Designation: D2519 – 07

An American National Standard

Standard Test Method for Bond Strength of Electrical Insulating Varnishes by the Helical Coil Test[1]

This standard is issued under the fixed designation D2519; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This test method covers determination of the bond strength of an electrical insulating varnish when applied to a helical coil. The helical coil can be made from bare aluminum or copper wire or from film or fiber-insulated magnet wire. Helical coils made from bare aluminum or bare copper wire will yield values of bond strength for the varnish when applied to bare metal conductors. The use of film or fiber-insulated magnet wire will show values for that particular combination of insulation and varnish.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D115 Test Methods for Testing Solvent Containing Varnishes Used for Electrical Insulation

D1711 Terminology Relating to Electrical Insulation

D6054 Practice for Conditioning Electrical Insulating Materials for Testing

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 *Definitions:* For definitions of other terms relating to electrical insulation, see Terminology D1711.

3.1.1 *bond strength*—a measure of the force required to separate surfaces which have been bonded together.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *event time*—the time between initial application of a physical or electrical stress and failure of the specimen under test.

3.2.2 *response time*—the time required for an indicating or recording device to react to change in stress on a specimen under test.

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.

5. Significance and Use

5.1 Values obtained by flexural tests can provide information with regard to the bond strength of the particular varnish, in combination with a particular wire, when measured under conditions described in this test method.

6. Apparatus

6.1 *Tensile Testing Machine*—Use an adjustable-speed drive and a suitable instrument for measuring force to break the specimen. Available tensile testing machines or an accurate spring gauge and a separate adjustable-speed drive are suitable. To cover the range of load strength values which are commonly encountered it is recommended that a multirange tester be used.

6.1.1 It has been found that gages rated 5, 25, 150, and 500 N (1, 5, 30, and 100 lbf) are adequate to cover the range of varnishes.

6.2 *Test Fixture*—The test fixture consists of two rollers, attached to a common frame, and a 90° V-block. One part, either the rollers or the V-block, is held stationary while the other part is moved. No friction contact which will affect this movement is allowed. The general shape and the relative position of these parts are shown in Fig. 1. The rollers have a diameter of 9.5 mm (0.375 in.) at the center and are parallel having a center-to-center distance of 44.5 mm (1.75 in.). The 90° V-block has a radius at the apex of 0.8 mm (0.03 in.).

[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.

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

***A Summary of Changes section appears at the end of this standard.**