

INCH-POUND

A-A-59474
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 SUPERSEDING
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COMMERCIAL ITEM DESCRIPTION

INSULATION TAPE, ELECTRICAL; HIGH TEMPERATURE, POLYTETRAFLUOROETHYLENE, PRESSURE-SENSITIVE

The General Services Administration has authorized the use of this commercial item description, for all federal agencies.

1. **SCOPE.** This commercial item description (CID) covers the requirements for polytetrafluoroethylene, high temperature insulating, pressure-sensitive adhesive, electrical tapes.

2. **CLASSIFICATION.** The electrical tape shall conform to the following types and classes:

2.1 Type.

- | | | |
|---------|---|---|
| Type I | - | Smooth backing (see 6.1.1). |
| Type II | - | Treated backing (for insulation varnish) (see 6.1.2). |

2.2 Classes.

<u>Class</u>	<u>Backing thickness (mils)</u>
1	1.5 to 2.5
2	2.6 to 3.5
3	3.6 to 4.5
4	4.6 to 5.5
5	5.6 to 6.5
6	6.6 to 7.5

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any other data which may improve this document should be sent to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100.
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FSC 5970

A-A-59474

3. SALIENT CHARACTERISTICS

3.1 Backing material. Backing material shall be fused polytetrafluoroethylene resin. Reprocessed material shall not be used in the manufacture of the backing material. Type II backing shall be treated to accommodate an insulation varnish.

3.1.1 Backing thickness. The backing thickness shall be specified (see 6.2) and shall be not less than 1.5 mils (0.038 mm) exclusive of the adhesive thickness when tested in accordance with ASTM-D3652.

3.1.2 Tensile strength and dielectric breakdown. The tensile strength and dielectric breakdown of the backing material shall meet the requirements in table I for the backing thickness specified when tested in accordance with ASTM-D3759 and 4.3.1.

TABLE I. Backing thickness, required tensile strength and dielectric breakdown values.

Backing thickness (ASTM-D3652)		Tensile strength (ASTM-D3759)		Dielectric breakdown (ASTM-D149)	
mils	mm	Type I and II lbs/in width	Type I and II N/mm width	Type I (volts-min)	Type I (volts-min)
1.5 – 2.5	0.038 - .065	7.0	1.23	4,200	3,800
2.6 – 3.5	0.066 - .089	12.0	2.10	7,200	6,500
3.6 – 4.5	0.090 - .115	17.0	2.98	10,300	9,000
4.6 – 5.5	0.116 - .141	22.0	3.85	12,700	11,500
5.6 – 6.5	0.142 - .166	27.0	4.73	15,400	14,000
6.6 – 7.5	0.167 - .191	32.0	5.60	18,000	16,500

3.1.3 Melting point. The melting point of the backing material shall be 590 ± 20 °F (310 ± 10 °C) when tested in accordance with ASTM-D1457.

3.1.4 Specific gravity. The specific gravity of the backing material shall be not greater than 2.21 and shall be not less than 2.15 when tested in accordance with ASTM-D792, Method A.

3.1.5 Adhesive. The adhesive shall be pressure sensitive silicone polymer applied uniformly, free of voids and lumps, to the backing and shall not require heat treatment or any other means of preparation prior to application.

3.2 Rolls. Type I tape shall be uniformly wound on cores, adhesive side in, without liner or separator. Type II shall be uniformly wound on cores, adhesive side in, and is permitted to have a liner.

A-A-59474

- 3.2.1 Core. The core shall be rigid to prevent distortion of the roll during shipment and use. The core shall have a tolerance of $\pm 1/16$ inch (1.6 mm) of the nominal inner diameter specified (see 6.2).
- 3.2.2 Dimensions. Unless otherwise specified (see 6.2), the tape shall be 36 yards (32.9 m) in length. The width of the tape (see 6.3) shall be as specified by the acquiring activity (see 6.2) with a tolerance that shall be $\pm 1/64$ inch (0.4 mm).
- 3.2.3 Marking. Unless otherwise specified (see 6.2), each roll shall be marked in or on the edge of the core with the: manufactures name, designation of the product, specification number, type, class, month and year of manufacture.
- 3.2.4 Splices. The tape shall not contain any splices on a 36 yard (32.9 m) roll. For rolls greater than 36 yards in length the number of splices shall be as specified by the acquiring activity (see 6.2).
- 3.3 Varnish adhesion (type II only). Insulation varnish shall not crack or peel away from treated backing and there shall not be any bare spots after air drying of the varnish when tested in accordance with 4.3.2.
- 3.4 Elongation. The elongation value between bench marks two inches (51 mm) apart shall be not less then 100 percent when tested in accordance with ASTM-D3759.
- 3.5 Moisture absorption. The moisture absorption on the backing material without the adhesive mass shall be not greater than 0.1 percent when tested in accordance with ASTM-D570.
- 3.6 Volume resistivity. Volume resistivity shall be not less than 1×10^{14} ohms/cm when tested in accordance with ASTM-D257.
- 3.7 Adhesion as received. The adhesion as received shall be not less than 16 ounces/inch (0.175 N/mm) when tested in accordance with ASTM-D3330.
- 3.8 Resistance to curl and twist. The tape curl shall be not greater than $3 \pm 1/64$ inch (76 ± 0.4 mm) and the twist shall be not greater than 360 ± 5 degrees when tested in accordance with ASTM-D3813. The tape shall not curl or twist back on to its self.
- 3.9 Adhesion at elevated temperature. The tape slippage shall be not greater than 0.125 inch (3 mm) per hour when tested in accordance with FED-STD-101, Method 2054, as modified in 4.3.3.

