Designation: D4708 – 19

Standard Practice for Preparation of Uniform Free Films of Organic Coatings[1]

This standard is issued under the fixed designation D4708; 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 preparation of free films of organic coatings for use in determining the physical properties of the coatings.

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]

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

D1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers

D1653 Test Methods for Water Vapor Transmission of Organic Coating Films

D2370 Test Method for Tensile Properties of Organic Coatings

D5590 Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay

E96/E96M Test Methods for Water Vapor Transmission of Materials

3. Summary of Test Method

3.1 Free films are prepared by depositing a uniform wet coating of the test material on a release substrate. The applied films are dried or baked, cut into appropriate size for the intended physical property test, and then stripped from the release substrate.

4. Significance and Use

4.1 Free films are required for conducting tests to evaluate physical and mechanical properties such as tensile and elongation (Test Methods D2370), moisture vapor permeability (Test Methods D1653 and E96/E96M), microbiological activity resistance (Test Method D5590), and other physical properties of organic coatings where the substrate may interfere with the determination.

5. Apparatus and Materials

5.1 *Equipment,* for applying films of uniform thickness as described in Practices D823.

5.2 *Micrometer Film Thickness Gage,* as described in Test Method D1005.

5.3 *Release Substrates,* any film releasing flat substrate which does not alter film properties and which allows the casting of coating films with a uniform thickness. Examples of suitable substrates are as follows:

5.3.1 *Sheet of FEP—(polyhexafluoropropylene).*

5.3.2 *Sheet of Silicone Coated Paper,* preferably 125-µm (5-mil) thick.

5.3.3 *Glass Plates,* coated with halosilane compound.

5.3.4 *Steel Panel*—Wrapped with polyvinyl fluoride film, preferably 25 to 50–µm (1 to 2 mils) thick.

5.3.5 *Flat Panel*—Coated with release agent.

5.3.6 *Polytetrafluoroethylene Sheet* (with or without glass fiber reinforcement) wiped with diluted surfactant solution as needed.

5.3.7 *Polyethylene Film* preferably 50 µm in thickness, wrapped around a glass sheet.

5.4 *Surfactant Solution*—Diluted surfactant solution. Fluorinated surfactants are preferred due to their high efficiency.

NOTE 1—Solution comprising 0.5 to 1 % fluorinated surfactant in isopropyl alcohol was found to be suitable for some coatings. Check that the use of surfactant does not alter the coating film properties to be tested.

[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 D01.23 on Physical Properties of Applied Paint Films.

Current edition approved March 1, 2019. Published August 2019. Originally approved in 1987. Last previous edition approved in 2012 as D4708 – 12. DOI: 10.1520/D4708-19.

[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.

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