



Designation: D4882 – 05 (Reapproved 2012)

Standard Test Method for Bond Strength of Electrical Insulating Varnishes by the Twisted-Coil Test¹

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1. Scope

1.1 This test method covers the determination of the bond strength of an electrical insulating varnish when applied to a twisted coil of film-insulated magnet wire. The use of a particular type of film-insulated wire will show the values for that combination of film coating and varnish.

1.2 The values stated in inch-pound units are the standard. The values given in parentheses are for information only.

NOTE 1—Although this standard and Method C of IEC 61033 differ in approach or detail, data obtained using either are technically equivalent.

1.3 *This standard does not purport to address all, if any, 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.* A specific precautionary statement is given in 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](#)

[D2519 Test Method for Bond Strength of Electrical Insulating Varnishes by the Helical Coil Test](#)

[D6054 Practice for Conditioning Electrical Insulating Materials for Testing \(Withdrawn 2012\)³](#)

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

2.2 IEC Standard:

[IEC 61033 Test Methods for the Determination of Bond Strength of Impregnating Agents to an Enamelled Wire Substrate⁴](#)

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

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

3.2 Refer to Terminology [D1711](#) for definitions of other terms.

4. Summary of Test Method

4.1 Flexural strength tests are made on twisted coils to determine the force required to break the coils under specific conditions.

5. Significance and Use

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

6. Apparatus

6.1 Coil winder as shown in [Fig. 1](#) and [Fig. 2](#).

6.2 Coil Twister as shown in [Fig. 3](#).

6.3 Test apparatus as described in Test Method [D2519](#).

7. Safety Precautions

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

8. Test Specimen Preparation

8.1 The test specimen is a wound coil made from film-insulated magnet wire, 28 AWG (0.320 mm). The coil shall be

⁴ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.