$\text{Spreading Rate } (\text{ft}^2/\text{gal}) = \frac{454 \times \text{Density of Test Paint } (\text{lbs/gal}) \times \text{Area of Panel } (\text{in.}^2)}{144 \times \text{g Applied}} \quad (1)$$

9.3 The test paint is allowed to dry and then a second coat is applied to an area on the right side of the panel, typically about 1⁄3 the area of the panel. Before the second coat is dried, typically about 10 min, a 6 in. wide stripe is applied covering 3 in. of the one coat and 3 in. of the two coat areas. This technique is meant to evaluate the lap properties of the paint encountered when a painter stops painting and then continues. (See Fig. 1.)

9.4 Allow the panel to dry overnight. Apply the paint, typically by brush, to a 4 square inch area on the two-coat area of the panel. This technique is meant to evaluate the touch-up properties of the paint, simulating when a painter needs to touch-up an area that was missed the next day.

9.5 Allow the panel to dry overnight and rate the panel for the following properties, using the rating scale as outlined in the ASTM Standardized Scoring Scheme (see 9.6):

Ease of Application
Foaming (roller only)
Spatter (roller only) – See Note 7
Practical Hiding (over one coat area)
Leveling
Sheen/Gloss Uniformity – See Note 6
  One Coat versus Two Coat Areas
  Primed versus Unprimed Areas
  Lap Area
  Touch-up Area

NOTE 6—Visual evaluations should be conducted with the same light source and preferably at the same viewing angle. View low gloss finishes at a 5° angle to the plane of the panel (85° to the normal) looking toward

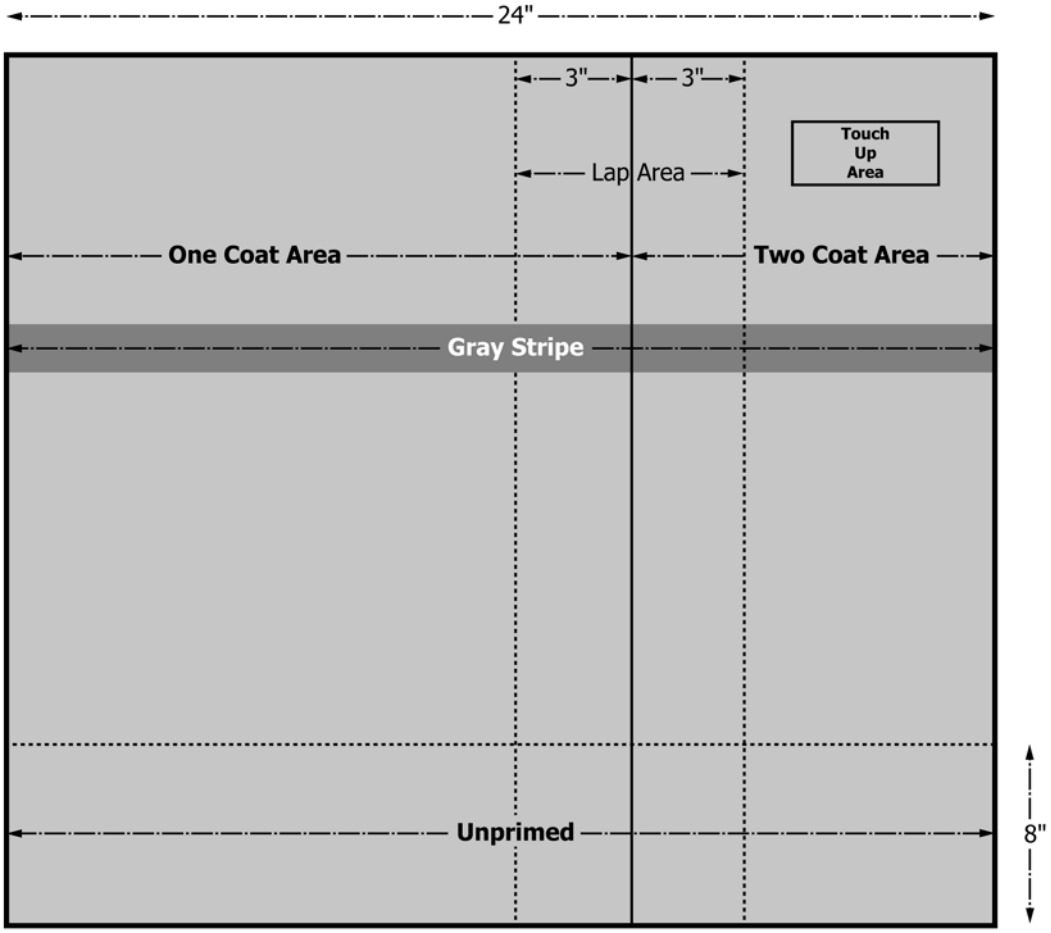

FIG. 1 Test Panel Application

a strong light source. View gloss or semi-gloss coatings at 30° to the panel (60° to the normal).

NOTE 7—Typically, paper of convenient size to which the spatter droplets will adhere and of a color to contrast that of the paint under test is either attached to the roller handle or placed under the application panel as catch paper. The frequency and density of the spatter droplets are scored using the ASTM Standardized Scoring Scheme. A more quantitative method of evaluating spatter resistance of paints can be found in Test Method D4707.

9.6 The above properties are rated in accordance with the ASTM Standardized Scoring Scheme (Note 6) shown below, where 10 is perfect or no effect and 0 indicates complete failure.

Rating or Score	Effect/Change
10	None
8	Trace
6	Slight
4	Moderate
2	Severe
0	Complete Failure

9.7 Before application of another paint, the brush should be properly cleaned following procedures outlined in Test Method D5913. New unused similar roller covers are preferable for each test.

10. Keywords

10.1 application; paint brush films; paint roller films

APPENDIX

(Nonmandatory Information)

X1. BRUSH APPLICATION PROPERTIES

X1.1 The choice of applicator used in a laboratory test involving brushouts to evaluate various paint properties such as leveling or hiding can have a profound effect on the results obtained. Applicators can begin to understand about the probable performance of a brush by reviewing Practice D5301. Brush performance is affected by the way that the filament tips are shaped such as flat, dome shaped or chiseled to a tip. Filaments themselves can be tipped or flagged, or both, and level or tapered. Filaments come in a variety of shapes and compositions. The amount and type of this "finishing" will affect brushout performance. Always use the highest quality paint brush when performing any laboratory tests.