



Designation: D2486 – 17

Standard Test Methods for Scrub Resistance of Wall Paints¹

This standard is issued under the fixed designation D2486; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods cover a procedure for determining the resistance of wall paints to erosion caused by scrubbing, referred to herein after as “scrub resistance.”

1.2 Two test methods are covered as follows:

1.2.1 *Test Method A*—Cycles-to-failure obtained on test paint.

1.2.2 *Test Method B*—Ratio expressed as a percentage of cycles-to-failure obtained on the test paint to that obtained on a concurrent run with a known reference paint.

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.*

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

D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials (Withdrawn 2016)³

¹ These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.42 on Architectural Coatings.

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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.

D4213 Test Method for Scrub Resistance of Paints by Abrasion Weight Loss

3. Summary of Test Method

3.1 In Test Method A, the test paint is applied to a black plastic panel. After curing, the coated panel is placed over a 12.7 wide by 0.25-mm thick (1/2-in. by 10-mil) shim and held in place on a drawdown plate in a washability machine by means of a gasketed frame. The coated panel is then scrubbed with a bristle brush and an abrasive scrub medium until the paint film is removed in one continuous thin line across the shim.

3.2 In Test Method B, the test paint and a reference paint are applied simultaneously perpendicular to the length of the black plastic panel. After curing, the coated panel is placed over two 12.7 by 0.25-mm (1/2-in. by 10-mil) shims that are positioned under each coating. The coatings are then scrubbed with a bristle brush and an abrasive scrub medium until each paint film is removed in one continuous thin line across its own shim.

4. Significance and Use

4.1 Paints often become soiled, especially near doorways, windows, and in work and play areas. These test methods cover the determination of the relative resistance of different paints to erosion when repeatedly scrubbed during the life of the paint.

4.2 Test Method D4213 is a similar scrub resistance test using a weight-loss technique and reporting volumetric film erosion rates.

4.3 Test Method A measures scrub resistance by the traditional cycles-to-failure concept. Poor correlation in scrub testing can be attributable to among other things variations in the stiffness of the brush bristles, condition of washability tester, application and drying conditions. In an attempt to improve reproducibility, Test Method B has been developed.

5. Apparatus

5.1 *Straight Line Washability Machine.*

5.1.1 Accessory Apparatus: (see Figs. 1 and 2).

5.1.1.1 *Nylon Bristle Brush and Accessories*, (total weight 454 ± 10 g).

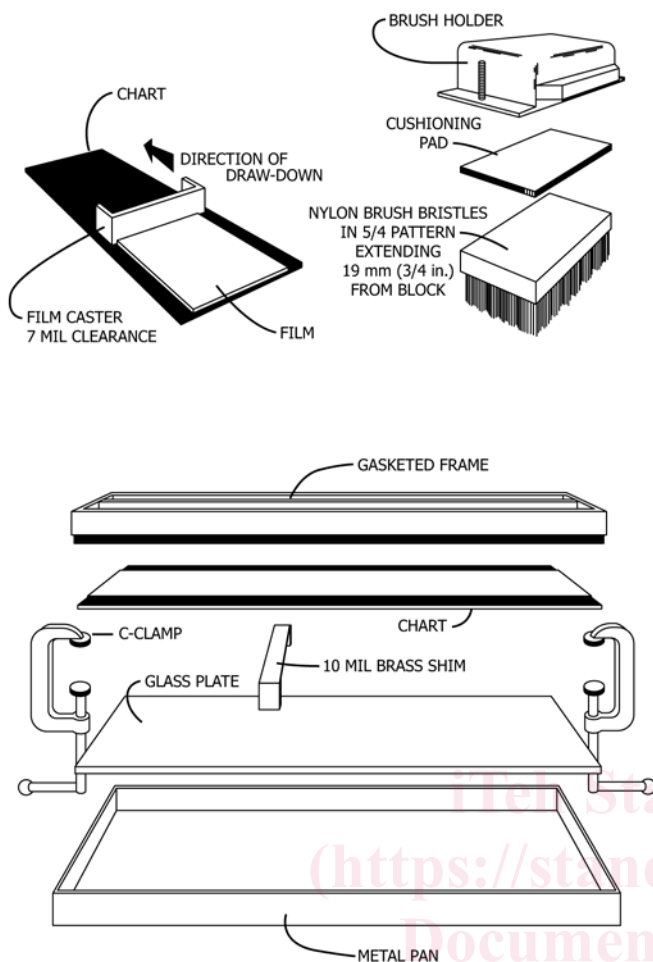
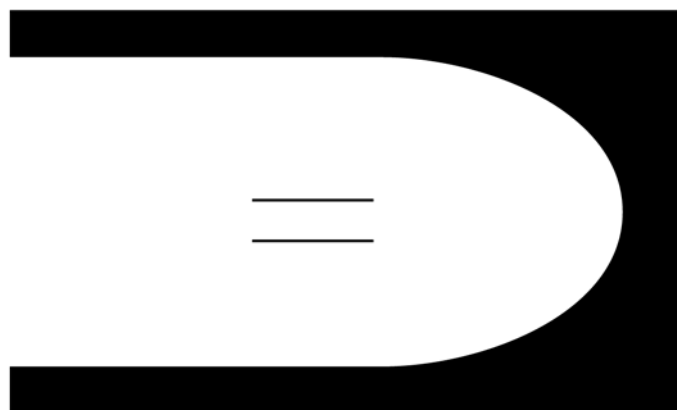
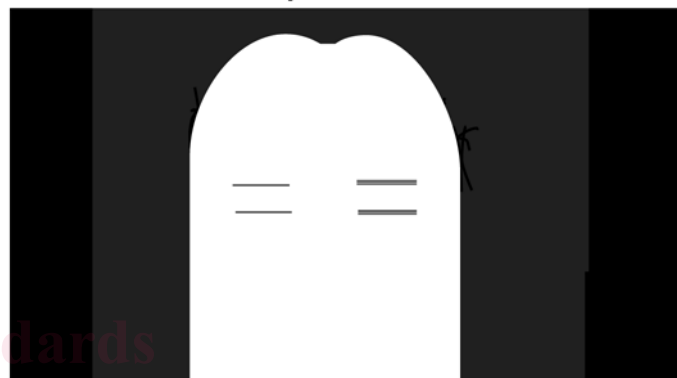


