



Designation: D4213 – 24

Standard Test Method for Scrub Resistance of Paints by Abrasion Weight Loss¹

This standard is issued under the fixed designation D4213; 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 test method covers an accelerated procedure for determining the resistance of paints to erosion caused by scrubbing. (Note: The term *wet abrasion* is sometimes used for scrubbing, and *wet abrasion resistance* or *scrubbability* for scrub resistance.) Although scrub resistance tests are intended primarily for interior coatings, they are sometimes used with exterior coatings as an additional measure of film performance.

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

1.4 *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

D562 Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer

D1193 Specification for Reagent Water

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

D2486 Test Methods for Scrub Resistance of Wall Paints

D3450 Test Method for Washability Properties of Interior

Architectural Coatings

D3980 Practice for Interlaboratory Testing of Paint and Related Materials (Withdrawn 1998)³

D4828 Test Methods for Practical Washability of Organic Coatings

E70 Test Method for pH of Aqueous Solutions With the Glass Electrode

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Summary of Test Method

3.1 The material under test is applied to a black plastic scrub test panel, and after drying one week, a section of the test panel is placed in a straight-line abrasion tester, adjacent to a similar section of a standard calibration panel. The two sections are scrubbed simultaneously to produce essentially identical abrasion experiences, and the amount of erosion loss in each section determined from the panel weights before and after scrubbing.

3.2 The scrub resistance on a dry-film basis is calculated as the percent ratio of the weight loss of the calibration panel to that of the test panel. From that value, scrub resistance is calculated on the basis of both dry- and wet-film volume.

4. Significance and Use

4.1 Interior paint films often become soiled, especially near doorways, windows, and play areas, and frequently need to be cleaned by scrubbing. This test method covers the determination of the relative resistance of paints to erosion when scrubbed.

4.2 The precision of scrub resistance measurements in absolute physical values, such as Test Methods D2486 (cycles-to-failure or this test method, microlitres per 100 cycles), is poor due to the relatively large effect of subtle and difficult-to-control variables in test conditions. The test method described herein minimizes this problem by using a standard calibration panel as an integral part of each scrubbing operation and relating its weight loss to that of the paint film under test to establish the latter's scrub resistance.

¹ This test method is under the jurisdiction of ASTM Committee D01 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 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.