



Designation: D 4708 – 99

## Standard Practice for Preparation of Uniform Free Films of Organic Coatings<sup>1</sup>

This standard is issued under the fixed designation D 4708; 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 approval. A superscript epsilon ( $\epsilon$ ) 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. Procedures are given for preparing free films on four alternative substrates. These substrates are dental foil, treated FEP (fluorinated ethylene-propylene) sheet, silicone coated paper, and halo-silane coated glass plates.

1.2 *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.* A specific hazard statement is given in 6.1.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 823 Test Methods for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels<sup>2</sup>
- D 1005 Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers<sup>2</sup>
- D 1653 Test Methods for Water Vapor Transmission of Organic Coating Films<sup>2</sup>
- D 2370 Test Method for Tensile Properties of Organic Coatings<sup>2</sup>

### 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 properties such as tensile and elongation (Test Method

D 2370), moisture vapor permeability (Test Methods D 1653), and other physical properties of organic coatings where the substrate may interfere with the determination.

4.2 The tin foil/mercury amalgamation procedure should be used only in cases where other substrates may be affected by high-temperature baking or may affect the test results.

### 5. Apparatus and Materials

5.1 *Equipment*, for applying films of uniform thickness as described in Test Methods D 823.

5.2 *Micrometer Film Thickness Gage*, as described in Test Methods D 1005.

#### 5.3 Alternative Release Substrates:

5.3.1 *Dental Tin Foil*, preferably 1-mil (25- $\mu$ m) thick.

5.3.2 *Sheet of FEP—(polyhexafluoropropylene)*,<sup>3</sup> preferably 2-mils (50- $\mu$ m) thick, coated with a thin film of a dry lubricant.<sup>4</sup>

5.3.3 *Sheet of Silicone Coated Paper*, preferably 5-mil (125- $\mu$ m) thick.<sup>5</sup>

5.3.4 *Glass Plates*, coated with halosilane compound.

NOTE 1—Other substrates that may be suitable are 10-mil (250- $\mu$ m) thick polyethylene, photographic paper, polished steel, and fluoropolymer coated metal panels.

<sup>3</sup> Teflon FEP 2-mil film thickness (Card No. 03111, Item #29499) from E.I. du Pont de Nemours & Co., Inc., Wilmington, DE 19898, was found suitable for this purpose. However, it is no longer available. Other substrates that may be suitable are 10-mil (250- $\mu$ m) thick polyethylene, photographic paper, polished steel, and fluoropolymer coated metal panels.

<sup>4</sup> The sole source of supply of dry lubricant (MS-122 Fluorocarbon Release Agent) known to the committee at this time is Miller-Stephenson Chemical Co., Inc., 55 Backus Ave., Danbury, CT 06810. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.

<sup>5</sup> The sole source of supply of silicone coated release paper, Form RP-1K, size 8 $\frac{3}{8}$  by 11 $\frac{1}{4}$  in., known to the committee at this time is the Leneta Co., 15 Whitney Rd., Mahwah, NJ 07430. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.01.