



Standard Specification for Friction Tape¹

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1. Scope*

1.1 This specification² covers friction tapes that are commonly used for protecting, and binding in place, insulation applied to joints of electrical wires and cables, and for other mechanical purposes.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards*:³

D69 Test Methods for Friction Tapes

D1711 Terminology Relating to Electrical Insulation

D3636 Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials

D5118/D5118M Practice for Fabrication of Fiberboard Shipping Boxes

2.2 *Federal Specifications*:

PPP-B-566 Boxes, Folding, Paperboard

2.3 *Federal Standards*:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁴

2.4 *Military Standards*:

MIL-STD-129 Marking for Shipment and Storage⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology D1711.

4. Materials and Manufacture

4.1 The tape shall consist of a woven fabric sheeting impregnated with an adhesive insulating compound, cut into rolls of narrow width and wound on a core.

¹ This specification is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.07 on Flexible and Rigid Insulating Materials.

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² This specification was formerly part of Test Method D69.

³ 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.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

4.2 The fabric sheeting shall be evenly and firmly woven and as free of unsightly defects, dirt, knots, lumps and irregularities of twist as is consistent with the best manufacturing practices. The threads shall run in lines as straight as possible without weaving, to reduce to a minimum the raveling of the cloth when cut into tape.

4.3 The frictioning compound shall be a tacky adhesive insulating compound that will not have a deteriorating effect on copper or other metals or on the fabric.

4.4 The fabric shall be thoroughly impregnated and evenly covered on both sides with the frictioning compound. The compound shall adhere firmly to the fabric and shall not pull away from the fabric and leave bare spots when adjacent layers of tape are separated.

5. General Requirements

5.1 Friction tapes shall meet the requirements given in Table 1 when tested in accordance with Test Methods D69.

5.2 When discoloration of the surface on which the tape is to be applied is an important consideration, the purchaser may request that the tape must pass the test for discoloration of copper in accordance with Test Methods D69.

6. Dimensions and Permissible Variations

6.1 The nominal dimensions and their permissible variations when measured by the procedures of Test Methods D69 are presented in Table 2.

7. Test Methods

7.1 The selection of the rolls, conditioning, and testing shall be in accordance with Test Methods D69.

8. Inspection

8.1 Inspection of the material shall be made as agreed upon between the purchaser and the seller as part of the purchase contract.

8.2 If it is required, the tape shall be tested and inspected either at the place of manufacture prior to shipment or at the place of delivery within four weeks from the date of delivery.

9. Rejection

9.1 The purchaser reserves the right to reject any part of the shipment that does not comply with Section 11 of this specification.

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

TABLE 1 Requirements for Friction Tape

| Property | Value |
|-------------------|------------------------------|
| Adhesion | 15 in./min (380 mm/min), max |
| Aged Adhesion | 15 in./min (380 mm/min), max |
| Breaking Strength | 40 lb/in. (170 N/25 mm), min |
| Breakdown Voltage | 1000 V, min |
| Parallelism | 0.125 in. (3.2 mm), max |

TABLE 2 Dimensions and Permissible Variations

| | ¾ in. (19 mm) | 1 in. (25 mm) | 1½ in. (38 mm) | 2 in. (51 mm) |
|--------------------------------------|---------------|------------------------------|----------------|---------------|
| Nominal width | | | | |
| Permissible variation for average | ← ← ← | ±½ in. (±0.8 mm) | | → → → |
| Permissible variation for individual | ← ← ← | ±¼ in. (±1.6 mm) | | → → → |
| Nominal thickness | ← ← ← | 0.015 in. (0.38 mm) | | → → → |
| Permissible variation for average | ← ← ← | ± 0.003 in. (± 0.08 mm) | | → → → |
| Permissible variation for individual | ← ← ← | ± 0.004 in. (± 0.10 mm) | | → → → |
| Nominal length | ← ← ← | 82 ft (25 m) | | → → → |
| Permissible variation for length | ← ← ← | + 3 ft (+0.9 m) –0 ft (–0 m) | | → → → |

9.2 The purchaser reserves the right to reject a shipment from which two or more sample rolls fail to meet the requirements of any individual test or measurement prescribed in this specification, without additional sampling. If only one sample roll fails an individual test or measurement or the average length of the sample rolls exceeds the prescribed value, a second set of samples shall be taken in accordance with Test Methods **D69**, and all rolls in the second sampling shall be subjected to that test or measurement wherein the failure occurred. The purchaser reserves the right to reject the shipment if the second sampling fails to conform with the applicable requirement.

10. Aging and Storage

10.1 The tape shall at any time, within eight months after acceptance if stored in accordance with **10.2**, meet the adhesion test specified in Test Methods **D69** except that a force of 3

lbf/in. (13.3 N/25 mm) shall be substituted for the 4 lbf/in. (17.8 N/25 mm) during unwinding.

10.2 Proper storage of tape requires the use of the original boxes and a cool, dark location. Tape shall not be stored near steam pipes, radiators, or other sources of heat.

11. Packaging and Package Marking

11.1 Unless otherwise specified, the tape or carton shall be securely wrapped and sealed in a moisture-proof material to protect its contents.

12. Keywords

12.1 adhesion; aged adhesion; aging; breakdown voltage; breaking strength; dimensions; friction tape; parallelism; storage; tackiness

SUPPLEMENTARY REQUIREMENTS

GOVERNMENT/MILITARY PROCUREMENT

These requirements apply *only* to Federal/Military procurement, not domestic sales or transfers.

S1.1 Quality Assurance Provisions

S1.1.1 *Responsibility for Inspection*—Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements, as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

S1.1.2 *Examination and Tests*—The examinations and tests shall be in accordance with this specification, and the additional examinations set forth herein.

