Designation: D5401 – 03 (Reapproved 2022)

Standard Test Method for Evaluating Clear Water Repellent Coatings on Wood[1]

This standard is issued under the fixed designation D5401; 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 evaluates the effectiveness of clear water repellent coatings on wood before or after exterior exposure.

1.2 Intralaboratory results with this test method can be used to compare the effectiveness of clear water repellent coatings. The agreement between results obtained in different laboratories may be less satisfactory unless a known water repellent is used as a reference.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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]

D358 Specification for Wood to Be Used as Panels in Weathering Tests of Coatings (Withdrawn 2014)[3]

D1006 Practice for Conducting Exterior Exposure Tests of Hand and Factory Applied Paints on Wood and Wood Composite Materials

D1193 Specification for Reagent Water

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

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *clear water repellent coating, n*—a transparent coating formulated for the purpose of protecting porous substrates by preventing the penetration of liquid water.

4. Summary of Test Method

4.1 Five Ponderosa pine specimens are treated with the clear water repellent under test and allowed to dry for seven days. Five untreated specimens serve as controls. The treated and untreated specimens are each weighed and then allowed to float in water for 30 min. The specimens are removed, the excess water is wiped off, and each are reweighed. The effectiveness of the water repellent coating is then calculated.

5. Significance and Use

5.1 Water is known to penetrate wood substrates, causing dimensional instability and eventual deterioration. Clear water repellent coatings are designed to protect wood from damaging effects of water. This test method is used to evaluate the effectiveness of water repellent coatings on wood soon after application or after long-term exterior exposure.

6. Apparatus

6.1 *Conditioning Room or Chamber,* having a controlled temperature of 73.5 °F ± 3.5 °F (23 °C ± 2 °C) and a controlled relative humidity of 50 % ± 5 % as described in Specification D3924. This is used to establish a uniform moisture content in the test specimens and during the test.

6.2 *Balance,* accurate to at least 0.1 g.

6.3 *Saw,* sharp, fine-toothed, with a minimum of ten teeth/in. to obtain a smooth surface on the test specimen.

7. Reagents and Materials

7.1 *Purity of Water*—Unless otherwise clearly indicated, references to water shall be understood to mean reagent water as defined by Type IV of Specification D1193.

[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.

Current edition approved Dec. 1, 2022. Published December 2022. Originally approved in 1993. Last previous edition approved in 2014 as D5401 – 03 (2014). DOI: 10.1520/D5401-03R22.

[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.