Designation: D7306 – 07 (Reapproved 2017)

Standard Practice for Testing Low Temperature Film-Formation of Latex Paints by Visual Observation[1]

This standard is issued under the fixed designation D7306; 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 specifies a laboratory procedure for evaluating the ability of a latex paint to form a uniform film free of visible defects at low temperatures.

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 and health 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]

D823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels

D3793 Test Method for Low-Temperature Coalescence of Latex Paint Films by Porosity Measurement (Withdrawn 2012)[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *low temperature coalescence (LTC), n*—the ability of a latex paint to form a film at low temperatures, typically 4 ± 2°C (39 ± 4°F).

4. Summary of Practice

4.1 The paint, applicator and the test panel are allowed to equilibrate for at least 4 h at 4 ± 2°C (39 ± 4°F). The test paint is applied to a part-sealed/part-unsealed drawdown chart and immediately placed in a cold cabinet.

4.2 After 18 h the panel is removed from the cold cabinet and evaluated for any cracking of the paint film.

NOTE 1—Temperature of film formation testing may be altered upon mutual consent of all parties involved.

5. Significance and Use

5.1 This practice can be used by paint formulators to determine if a given paint has the ability to form a film at low temperatures. This practice can be used as an aid for determining coalescing solvent level required to form a good film. Test Method D3793 compares the porosity of a film drawn down at room temperature to another film drawn down and cured at low temperature.

5.2 This practice provides no absolute information, rather ranking only of the selected series of paints.

5.3 This practice can provide a pass-fail situation if known acceptable and unacceptable paints are included in the test.

6. Apparatus and Materials

6.1 *Vacuum Plate.*

6.2 *Paint Test Chart* with sealed and unsealed evaluation areas.[4]

6.3 *Paint Applicator(s),* typically to apply 3 and 10 mil wet film thickness of paint with higher thickness being more severe.

6.4 *Cold Cabinet,* maintaining 4 ± 2°C (39 ± 4°F) or a different temperature as agreed upon.

[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 D01.42 on Architectural Coatings.

Current edition approved June 1, 2017. Published June 2017. Originally approved in 2007. Last previous edition approved in 2013 as D7306 – 07 (2013). DOI: 10.1520/D7306-07R17.

[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.

[4] Paint test charts selected for use should be from a sole supply across the experiment to ensure accurate comparisons between test samples.

6.5 *Instrument,* to record relative humidity (typically 20 to 100 %).

NOTE 2—Variation in humidity can have impact on film formation.

6.6 *4X – 12X Magnifying Glass,*

6.7 *Test Paint.*

7. Procedure

7.1 Place the applicator, paint, and test panel in a cold cabinet and equilibrate for 4 h at 4 ± 2°C (39 ± 4°F), or as agreed upon.

7.2 Secure a paint test chart with sealed and un-sealed areas on a vacuum drawdown plate.

7.3 After mixing the paint sample, draw down the paint uniformly using a straight bar applicator as in Practices D823.

7.4 Immediately place the panel into the cold cabinet.

7.5 After 18 h, remove the panel for evaluation as outlined in 8.2.

NOTE 3—This practice can be conducted at several thicknesses in order to obtain a better understanding of low temperature film performance. Thicker films tend to increase the likelihood of cracking.

NOTE 4—Variations in airflow within the cold cabinet can affect results.

8. Report

8.1 Examine the dried film for continuity under a magnifying glass. Report the degree of cracking over the sealed surface and the unsealed surface. Disregard cracking on the periphery of the dried film.

8.2 Rating system for each surface should be as follows:

5 = No cracking
4 = Slight cracking (visible with magnifying glass only)
3 = Some cracking (just visible with eye)
2 = Moderate cracking
1 = Severe cracking
0 = Film chips off completely

8.3 Add the ratings of the sealed and unsealed portions together to obtain a total rating from 0 to 10 for the applied paint.

8.4 Record humidity during the drying period.

NOTE 5—Changes in visual gloss may also indicate poor film formation.

9. Keywords

9.1 coalescence; cracking; film formation; latex paint; low temperature