A-A-59474

4. QUALITY ASSURANCE PROVISIONS

4.1 Product conformance. The tapes provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

4.2 Market acceptability. The following market acceptability criteria is necessary to document the quality of the product to be provided under this commercial item description: The company furnishing the tape must have been producing a product meeting the requirements of this commercial item description for at least 6 months.

4.3 Testing. All tests shall be conducted and rolls shall be conditioned prior to testing for a period of 24 hours at a temperature of 73 ± 3.0 °F (22.8 ± 1.79 °C) and a relative humidity of 50 ± 5 percent.

4.3.1 Dielectric breakdown test. Dielectric breakdown shall be conducted on the primed, etched, or other surface of treated backing material without the adhesive mass. The apparatus shall be in accordance with ASTM-D149 utilizing the short-time test with air as the medium. The transformer and source of supply of energy rating shall be not less than 2 kVA. The frequency shall be not greater than 100 Hz. The electrodes shall be opposing cylindrical brass rods 1/4 inch (6.4 mm) in diameter with edges rounded to a radius of 1/32 inch (0.8 mm). The upper movable electrode shall weigh 0.1 ± 0.005 pound (0.045 ± 0.002 kg). If necessary, a special testing device shall be used to clamp the test specimen under pressure in order to prevent flashover around the edges of the material. The voltage shall be increased at a rate of 500 volts/sec.

4.3.2 Varnish adhesion (type II only). An insulation varnish shall be applied to a six-inch (152 mm) length of the treated backing to a thickness of 4 mils (0.100 mm) and dried for 72 hours. After drying, the tape shall be examined for uniformity of the varnish film and complete surface wetting. The tape shall then be bent 180 degrees over a 1/8 inch (3 mm) mandrel. The specimen, after bending, shall be examined for cracking or peeling away of insulation varnish from backing as specified in 3.3.

4.3.3 Adhesion at elevated temperature. The panel shall be placed in an oven, a 3.53 ounce (100 gm) load shall be uniformly applied to the free end of the tape, and the oven temperature raised to 500 °F (260 °C) in approximately 1 hour. After 1 hour at 500 °F, the specimen shall be examined for slippage. The slippage shall be not greater than 0.125 (3 mm). Three specimens shall be tested. Failure of more than one specimen to meet the requirement shall be cause for rejection.

A-A-59474

5. PACKAGING

5.1 Preservation, packing and marking. Preservation, packing, and marking shall be specified in the contract or order.

6. NOTES

6.1 Intended use. The pressure-sensitive tapes covered by this specification are for electrical systems of underwater ordnance equipment, aircraft, missile, and other weapons systems within the limitations of the performance requirements.

6.1.1 Type I. Type I tape is intended for splicing insulation of polytetrafluoroethylene-coated electrical wire for continuous operation at 500 °F (260 °C) and where a minimum of 15 lbs/inch (2.63 N/mm) of tensile strength is required for watertight seals around blasting cap and detonating cord, lap splicing of firing cable to prevent shorting out of firing circuit watertight seals around junctions of non-elastic caps and safety fuses, and general use in underwater demolition.

6.1.2 Type II. Type II tape is intended for use in electrical equipment where it is necessary to impregnate with insulation varnish after application of the tape.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of the DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced.
- c. Type and class (see 2.1 and 2.2).
- d. Backing thickness (see 3.1.1).
- e. Core nominal inner diameter (see 3.2.1).
- f. Length (if other than 36 yards) and width of tape (see 3.2.2).
- g. If markings of roll are required (3.2.3).
- h. The number of splices allowed (if the length is greater 36 yards) (see 3.2.4).

6.3 Tape widths of 1/2, 1, 1-1/2, and 2 inches (13, 25, 38, and 51 mm) are commonly available and used.

A-A-59474

6.4 Source of documents.

6.4.1 Federal Standards and Specifications may be obtained from the General Services Administration Specifications Section, Suite 8100, 470 E. L'Enfant Plaza, SW, Washington, DC 20407.

6.4.2 American Society for Testing and Materials (ASTM) documents may be obtained from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Military interests:

Custodians:

Army – CR

Navy – AS

Air Force – 85

Review activities:

Army – MI, SM

Navy – EC, OS

Air Force – 99

DLA – GS

Other: DS

Civil Agency Coordinating
Activity:

GSA/FSS

Preparing Activity:

Navy – AS

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