



Standard Specification for Unsintered Polytetrafluoroethylene (PTFE) Extruded Film or Tape¹

This standard is issued under the fixed designation D 6585; 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

1.1 This specification covers unsintered extruded films or tapes manufactured from virgin polytetrafluoroethylene, in nominal thickness from 0.025 to 0.39 mm (0.001 to 0.010 in.), and are > 97 % PTFE in composition.

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 The following precautionary statement pertains only to the test method portion, Section 8 of this specification: *This standard does not purport to address all 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.*

NOTE 1—There is no ISO standard that covers information included in this specification. A few of the test methods are mentioned in ISO 12086-2: 1995.

2. Referenced Documents

2.1 ASTM Standards:

- D 257 Test Methods for DC Resistance or Conductance of Insulating Materials²
- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing³
- D 638 Test Methods for Tensile Properties of Plastics³
- D 883 Terminology Relating to Plastics³
- D 1600 Terminology for Abbreviated Terms Relating to Plastics³
- D 1711 Terminology Relating to Electrical Insulation²

- D 3892 Practice for Packaging/Packing of Plastics⁴
- D 4895 Specification for Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion⁵
- D 6040 Test Methods for Unsintered Polytetrafluoroethylene (PTFE) Extruded Film or Tape⁵
- IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System³
- 2.2 *ISO Standard:*
 - ISO 12086-2: 1995 Plastics-Fluoropolymer Dispersions and Molding and Extrusion Materials Part-2 Preparation of Test Specimens and Determination of Properties⁶
- 2.3 *GSA Standard:*
 - A-A-58092 Tape, Antiseize, Polytetrafluoroethylene⁷

NOTE 2—Supersedes MIL-T-27730A (ASG) 7 January 1997.

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology D 1711, Terminology D 883, and Test Method D 257 and abbreviated terms are in accordance with Terminology D 1600, unless otherwise specified.

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

3.2 Definitions of Terms Specific to This Standard:

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

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

3.2.3 *tensile strength at yield, n*—from Test Methods D 638, Fig. A2.3.

4. Classification

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

4.1.1 *Type I*—Thread seal tape (T.S.T.) with an apparent density of 0.50 to 1.60 g/cm³.

4.1.2 *Type II*—Low density tape with an apparent density of 0.60 to 0.80 g/cm³.

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.

Current edition approved Aug. 10, 2000. Published October 2000.

² *Annual Book of ASTM Standards*, Vol 10.01.

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 08.02.

⁵ *Annual Book of ASTM Standards*, Vol 08.03.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ A-A-58092 can be obtained from General Services Administration, Engineering and Commodity Management Division (9FTE-10), 400 15th St. SW, Auburn, WA 98001.

NOTE 3—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 1.50 to 1.70 g/cm³.

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

4.3 A one-line system may be used to specify materials covered by this specification. This 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 |
|--------------------------|------|------------------------|-------|---------------------------|
| Example: ASTM D 6585 | III | 2 mil | — | color to be Muncel Red |

For this example, the line call-out would be: ASTM D 6585, III, 2 mil, color to be Muncel Red that would specify an unsintered wire and cable tape, 2 mil thick, and would have 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 and Style for ASTM Standards*. Provision for “Special Notes” is included so that other information can be provided when required. This example would be wire and cable tape noting that the color shall be a Muncel Red. When special notes are used, they should 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.

5.2 The materials shall conform to the requirements in Tables 1-3 and suffix requirements as they apply.

6. Sampling

6.1 Sampling shall be in accordance with an adequate statistical sampling procedure.

7. Conditioning

7.1 For those tests where conditioning is required, condition the test specimens in accordance with Procedure A of Practice D 618, except the time shall be for a period of at least 4 h prior to test instead of the 40 h required by this method. If the test material has been exposed to temperatures below 20°C (68°F) within 24 h period prior to test, the conditioning shall be at least 24 h.

7.2 Conduct tests at the standard laboratory temperature of 23 ± 2°C (73.4°F ± 3°F). The maintenance of constant humidity is not necessary. In reference cases, the standard atmosphere and 50 ± 5 % relative humidity shall apply.

8. Test Methods

8.1 The properties enumerated in this specification shall be determined in accordance with test methods referenced in Section 2 of Test Method D 6040.

8.1.1 The number of samples shall be consistent with the requirements of Section 6.

8.1.2 One set of test specimens shall be considered sufficient for testing each lot. The average result of the specimens shall conform to the requirements of this specification.

