



# Standard Guide to Properties and Tests of Mastics and Coating Finishes for Thermal Insulation<sup>1</sup>

This standard is issued under the fixed designation C 647; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 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:<sup>2</sup>

- C 168 Terminology Relating to Thermal Insulation
- C 419 Practice for Making and Curing Test Specimens of Mastic Thermal Insulation Coatings
- C 461 Test Methods for Mastics and Coatings Used With Thermal Insulation
- C 488 Test Method for Conducting Exterior Exposure Tests of Finishes for Thermal Insulation
- C 639 Test Method for Rheological (Flow) Properties of Elastomeric Sealants
- C 681 Test Method for Volatility of Oil- and Resin-Based, Knife-Grade, Channel Glazing Compounds
- C 733 Test Method for Volume Shrinkage of Latex Sealants<sup>3</sup>
- C 755 Practice for Selection of Water Vapor Retarders for Thermal Insulation
- C 792 Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants
- D 36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- D 56 Test Method for Flash Point by Tag Closed Cup Tester
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- D 93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester
- D 529 Practice for Enclosed Carbon-Arc Exposures of Bituminous Materials
- D 543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- D 562 Test Method for Consistency of Paints Measuring

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Withdrawn.

Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer

- D 638 Test Method for Tensile Properties of Plastics
- D 658 Test Method for Abrasion Resistance of Organic Coatings by Air Blast Abrasive<sup>3</sup>
- D 747 Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
- D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D 822 Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
- D 903 Test Method for Peel or Stripping Strength of Adhesive Bonds
- D 968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
- D 1310 Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus
- D 1640 Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
- D 1654 Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- D 1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials
- D 1823 Test Method for Apparent Viscosity of Plastisols and Organosols at High Shear Rates by Extrusion Viscometer
- D 1824 Test Method for Apparent Viscosity of Plastisols and Organosols at Low Shear Rates
- D 1849 Test Method for Package Stability of Paint
- D 2196 Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield type) Viscometer
- D 2243 Test Method for Freeze-Thaw Resistance of Water-Borne Coatings
- D 2354 Test Method for Minimum Film Formation Temperature (MFFT) of Emulsion Vehicles<sup>4</sup>
- D 2444 Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- D 2453 Test Method for Shrinkage and Tenacity of Oil- and Resin-Base Caulking Compounds
- D 2485 Test Methods for Evaluating Coatings For High Temperature Service<sup>4</sup>
- D 2507 Terminology of Rheological Properties of Gelled Rocket Propellants<sup>4</sup>
- D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings
- D 3134 Practice for Establishing Color and Gloss Tolerances
- D 3274 Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation
- D 3361 Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
- D 3828 Test Methods for Flash Point by Small Scale Closed Cup Tester

- D 4339 Test Method for Determination of the Odor of Adhesives
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 96/E 96M Test Methods for Water Vapor Transmission of Materials
- E 162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
- E 659 Test Method for Autoignition Temperature of Liquid Chemicals
- G 21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Discontinued 2001)<sup>4</sup>

### 3. Terminology

3.1 Terminology **C 168** shall be considered as applying to the terms used in this specification.

#### 3.2 General Definitions:

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

3.2.2 *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).

3.2.3 *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).

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

3.3 *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.

<sup>4</sup> Withdrawn.