S1.1.3 *Sampling for Examinations*—All insulation tape of the same width offered for delivery at one time shall be considered a lot for purposes of examination. Random samples of the insulation tape shall be selected from each lot in accordance with Practice **D3636**. The samples, for purposes of determining the sample size in accordance with Practice **D3636**, shall be expressed in units of rolls of tape, or in the case of preparation for delivery, in units of packed shipping containers. The inspection levels and acceptance quality level (AQL), expressed in defects per 100 units, shall be in accordance with **Table S1.1**.

S1.1.4 *Examination*—Each sample selected shall be examined for compliance with the specified requirements. Examinations shall be conducted as specified requirements. Examinations shall be conducted as specified in S1.1.4.1, S1.1.4.2,

TABLE S1.1 Inspection and Acceptable Quality Levels for Sampling Examinations

| Supplementary Requirement | Table | Inspection Level | AQL |
|---------------------------|-------|------------------|-----|
| S1.1.4.1 | S1.2 | I | 2.5 |
| S1.1.4.2 | S1.3 | S-3 | 4.0 |
| S1.1.4.3 | S1.4 | S-3 | 2.5 |
| S1.1.4.5 | S1.5 | S-2 | 2.5 |

S1.1.4.3, S1.1.4.4, and S1.1.4.5. If the number of nonconformities in any sample exceeds the acceptance number for the sample, the lot represented by the sample shall be rejected.

S1.1.4.1 Examination of the End Item for Nonconformities in Appearance and Workmanship—The sample unit for this examination shall be two continuous yards, disregarding the first three units of each sample roll (see [Table S1.2](#)).

S1.1.4.2 Examination of Assembly of Roll of Tape—The assembly shall be in accordance with [Table S1.3](#).

S1.1.4.3 Examination of the End Item for Nonconformities in Dimensions—Samples selected in accordance with S1.1.3 shall be inspected for thickness and width in accordance with [Table S1.4](#).

S1.1.4.4 Examination of the End Item for Average Length of Tape per Roll—The sample unit for this examination shall be one roll of tape. A minimum of five rolls shall be randomly selected throughout the lot and measured for length (see [Table S1.5](#)).

S1.1.4.5 Inspection of Preparation for Delivery Requirements—An inspection shall be made to determine that the packaging, packing, and marking requirements comply with S1.2.

S1.2. Preparation for Delivery

S1.2.1 Packaging—Packaging shall be Level A, B, or C, as specified.

S1.2.1.1 Level A—Each roll of tape shall be packaged in a snug fitting paperboard box conforming to Federal Specification PPP-B-566. The box shall be closed to prevent accidental opening.

S1.2.1.2 Level B—Each roll of tape shall be packaged in a cellophane or plastic wrap with the identification label secured to the outside of the wrap, or each roll shall be packaged in a

TABLE S1.3 Examination of the Assembly of the Roll of Tape

| Examine | Nonconformity |
|--------------------|---------------------------------------------------------------------------------------------------|
| <i>Appearance:</i> | Tape not evenly, neatly, or tightly wound. Any telescoping of roll. Core missing or damaged |

TABLE S1.4 Examination of the End Item for Dimensional Nonconformities

| Examine | Nonconformity |
|-------------------|------------------------------------------------------|
| <i>Thickness:</i> | Thickness not in accordance with this specification. |
| <i>Width:</i> | Width not in accordance with this specification. |

TABLE S1.5 Examination of the End Item for Average Length of Tape per Roll

| Examine | Nonconformity |
|------------------------|---------------------------------------------------|
| <i>Length of Roll:</i> | Length not in accordance with this specification. |

printed cellophane or plastic wrap. The printed wrap shall contain the information normally required for the label or unit container. The wrap shall be secured to prevent accidental opening.

S1.2.1.3 Level C—Each roll of tape shall be packaged to prevent damage during shipment from the supplier to the initial destination.

S1.2.2 Packing—Packing shall be Level A, B, or C, as specified.

S1.2.2.1 Level A—One hundred rolls of tape shall be packed in a snug fitting fiberboard box conforming to Practice [D5118/D5118M](#) for weather resistant class corrugated fiberboard boxes.

S1.2.2.2 Level B—One hundred rolls of tape shall be packed in snug-fitting fiberboard box conforming to Practice [D5118/D5118M](#) for weather domestic class corrugated fiberboard boxes.

S1.2.2.3 Level C—The insulation tape shall be packed in such a manner to ensure carrier acceptance and safe delivery to the destination at the lowest transportation cost for such supplies. Containers shall be in accordance with the Uniform Freight Classification or National Motor Freight Classification, as applicable.

S1.2.3 Marking:

S1.2.3.1 Civil Agencies—In addition to markings required by the contract or purchase order, the unit package and the shipping container shall be marked in accordance with Fed. Std. No. 123.

S1.2.3.2 Military Agencies—In addition to markings required by the contract or purchase order, the unit package and shipping container shall be marked in accordance with MIL-STD-129.

TABLE S1.2 Examination of the End Item for Nonconformities in Workmanship and Appearance

| Examine | Nonconformity |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Appearance:</i> | Any tear, cut or break, lumps, knots or unevenness to tape. Dirt, foreign material or imbedded particles. Adhesive not uniform, areas not coated. |
| <i>Workmanship:</i> | Raveling or frayed edges. Splice in tape. Not uniform texture or finish. |

SUMMARY OF CHANGES

Committee D09 has identified the location of selected changes to this specification since the last issue, D4514 – 06, that may impact the use of this specification. (Approved April 1, 2012)

(1) Revised Table 1.

(2) Revised Section 11.1 and deleted old 11.2.

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