



Designation: D3377 – 04 (Reapproved 2013)

## Standard Test Method for Weight Loss of Solventless Varnishes<sup>1</sup>

This standard is issued under the fixed designation D3377; 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 test method covers the determination of the percent weight loss of cured solventless electrical varnishes when exposed to elevated temperatures for prescribed periods of time.

1.2 Results of this test method are based on 6-mm ( $\frac{1}{4}$ -in.) thick specimens and will not be applicable to specimens appreciably thinner or thicker than 6 mm.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *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.*

NOTE 1—This standard resembles IEC 60216–2 “Guide for the determination of thermal endurance properties of electrical insulating materials. Part 2: Choice of test criteria” in a number of ways, but is not consistently similar throughout. The data obtained using either standard will possibly be technically equivalent.

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>  
[D1711 Terminology Relating to Electrical Insulation](#)  
[D5423 Specification for Forced-Convection Laboratory Ovens for Evaluation of Electrical Insulation](#)

2.2 *IEC Standard*:  
[IEC 60216–2 Guide for the determination of thermal endurance properties of electrical insulating materials. Part 2: Choice of test criteria](#)<sup>3</sup>

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

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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> Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *varnish, n—electrical insulating*, a liquid resin system that is applied to and cured on electrical components providing electrical, mechanical, and environmental protection.

3.1.1.1 *Discussion*—There are two types of electrical insulating varnish: solvent-containing and solventless. The solvent-containing varnish is a solution, dispersion, or emulsion of a polymer or mixture of polymers in a volatile, nonreactable liquid. The solventless type is a liquid resin system free of volatile, nonreactable solvents.

3.1.2 For definitions of other terms relating to electrical insulation, see Terminology [D1711](#).

### 4. Significance and Use

4.1 The amount and composition of by-products produced by exposure of insulating varnishes to elevated temperatures can possibly:

4.1.1 Deteriorate other insulations in the system,

4.1.2 Cause cracking of insulation due to pressure, buildup in thick cross sections, or

4.1.3 Corrode other parts in the assembly.

4.2 Amount and rate of weight loss will possibly affect the thermal rating of a varnish.

### 5. Apparatus

5.1 *Metal Mold*, consisting of two flat sheets 300 by 300 by 6 mm (12 by 12 by  $\frac{1}{4}$  in.) separated by  $6.4 \pm 0.5$ -mm ( $\frac{1}{4} \pm 0.02$ -in.) thick spacers along three sides. The spacers also seal the edges of the mold and the assembly is held together with “C” clamps or bolts. Aluminum or polished steel plates are permissible.

5.2 *Laboratory Balance*, with accuracy of  $\pm 1$  mg.

5.3 *Forced-Convection Laboratory Oven*, meeting requirements of Specification [D5423](#), Type II for each test temperature.

5.4 *Screening Platform*, 6-mm ( $\frac{1}{4}$ -in.) mesh, with 50-mm (2-in.) legs.

5.5 *Mold Release*.

NOTE 2—Fluorocarbon-type release agents are satisfactory.

5.6 Desiccator.