



Designation: D870 – 25

Standard Practice for Testing Water Resistance of Coatings Using Water Immersion¹

This standard is issued under the fixed designation D870; 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 basic principles and operating procedures for testing water resistance of coatings by the partial or complete immersion of coated specimens in distilled or de-mineralized water at ambient or elevated temperatures. Although the apparatus and procedure could be employed in immersion tests using solutions of various materials in water, this practice is limited to tests in water alone.

1.2 This practice is limited to the methods of obtaining, measuring, and controlling the conditions and procedures of water immersion tests. It does not specify specimen preparation, specific test conditions, or evaluation of results.

NOTE 1—Alternative practices for testing the water resistance of coatings include Practices [D1735](#), [D2247](#), and [D4585](#).

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, health, and environmental 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

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 [D01.27](#) on Accelerated Testing.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[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

[D714](#) Test Method for Evaluating Degree of Blistering of Paints

[D823](#) Practices for Producing Films of Uniform Thickness of Paint, Coatings and Related Products on Test Panels

[D888](#) Test Methods for Dissolved Oxygen in Water

[D1193](#) Specification for Reagent Water

[D1654](#) Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

[D1730](#) Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting

[D1735](#) Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus

[D2247](#) Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity

[D2616](#) Test Method for Evaluation of Visual Color Difference With a Gray Scale

[D3359](#) Test Methods for Rating Adhesion by Tape Test

[D3363](#) Test Method for Film Hardness by Pencil Test

[D4541](#) Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

[D4585](#) Practice for Testing Water Resistance of Coatings Using Single-Sided Controlled Condensation

3. Summary of Practice

3.1 Coated specimens are partially or completely immersed in water in a container that is resistant to corrosion. The exposure conditions are varied by selecting: (a) the temperature of the water, and (b) the duration of the test. Water permeates the coating at rates that are dependent upon the characteristics of the coating and upon the temperature of the water. Any effects such as color change, blistering, loss of adhesion, softening, or embrittlement are observed and reported.

4. Significance and Use

4.1 Immersion in water can cause the degradation of coatings. Knowledge on how a coating resists water immersion is helpful in predicting its service life. Failure in a water

*A Summary of Changes section appears at the end of this standard