Designation: D 5637 – 00

An American National Standard

Standard Test Method for Moisture Resistance of Electrical Insulating Varnishes[1]

This standard is issued under the fixed designation D 5637; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the mechanical performance of electrical insulating varnishes subjected to high humidity conditions.

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

1.3 *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.* See 7.1.

2. Referenced Documents

2.1 *ASTM Standards:*

D 2519 Test Method for Bond Strength of Electrical Insulating Varnishes by the Helical Coil Test[2]

2.2 *IEEE Standard:*

IEEE 117 Standard Test Procedure for Evaluation of Systems of Insulating Materials for Randon-Wound AC Electric Machinery[3]

3. Terminology

3.1 See Test Method D 2519.

4. Summary of Test Method

4.1 Flexural strength tests are made on varnish-treated helical coils to determine the force required to break the coil under specified conditions both before and after exposure to high humidity conditions.

5. Significance and Use

5.1 This test method is useful for the evaluation of insulating varnish performance in high humidity exposure.

6. Apparatus

6.1 *Tensile Testing Machine*—See Test Method D 2519.

6.2 *Test Fixture*—See Test Method D 2519.

6.3 *Exposure Chamber*—A chamber capable of maintaining a minimum of 100 % relative humidity with condensation, at 30 ± 1°C.

NOTE 1—The exposure chamber described in IEEE 117 has been found suitable.

7. Safety Precautions

7.1 It is unsafe to use liquid varnish at temperatures above the flash point without adequate ventilation, especially if the possibility exists that flames or sparks are present.

8. Test Specimens

8.1 Prepare a minimum of ten test specimens in accordance with Test Method D 2519 using a wire mutually agreed upon by supplier and purchaser.

9. Procedure

9.1 Condition half of the test specimens in the exposure chamber maintaining a minimum of 98 % relative humidity for 336 ± 1 h.

9.2 Test specimens both conditioned and unconditioned as described in Test Method D 2519 at standard laboratory conditions. If possible, test conditioned specimens in the exposure chamber. When specimens are not tested in the exposure chamber, they should be removed one at a time from the chamber and tested as soon as possible. The time after removal from the chamber and room conditions may affect test results. Take care to minimize any change in humidity within the cabinet during testing.

10. Report

10.1 Report the following information:

10.1.1 Description of varnish,

10.1.2 Identification of wire used,

10.1.3 Cure time and temperature and number of dips used to prepare the coils,

10.1.4 Average bond strength in newtons (pounds-force) of unconditioned coils,

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

Current edition approved April 10, 2000. Published July 2000. Originally published as D 5637 – 94. Last previous edition D 5637 – 95.

[2] *Annual Book of ASTM Standards*, Vol 10.02.

[3] Available from Institute of Electrical and Electronics Engineers, Inc., 345 E. 47th St., New York, NY 10017.

10.1.5 Average bond strength in newtons (pounds-force) of conditioned coils, and

10.1.6 Percent retention of bond strength after conditioning:

$$\text{Percent retained bond strength} = \frac{\text{average bond strength (conditioned)}}{\text{average bond strength (unconditioned)}} \times 100 \quad (1)$$

11. Precision and Bias

11.1 *Precision*—No information has been presented to ASTM upon which to base a statement of precision. No activity has been planned to develop such information.

11.2 *Bias*—This test method has no bias because the value for moisture resistance is determined solely in terms of this test method itself.

12. Keywords

12.1 bond strength; helical coils; moisture resistance; varnish