



# Standard Specification for Electrical Insulating Varnishes<sup>1</sup>

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## 1. Scope

1.1 This specification lists the tests and values for electrical insulating varnishes suitable for the impregnation and treatment of electrical coils and windings applied by dip process.

1.2 Varnishes, flexible or rigid, included in this specification are:

Grade DA—Air-dry

Grade DO—Organic solvent containing, baking,

Grade DM—Reactive diluent containing,

Grade DS—Silicone,

Grade DW—Water containing, and

Grade DT—Thixotropic.

1.3 The values stated in inch-pound units are the standard.

NOTE 1—This specification resembles IEC 455 in title only. The content is significantly different.

## 2. Referenced Documents

### 2.1 ASTM Standards:

D 93 Test Methods for Flash-Point by Pensky-Martens Closed Cup Tester<sup>2</sup>

D 115 Test Methods for Varnishes Used for Electrical Insulation<sup>3</sup>

D 1711 Terminology Relating to Electrical Insulation<sup>3</sup>

D 2519 Test Method for Bond Strength of Electrical Insulating Varnishes by the Helical Coil Test<sup>4</sup>

D 3056 Test Method for Gel Time of Solventless Varnishes<sup>4</sup>

D 3145 Test Method for Thermal Endurance of Electrical Insulating Varnishes by the Helical Coil Method<sup>4</sup>

D 3251 Test Method for Thermal-Aging Characteristics of Electrical Insulating Varnishes Applied over Film-Insulated Magnet Wire<sup>4</sup>

D 3278 Test Methods for Flash Point of Liquids by Set-

aflash Closed-Cup Apparatus<sup>5</sup>

D 4733 Test Methods for Solventless Electrical Insulating Varnishes<sup>4</sup>

D 4880 Test Method for Salt Water Proofness of Insulating Varnishes Over Enamelled Magnet Wire<sup>4</sup>

D 5637 Test Method for Moisture Resistance of Electrical Insulation Varnishes<sup>4</sup>

D 5638 Test Method for Chemical Resistance of Electrical Insulation Varnishes<sup>4</sup>

### 2.2 Military Specifications:<sup>6</sup>

MIL-H-17672 Hydraulic Fluid, Petroleum, Inhibited

MIL-L-17331 Lubricating Oil, Synthetic Base P-D-680, Dry Cleaning Solvent

MIL-D-16791 Detergent, General Purpose, (Liquid, Non-Ionic)

### 2.3 Nema Standard:

MW1000—Magnet Wire<sup>6</sup>

## 3. Terminology

3.1 *Definitions:* —For definitions of terms used in this specification refer to Terminology D 1711.

## 4. Flexible or Rigid Classification

4.1 This specification covers both flexible and rigid, solvent (including water) and solventless insulating varnishes.

## 5. Thermal Classification

5.1 The thermal classification of insulating varnishes covered by this specification is determined by using Test Methods D 3145 and D 3251 in conjunction with 18 awg magnet wire conforming to MW35C and MW16C in accordance with NEMA MW1000. Determine the temperature index at 20 000 h.

5.2 The thermal class is determined from the temperature index range as follows:

Thermal Class	Temperature Index Range
130	130.0 to 154.9
155	155.0 to 179.9

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D-9 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.01 on Electrical Insulating Varnishes, Powders, and Encapsulating Compounds.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 05.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 10.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 10.02.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.01.

<sup>6</sup> Available from Global Engineering Documents, 15 Inverness Way East, Englewood CO 80112.