

Designation: C 647 – 95

Standard Guide to Properties and Tests of Mastics and Coating Finishes for Thermal Insulation¹

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1. Scope

1.1 This guide identifies properties of mastics and coating finishes characterizing their performance as finishes for thermal insulation.

1.2 These properties relate to application and service. Each property is defined, and its significance and suggested test methods are described.

1.3 The properties appear in the following order in this guide.

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

2. Referenced Documents

2.1 ASTM Standards:

- C 419 Practice for Making and Curing Test Specimens of Mastic Thermal Insulation Coatings²
- C 461 Test Methods for Mastics and Coatings Used with Thermal Insulation²
- C 488 Test Method for Conducting Exterior Exposure Tests of Finishes for Thermal Insulation²
- C 639 Test Method for Rheological (Flow) Properties of Elastomeric Sealants³
- C 681 Test Method for Volatility of Oil- and Resin-Based, Knife-Grade, Channel Glazing Compounds³
- C 733 Test Method for Volume Shrinkage of Latex Sealants³
- C 755 Practice for Selection of Vapor Retarders for Thermal Insulation²
- C 792 Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants³
- D 36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)⁴
- D 56 Test Method for Flash Point by Tag Closed Tester⁵
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup⁵
- D 93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester⁵
- D 529 Test Method for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Carbon-Arc Method)⁴
- D 543 Test Method for Resistance of Plastics to Chemical Reagents⁶
- D 562 Test Method for Consistency of Paints Using the Stormer Viscometer⁷
- D 638 Test Method for Tensile Properties of Plastics⁶
- D 658 Test Method for Abrasion Resistance of Organic Coatings By Air Blast Abrasive⁷
- D 747 Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam⁶
- D 790 Test Methods for Flexural Properties of Unreinforced

² Annual Book of ASTM Standards, Vol 04.06.

³ Annual Book of ASTM Standards, Vol 04.07.

⁴ Annual Book of ASTM Standards, Vol 04.04.

⁵ Annual Book of ASTM Standards, Vol 05.01.

⁶ Annual Book of ASTM Standards, Vol 08.01.

⁷ Annual Book of ASTM Standards, Vol 06.01.

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- and Reinforced Plastics and Electrical Insulating Materials⁶
- D 822 Practice for Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus⁷
- D 903 Test Method for Peel or Stripping Strength of Adhesive Bonds⁸
- D 968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive⁷
- D 1310 Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus⁷
- D 1640 Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature⁷
- D 1654 Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments⁷
- D 1729 Practice for Visual Evaluation of Color Differences of Opaque Materials⁷
- D 1823 Test Method for Apparent Viscosity of Plastisols and Organosols at High Shear Rates by Extrusion Viscometer⁶
- D 1824 Test Method for Apparent Viscosity of Plastisols and Organosols at Low Shear Rates by Brookfield Viscometer⁶
- D 1849 Test Method for Package Stability of Paint⁹
- D 2196 Test Method for Rheological Properties of Non-Newtonian Materials By Rotational (Brookfield) Viscometer⁷
- D 2243 Test Method for Freeze-Thaw Resistance of Water-Borne Coatings⁹
- D 2354 Test Method for Minimum Film Formation Temperature (MFT) of Emulsion Vehicles¹⁰
- D 2444 Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)¹¹
- D 2453 Test Method for Shrinkage and Tenacity of Oil- and Resin-Base Caulking Compounds³
- D 2485 Test Method for Evaluating Coatings for High Temperature Service⁷
- D 2507 Terminology of Rheological Properties of Gelled Rocket Propellants¹²
- D 2939 Test Methods for Testing Emulsified Bitumens Used as Protective Coatings⁴
- D 3134 Practice for Establishing Color and Gloss Tolerances⁷
- D 3274 Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation⁷
- D 3361 Practice for Operating Light- and Water-Exposure Apparatus (Unfiltered Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products Using the Dew Cycle⁷
- D 3828 Test Methods for Flash Point by Small Scale Closed Tester¹³
- D 4339 Test Method for the Determination of the Odor of Adhesives⁸
- E 84 Test Method for Surface Burning Characteristics of Building Materials³
- E 96 Test Methods for Water Vapor Transmission of Materials²
- E 162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source³
- E 659 Test Method for Autoignition Temperature of Liquid Chemicals¹⁴
- G 21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi¹⁴
- G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials¹⁴

3. Terminology

3.1 General Definitions:

3.1.1 *application properties*—properties that influence or affect the effective installation of finishes.

3.1.2 *coating*—a liquid or semiliquid protective finish capable of application to thermal insulation or other surfaces, usually by brush or spray, in moderate thickness, 30 mils (0.76 mm).

3.1.3 *mastic*—a protective finish of relatively thick consistency capable of application to thermal insulation or other surfaces usually by spray or trowel, in thick coats greater than 30 mils (0.03 in.) (0.76 mm).

3.1.4 *service properties*—properties that govern performance of finishes after installation.

3.2 *Specific Definitions*—Terms specific to Sections 6 and 7 are defined as appropriate.

4. Significance and Use

4.1 Each of the properties listed should be considered in selecting materials for specific projects. A list of the selected properties with limiting values assigned will form a part of the product specification.

4.2 All of the properties may not be pertinent in any specific situation, and all of the tests outlined may not be required. A condition to any specification must be an evaluation of the proposed use to determine which properties may be required.

4.3 Membrane reinforcements are frequently specified and used with mastics and coatings. Service properties of such systems of finishes may be different from the unreinforced finishes; therefore, it is essential to test specimens of the reinforced system.

5. Classification of Mastics and Coatings

5.1 *Vapor-Retarder Type*—A finish intended for service on insulated units that are operated below ambient temperature at least part of the time.

NOTE 1—Practice C 755 may provide additional guidance.

5.1.1 Outdoor service.

5.1.2 Indoor service.

⁸ Annual Book of ASTM Standards, Vol 15.06.

⁹ Annual Book of ASTM Standards, Vol 06.02.

¹⁰ Annual Book of ASTM Standards, Vol 06.03.

¹¹ Annual Book of ASTM Standards, Vol 08.04.

¹² Annual Book of ASTM Standards, Vol 15.03.

¹³ Annual Book of ASTM Standards, Vol 05.02.

¹⁴ Annual Book of ASTM Standards, Vol 14.02.