



Designation: D 2486 – 00

Standard Test Methods for Scrub Resistance of Wall Paints¹

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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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 3924 Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials²

D 4213 Test Method for Scrub Resistance of Paints by Abrasion Weight Loss²

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 ($\frac{1}{2}$ -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 ($\frac{1}{2}$ -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 D 4213 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).

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*.^{3,4}

6.3 *Abrasive Scrub Medium*.^{4,5}

6.3.1 Laboratory standardized abrasive scrub medium consisting of the following:

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

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² *Annual Book of ASTM Standards*, Vol 06.02.

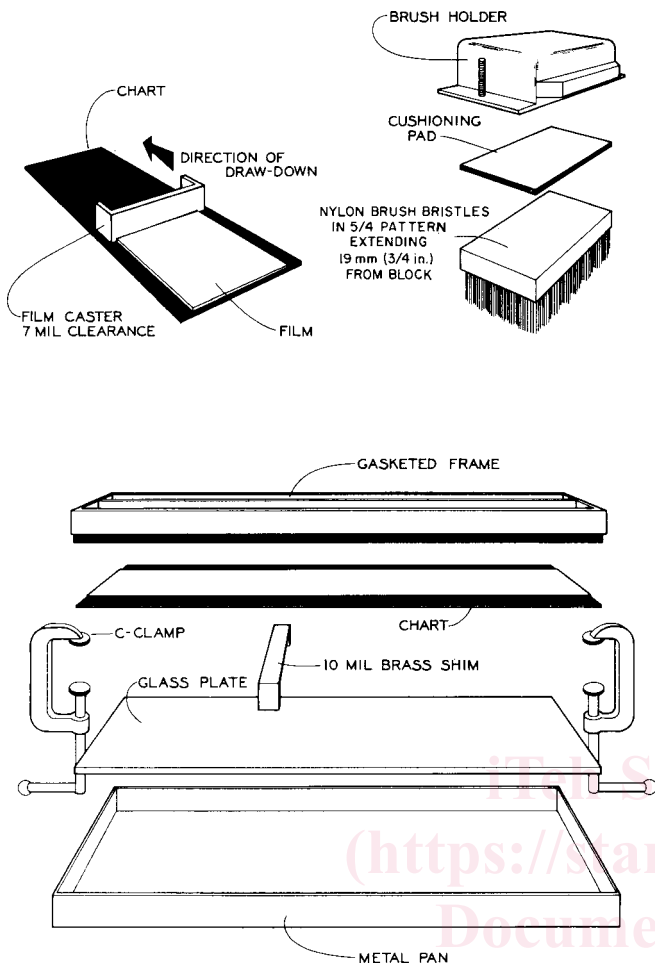


FIG. 1 Accessory Apparatus for Scrub Test

	grams
Water, distilled or deionized	49.4 ^A
Hydroxyethyl cellulose ^{4,6}	0.8
Ammonium hydroxide, 28 %	0.1
Detergent ^{4,7}	2.0
Trisodium phosphate, anhydrous	2.0
Silica ^{4,8}	45.0
Acetic acid (glacial)	0.7 ^B
Preservative ^{4,9}	0.1

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

^BVary to achieve a pH of 9.5 to 10.

³ Dull black plastic panels, P-121-10N, 165 by 432 by 0.25 mm (6 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.

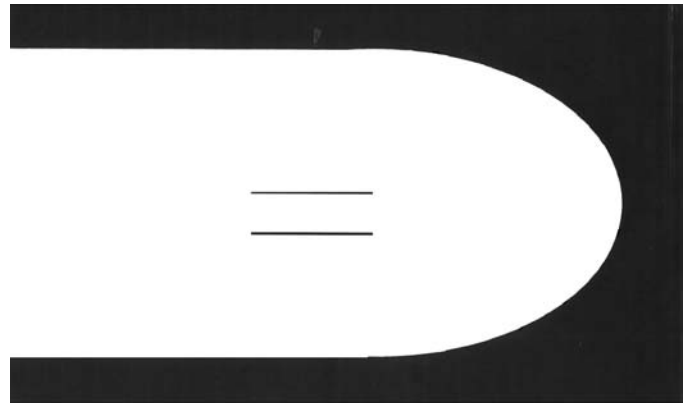
⁴ If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

⁵ The sole source of supply of the abrasive scrub medium known to the committee at this time is the Leneta Company.

⁶ The sole source of supply of cello size OP-4400, viscosity grade of HEC, known to the committee at this time is Union Carbide, Polymer Division, 318-24 Fourth Ave., So. Charleston, WV 25303.

⁷ The sole source of supply of the Triton X-100 detergent known to the committee at this time is Union Carbide, 10235 W. Little York Road, Suite 300, Houston, TX 77040.

⁸ The sole source of supply of the Tamsil 45, known to the committee at this time is Unimin Specialty Minerals Inc., 258 Elm St., New Canaan, CT 06840.



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

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.

7.2 *Brush*—Replace the brush when the bristles have become worn to a point that the bristles extend less than 15 mm (5/8 in.) from the block. Mark the ends of the brush to ensure it is oriented in the same direction for each use.

7.2.1 *Brushes (that are in frequent use)*—Brushes that are in frequent use shall be stored in water. Each time before starting the first test of the day, remove the brush and rinse in water, then precondition the brush, by running it for 400 cycles on a scrub panel, after which it is ready for test work.

7.2.2 *Brushes (that are not in regular use)*—Brushes that will not be used on a regular basis shall be washed out thoroughly in water after their last use and stored with the bristling side up under ambient conditions. Before being used again, the brush should be soaked in water for at least 24 h. Precondition the brush as directed in 7.2.1 before starting the test work.

7.3 *Brush Holder*—For washability testers that include a separate brush holder, insert a 3.2-mm (1/8-in.) thick rubber mat

⁹ The sole source of supply of the 1.3.5-triethyl hexahydro-sym-triazine (Vancide TH), known to the committee at this time is R. T. Vanderbilt Co., 30 Winfield St., Norwalk, CT 06855.