9. Inspection and Certification

9.1 Inspection and certification of the material supplied with reference to a specification based on this classification system shall be for conformance to the requirements specified herein.

9.2 Lot-acceptance inspection shall be the basis on which acceptance or rejection of the lot is made. The lot-acceptance inspection shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

9.3 Periodic check inspection with reference to a specification based upon this classification system shall consist of the tests for all requirements of the material under the specification. Inspection frequency shall be adequate to ensure the material is certifiable in accordance to 9.4.

9.4 Certification shall be that the material was manufactured by a process in statistical control, sampled, tested, and inspected in accordance with this classification system, and that the average values for the lot meet the requirements of the specification.

9.5 A report of test results shall be furnished when requested. The report shall consist of results of the lot-acceptance inspection for the shipment and the results of the most recent periodic-check inspection.

10. Packaging and Package Marking

10.1 *Packaging*—The materials shall be packaged in standard commercial containers constructed so as to ensure acceptance by common carrier unless otherwise specified in the contract or order.

10.2 *Package Marking*—Shipping containers shall be marked with the name of the material, type, thickness, and quantity contained therein. Each roll or package of sheets shall be marked to designate type, lot number and manufactures name.

TABLE 1 Type I Thread Seal Tape with an Apparent Density of 0.50 to 1.60 g/cm³

NOTE 1—Where no property is listed there is no requirement.

| Grade | Apparent Density, g/cm ³ | | Thickness | | | Tensile Strength at Yield | | Elongation at Maximum Strength | |
|-------------------------|-------------------------------------|------|-----------|-----------------------|--------|---------------------------|-------|--------------------------------|--------|
| | min | max | mm | tolerance | in. | tolerance | MPa | psi | min, % |
| 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 | +10.0254, - 0.0381 | 0.0035 | +10.0010, - 0.0015 | ... | ... | 40 |
| Premium | 1.20 | 1.60 | 0.076 | ± 0.0127 | 0.0030 | ± 0.0005 | 11.72 | 1700 | 75 |

TABLE 2 Type II Low Density Tape with an Apparent Density of 0.60 to 0.80 g/cm³

| Grade | Apparent Density, g/cm ³ | | Thickness | | | Tensile Strength at Yield | | Elongation at Maximum Strength | |
|--------|-------------------------------------|------|-----------|-----------|-------|---------------------------|-------|--------------------------------|--------|
| | min | max | mm | tolerance | in. | tolerance | MPa | psi | min, % |
| 4 mil | 0.60 | 0.80 | 0.102 | ± 0.0076 | 0.004 | ± 0.0003 | 13.10 | 1900 | 40 |
| 5 mil | 0.60 | 0.80 | 0.127 | ± 0.0102 | 0.005 | ± 0.0004 | 13.10 | 1900 | 40 |
| 10 mil | 0.60 | 0.80 | 0.254 | ± 0.0127 | 0.010 | ± 0.0005 | 8.27 | 1200 | 40 |

TABLE 3 Type III Wire and Cable Tape with an Apparent Density of 1.50 to 1.70 g/cm³

| Grade | Apparent Density, g/cm ³ | | Thickness | | | Tensile Strength at Yield | | Elongation at Maximum Strength | |
|--------|-------------------------------------|------|-----------|-----------|-------|---------------------------|-------|--------------------------------|--------|
| | min | max | mm | tolerance | in. | tolerance | MPa | psi | min, % |
| 2 mil | 1.50 | 1.70 | 0.050 | ± 0.0076 | 0.002 | ± 0.0003 | 12.41 | 1800 | 50 |
| 3 mil | 1.50 | 1.70 | 0.076 | ± 0.0076 | 0.003 | ± 0.0003 | 12.41 | 1800 | 50 |
| 4 mil | 1.50 | 1.70 | 0.102 | ± 0.0076 | 0.004 | ± 0.0003 | 10.34 | 1500 | 50 |
| 5 mil | 1.50 | 1.70 | 0.127 | ± 0.0076 | 0.005 | ± 0.0003 | 10.34 | 1500 | 50 |
| 10 mil | 1.50 | 1.70 | 0.254 | ± 0.0127 | 0.010 | ± 0.0005 | 4.83 | 700 | 100 |

10.3 All packaging and marking provision of Practice D 3892 shall apply to this specification. unsintered

11. Keywords

11.1 apparent density; elongation; extruded; film; fluorocarbon film and tape; PTFE; tape; tensile; thread seal tape;

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).