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Standard Specification for Non-Reinforced Liquid Coating Encapsulation Products for Leaded Paint in Buildings¹

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1. Scope

1.1 This specification covers minimum material performance requirements and laboratory test procedures for non-reinforced liquid coating encapsulation products (single or multiple-coat systems) for leaded paint in buildings. Performance properties addressed in this specification are:

- 1.1.1 Impact resistance,
- 1.1.2 Adhesion,
- 1.1.3 Dry Abrasion Resistance,
- 1.1.4 Water Vapor Transmission,
- 1.1.5 Water and Chemical Resistance,
- 1.1.6 Surface Burning Characteristics,
- 1.1.7 Volatile Organic Compound (VOC) Content,
- 1.1.8 Weathering,
- 1.1.9 Aging,
- 1.1.10 Scrub Resistance,
- 1.1.11 Mildew Resistance,
- 1.1.12 Paintability/Repairability,
- 1.1.13 Flexibility, and
- 1.1.14 Tensile Properties.

1.2 This specification does not address the selection of an encapsulation product for specific use conditions. Specific use conditions may require performance values other than those stated in this specification. See Guide E1796.

1.3 This specification complements Specification E1797 for reinforced liquid coating encapsulation products.

1.4 This specification does not cover the use of encapsulation products on industrial steel structures nor on residential coated metal surfaces because no corrosion control requirements are included.²

1.5 This specification applies to any non-reinforced liquid applied product that relies primarily on adhesion for attachment to the surface. These products are used to encapsulate a leaded paint surface with the intent of reducing human exposure to lead.

1.6 The results of the test methods included in this specification will not necessarily predict field performance.

1.7 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.8 *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 requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D16 Terminology for Paint, Related Coatings, Materials, and Applications

D522 Test Methods for Mandrel Bend Test of Attached Organic Coatings

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

D1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers D1186 Test Methods for Nondestructive

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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.

- D1212 Test Methods for Measurement of Wet Film Thickness of Organic Coatings
 D1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
 D1475 Test Method For Density of Liquid Coatings, Inks, and Related Products
 D1653 Test Methods for Water Vapor Transmission of Organic Coating Films
 D2370 Test Method for Tensile Properties of Organic Coatings
 D2486 Test Methods for Scrub Resistance of Wall Paints
 D2794 Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
 D3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
 D3274 Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation
 D3359 Test Methods for Measuring Adhesion by Tape Test
 D3891 Practice for Preparation of Glass Panels for Testing Paint, Varnish, Lacquer, and Related Products
 D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials
 D3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings
 D3960 Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
 D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
 D4214 Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
 D4414 Practice for Measurement of Wet Film Thickness by Notch Gages
 D4708 Practice for Preparation of Uniform Free Films of Organic Coatings
 E84 Test Method for Surface Burning Characteristics of Building Materials
 D7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals
 E1605 Terminology Relating to Lead in Buildings
 E1796 Guide for Selection and Use of Liquid Coating Encapsulation Products for Leaded Paint in Buildings
 E1797 Specification for Reinforced Liquid Coating Encapsulation Products for Leaded Paint in Buildings
 E2239 Practice for Record Keeping and Record Preservation for Lead Hazard Activities
 G154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
 2.2 ~~Federal Test Methods Standard 141D:~~Standard 141C:³
 2011 Preparation of Steel Panels
 2012 ~~Preparation of Tin Panels~~ Preparation of Tin Panels
 2.3 ~~Federal Test Methods Standard 141D:~~³
 3011 Condition in Container

3. Terminology

- 3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminologies D16 and E1605.
 3.2 *Definition of Term Specific to This Standard*
 3.2.1 *lead inaccessibility*—the ability of an encapsulation product to resist or inhibit the transport of lead to its surface.

4. Classification

- 4.1 *Type I: Interior Use Only*—Type I defines encapsulation products intended for interior use. These products shall meet the requirements of this specification except those for weathering and exterior aging (that is, test methods described in 10.9 and 10.10.1 not conducted).
 4.2 *Type II: Exterior Use Only*—Type II defines encapsulation products intended for exterior use. These products shall meet the requirements of this specification except that for interior aging (that is, test method described in 10.10.2 not conducted).
 4.3 *Type III: Either Exterior or Interior Use*—Type III defines encapsulation products intended for either interior or exterior use. These products shall meet all the requirements of this specification.

5. Performance Requirements

- 5.1 Performance requirements that shall be met for a non-reinforced liquid coating encapsulation product are given in Table 1.