FIG. 1 Accessory Apparatus for Scrub Test



Test Method A: Cycles to Failure on Test Paint



Test Method B: Ratio of Cycles to Failure of Test Paint and Reference Paint

FIG. 2 Accessory Apparatus for Scrub Test

5.1.1.2 *Drawdown Plate*, 454 by 165 by 6.3 mm (17 $\frac{7}{8}$ by 6 $\frac{1}{2}$ by $\frac{1}{4}$ in.).

5.1.1.3 *Brass Shims*, 12.7- by 0.25-mm ($\frac{1}{2}$ -in. by 10-mils). Its length can be fitted to the width of the drawdown plate.

5.2 *Film Applicator*, having 0.18-mm (7-mil) clearance and 6.25-mm ($\frac{1}{4}$ -in.) edge and width of 135 mm (5 $\frac{1}{4}$ -in.).

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests.

6.2 *Black Plastic Panels*.^{4,5}

6.3 *Abrasive Scrub Medium*.^{5,6}

6.3.1 Laboratory standardized abrasive scrub medium consisting of the following:

⁴ Dull black plastic panels, P-121-10N, 165 by 432 by 0.25 mm (6 $\frac{1}{2}$ by 17 in. by 10 mils) manufactured by The Leneta Co., 15 Whitney Rd., Mahwah, NJ 07430 were used in the original development of this standard in order to get the results in these test methods.

⁵ If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

⁶ The sole source of supply of the abrasive scrub medium known to the committee at this time is The Leneta Company.

Water, distilled or deionized	grams
Hydroxyethyl cellulose ^{5,7}	49.4 ^A
Ammonium hydroxide, 28 %	0.8
Detergent ^{5,8}	0.1
Trisodium phosphate, anhydrous	2.0
Silica ^{5,9}	2.0
Acetic acid (glacial)	45.0
Preservative ^{5,10}	0.7 ^B
	0.03g

^A Adjust to achieve viscosity of 110 to 120 Krebs units before use.

^B Vary to achieve a pH of 9.5 to 10.

6.4 Reference paint when using Test Method B.

7. Preparation of Apparatus

7.1 *Washability Machine*—The straight line washability machine should be leveled before use and operated at 37 ± 1 cycles per minute.

⁷ Cellosize QP-4400H, The Dow Chemical Company, Midland, Michigan, was used in developing the Precision and Bias statement. Other equivalent molecular weight cellulosic thickeners can be used such as Natrosol 250 MR, Ashland Aqualon, Wilmington, Delaware.

⁸ The sole source of supply of the Triton X-100 detergent known to the committee at this time is The Dow Chemical Company, Midland, Michigan.

⁹ The following silica is recommended by this Subcommittee and is used in commercially available abrasive scrub media. It is also known to be used by companies who blend their own abrasive scrub media: Imasil 1240, manufactured by Unimin Specialty Minerals Inc., 258 Elm St., New Canaan, CT 06840.

¹⁰ The preservative package recommended is BIT, 1,2-Benzisothiazol-3(2H)-one. There are several suppliers who offer BIT-based agents.