



Designation: D 3459 – 98

Standard Test Method for Humid-Dry Cycling for Coatings on Wood and Wood Products¹

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1. Scope

1.1 This test method covers the evaluation of coatings designed for use on interior wood and wood products substrates by exposure alternately to low and high humidity at an elevated temperature.

1.2 This test method is applicable to any coated material or product that is affected either entirely or partly by changes in atmospheric relative humidity.

1.3 This test method applies only to those coatings applied in sufficient quantity to form a continuous film.

1.4 The values stated in the inch/pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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 714 Test Method for Evaluating Degree of Blistering of Paints²

D 1005 Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers²

D 2691 Test Methods for Microscopical Measurement of Dry Film Thickness of Coatings on Wood Products³

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens⁴

3. Significance and Use

3.1 Wood substrates and the coatings applied to them expand and contract to different degrees as the humidity

changes, causing stresses that may produce checks, cracks, splits, blisters, swelling, loss of adhesion, and various changes in surface appearance. This test method is intended for use where the coating is applied in sufficient quantity to form a continuous film on the wood or wood product substrate. It is not possible to make any direct correlation between the results obtained from humid/dry cycling and the results expected in a specific period of time in service because of variations resulting from geographic locations, location within the building, care of the panel (such as waxing), and variations within materials involved.

4. Test Panels and Panel Preparation

4.1 Test panels shall be regular production finished panels if available.

4.2 If regular production finished panels are not available the purchaser and the seller shall agree upon the following variables: type of wood or wood substrate, sanding method(s) and paper(s), sealer(s) or toner(s), filler(s), stain, primer or basecoat, print(s), and topcoat(s), methods of application, and the number of surfaces to be coated. If rotary-cut veneered panels are used, it should also be agreed whether the veneer is to be open or close faced.

5. Apparatus

5.1 *Oven*—a gravity-convection or forced-ventilation electrically heated oven meeting the requirements of Specification E 145 and providing a continuous temperature of $122 \pm 3.5^\circ\text{F}$ ($50 \pm 2^\circ\text{C}$).

5.2 *Constant Elevated-Temperature and Constant-Humidity Chamber*, maintained at a relative humidity of $97 \pm 2\%$ and a temperature of $122 \pm 3.5^\circ\text{F}$ ($50 \pm 2^\circ\text{C}$).

5.3 *Constant-Temperature and Constant-Humidity Chamber*, maintained at a relative humidity of $50 \pm 5\%$ and a temperature of $73.5 \pm 3.5^\circ\text{F}$ ($23 \pm 2^\circ\text{C}$).

6. Test Specimens

6.1 Test specimens shall be large enough to be representative of the material or product and to permit easy observation of possible defects. This usually means a minimum area of approximately 12 by 12 in. (300 by 300 mm).

¹ This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D 01.52 on Factory-Coated Wood Products.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ Discontinued; see 1992 *Annual Book of ASTM Standards*, Vol 06.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.