



## Standard Specification for Friction Tape<sup>1</sup>

This standard is issued under the fixed designation D 4514; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification<sup>2</sup> 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:*

D 69 Test Methods for Friction Tapes<sup>3</sup>

D 1711 Terminology Relating to Electrical Insulation<sup>3</sup>

D 3636 Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials<sup>4</sup>

2.2 *Federal Specifications:*

PPP-B-636 Box, Fiberboard<sup>5</sup>

2.3 *Federal Standards:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)<sup>5</sup>

2.4 *Military Standards:*

MIL-STD-129 Marking for Shipment and Storage<sup>5</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology D 1711.

### 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.

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 D 69.

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	1/8 in. (3.2 mm), max
Tackiness	pass in all combinations

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 D 69.

### 6. Dimensions and Permissible Variations

6.1 The nominal dimensions and their permissible variations when measured by the procedures of Test Methods D 69 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 D 69.

### 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.

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<sup>2</sup> This specification was formerly part of Test Method D 69.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol. 10.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol. 10.02.

<sup>5</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

**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)		→ → →

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.

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 D 69, 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 D 69 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 *Packaging*—Each roll of tape shall be enclosed in a paper carton unless otherwise specified. If enclosed in a paper carton, either the roll of tape or the carton shall be wrapped in a moisture-proof material and sealed. The wrapping on the tape or carton shall be secure and shall protect the contents fully.

11.2 *Package Marking*—Each box shall be marked with the name of the manufacturer or trademark, and the nominal width and length of the tape.

## 12. Keywords

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

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## 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 D 3636. The samples, for purposes of

determining the sample size in accordance with Practice D 3636, 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