NOTE 1—In addition to those given in Table 1, performance requirements for three other properties are of concern for liquid coating encapsulation products. These are combustion toxicity, emissions during application and curing, and lead accessibility. However, requirements for these properties

³ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098.

³ Available from https://assist.daps.dla.mil/quicksearch/basic_profile.cfm?ident_number=53676.

TABLE 1 Performance Requirements for Reinforced Liquid Coating Encapsulation Products

Performance Property	Minimum Performance Requirement	Tested in Accordance with Section	Minimum Number of Tests
Impact resistance	9 J (80 in-lbf) without cracking to the substrate	10.2	Two panels
Adhesion	5A rating	10.3	Two panels each tested at three locations
Dry abrasion resistance	Film thickness loss: <20 %	10.4	Two panels
Water vapor transmission	No minimum; report test result ^A	10.5	Three cups
Water and chemical resistance—spot test	After 1 h recovery period, no evidence of blistering, cracking, or delamination	10.6/10.6.1	Two tests for each reagent
Water and chemical resistance—immersion test	After 24 h recovery, indistinguishable hardness of the exposed and unexposed surfaces	10.6/10.6.2	Two panels each tested at three locations
Surface burning characteristics	After 2 h drying period, adhesion rating: 5A Flame spread index (FSI) <25 Smoke development rating <50	10.7	One panel
Volatile organic compound (VOC) content	No minimum; report test result ^B	10.8	See Practice D3960
Weathering—exterior end-use products	After exposure: chalking: 8 rating adhesion: 5A rating flexibility: no cracking or other visual defects tensile properties: <35 % change from initial value	10.9	Chalking and Adhesion: two panels each tested at three locations ^C Flexibility: three panels Tensile properties: ten specimens
Aging—exterior and interior end-use products	After minimum 6 h recovery: adhesion: 5A rating flexibility: no cracking or other visual defects tensile properties: <35 % change from initial value	10.10.1: for exterior products 10.10.2: for interior products	Adhesion: two panels each tested at three locations Flexibility: three panels Tensile properties: ten specimens
Scrub resistance	No erosion of the encapsulant to the substrate after 1200 cycles	10.11	Two panels
Mildew resistance	Mildew resistance rating: 8	10.12	Three panels
Paintability	Adhesion rating: 5A	10.13.1	Two panels each tested at three locations
Repairability	Adhesion rating: 5A	10.13.2	Two panels each tested at three locations
Flexibility	No cracking or other visual defects	10.14	Three panels
Tensile Properties	No minimum; report test result ^A	10.15	Ten specimens

^A Minimum performance depends on architectural and end use conditions (see 1.2).

^B VOC requirements may be specified in ordinances promulgated by authorities having jurisdiction.

^C The chalking and adhesion tests can be conducted on the same panels provided that chalking is first performed.

cannot be included in this specification at this time because there are no adequate ASTM or Federal test methods for determining them. Requirements for two of these properties, combustion toxicity and emissions during application and curing, may be subject to regulations or ordinances promulgated by authorities having jurisdiction. The user of this specification is advised to determine whether such regulations or ordinances exist. The addition of requirements for these properties to this specification will be undertaken when suitable test methods are available.

6. Sampling

6.1 A 3.8-L (1-gal) sample is usually sufficient for the recommended tests.

6.2 Prior to sampling, establish the condition of the container since damage to it may cause evaporation, skinning, or other undesirable effects. Excessive storage time and temperature fluctuations may cause settling or changes in viscosity. Materials beyond the manufacturer's stated shelf life shall not be sampled.

6.3 Thickening, settling, and separation are undesirable and objectionable if the coating, after storage, cannot be readily made suitable for application with a reasonable amount of stirring. Determine the conditions in the container in accordance with Method 3011 of the Federal Test Method Standard No. 141C.

6.4 Sample the encapsulant in accordance with Practice D3925. Determine the density in accordance with Test Method D1475 and repeat until two successive readings agree within 90 g (0.2 lb). Samples for testing may then be taken.

6.5 Report the size of the container from which the sample was taken and product identification codes.

7. Number of Tests

7.1 The number of tests that shall be conducted for each performance property is given in Table 1.

8. Retesting

8.1 In cases where encapsulation products fail to pass one or more requirements of this specification, retesting shall be permitted. Both the original data and the retesting data for each requirement for which retesting was conducted shall be used in determining whether the requirement is met.

9. Test Specimens

9.1 A non-reinforced liquid coating encapsulation product shall be comprised of all principal components in the system, including the base and top coats and primer, if specified, for field application. Except for adhesion testing and dry abrasion testing, where specialty primers may be used for flash rust resistance, primers shall not be used solely for product performance testing in accordance with this specification.