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Standard Specification for Unsintered Pigmented Polytetrafluoroethylene (PTFE) Extruded Film or Tape[1]

This standard is issued under the fixed designation D7193; 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.

1. Scope

~~1.1This specification covers unsintered, pigmented, extruded films or tapes manufactured from polytetrafluoroethylene, in nominal thicknesses from 0.025 mm (0.001 in.) to 0.51 mm (0.020 in.), that are >97% virgin PTFE in composition prior to introducing pigments.~~ *

1.1 This specification covers unsintered, pigmented, extruded films or tapes manufactured from polytetrafluoroethylene, in nominal thicknesses from 0.025 mm (0.001 in.) to 0.51 mm (0.020 in.), which are >97 % virgin PTFE in composition prior to introducing pigments.

NOTE 1—For unsintered non-pigmented products refer to Specification D6585.

1.1.1 The use of recycled PTFE for production of unsintered extruded films or tapes has not been identified at this time. When commercial usable processes and materials are available, this specification will be revised to include recycled materials.

1.2 The values stated in SI units are detailed in IEEE/ASTM SI-10 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 problems 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.*

NOTE ~~1~~2—Although this specification and ISO/DIS 13000-1 (1997) and ISO/DIS 13000-2 (1997) differ in approach or detail, data obtained relating to specific properties, using either are technically equivalent.

NOTE~~2—This~~ 3—This specification is intended to be a complement to Specification D6585, as the materials covered herein vary significantly enough due to their additives to warrant a stand-alone set of requirements.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

D150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

D618 Practice for Conditioning Plastics for Testing

D638~~Test Method for Tensile Properties of Plastics~~ 882 Test Method for Tensile Properties of Thin Plastic Sheeting

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

D1711 Terminology Relating to Electrical Insulation

D3892 Practice for Packaging/Packing of Plastics

D6040 Guide to Test Methods for Unsintered Polytetrafluoroethylene (PTFE) Extruded Film or Tape

D6585 Specification for Unsintered Polytetrafluoroethylene (PTFE) Extruded Film or Tape

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

IEEE/ASTM SI-10 Standard for Use of the International System of Units (SI): The Modern Metric System

[1] This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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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.**

2.2 *ISO Standards:*[3]

ISO/DIS 13000-1 Plastics—Polytetrafluoroethylene (PTFE) Semi-Finished Products—Part 1: Requirements and Designation

ISO/DIS 13000-2 Plastics—Polytetrafluoroethylene (PTFE) Semi-Finished Products—Part 2: Preparation of Test Specimens and Determination of Properties

2.3 *GSA Standard:*[4]

A-A-58092 Tape, Anti-Seize Polytetrafluoroethylene

3. Terminology

3.1 *Definition*—Definitions are in accordance with Terminologies D883, D1711, and Test Methods D257; and abbreviated terms are in accordance with Terminology D1600, unless otherwise specified.

3.2 *lot*, *n*—one production run or a uniform blend of two or more production runs

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *film*, *n*—full width material received as finished film.

3.3.2 *tape*, *n*—material that has been slit from the finished film.

3.3.3 *tensile strength at yield*, *n*~~—from Test Methods D638, Figure A2.3.~~ —from Test Methods D882.

3.3.4 *pigment*—liquid or dry matter used as an additive, to alter the color of finished film or tape.

4. Classification

4.1 This specification covers three types of unsintered, pigmented, extruded PTFE tapes:

4.1.1 *Type I*—Thread Seal Tape (TST) with an apparent density of 0.50-1.60 g/cm^3.

4.1.2 *Type II*—Low Density Tape with an apparent density of 0.60-0.80 g/cm^3. ~~Note3—Other low apparent density products that do not fall into this density range are available. The values vary on these products and must be agreed to between supplier and purchaser.~~

4.1.3 *Type III*—Wire and Cable Tape with an apparent density of 1.40-1.65 g/cm^3~~.~~.

NOTE 4—Other products that do not fall into these density ranges are available. The values vary on these products and must be agreed to between supplier and purchaser.

4.2 Grades of tape are identified in Tables 1-3.

4.3 A line callout system is used to specify materials in this specification. The system uses pre-defined cells to refer to specific aspects of this specification, as illustrated below:

Standard Number Block	Type	Specification Grade	Class	Special Notes
ASTM D7193	III	2 mil	---	Color to be Royal Blue

For this example, the line call-out would be: ASTM D7193, III, 2 MIL, Color to be Royal Blue, that ~~would specify~~ specifies an unsintered wire and cable tape, 2 mil thick, ~~and would have~~having all of the properties listed for that type and grade in the appropriate specified properties, tables, or both, in the specification identified. A comma is used as the separator between the standard number and the type. Separators are not needed between the type and grade because they are, in turn, Roman numerals and Arabic digits as provided in Section B8. of the *Form & Style for ASTM Standards*, April 2004 Edition. Provision for "Special Notes" is included so that other information can be provided when required. This example ~~would be~~relates to wire and cable tape with the added requirement that it be royal blue in color. When special notes are used, they shall be preceded by a comma.

5. Performance Requirements

5.1 Basic requirements from the property tables are always in effect unless superseded by specific suffix requirements, which always take precedence.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org..

[4] Available from General Services Administration, Engineering and Commodity Management Division (9FTE-10), 400 15th St. SW, Auburn, WA 98001

TABLE 1 TYPE I Thread Seal Tape[A] with an Apparent Density of 0.50 to 1.60 g/cm^3

Grade	Apparent Density, g/cm^3		Thickness				Tensile Strength at Yield		Elongation at Maximum Strength
	Min	Max	mm	Tol	(in.)	Tol	MPa	psi	Min percent
Economy	0.50	0.90	0.076		0.0030				
Standard	0.80	1.10	0.076	±0.0127	0.0030	±0.0005			50
Mil Spec.A-A-58092	1.20		0.088	+0.0254 -0.0381	0.0035	+0.0010 -0.0015			40
Premium	1.20	1.60	0.076	±0.0127	0.0030	±0.0005	11.72	1700	75

[A] Where no property is listed, there is no requirement.