



Standard Specification for Polytetrafluoroethylene (PTFE) Resin Cast Film¹

This standard is issued under the fixed designation D 3369; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers PTFE-fluorocarbon resin cast film in thicknesses from 0.025 to 0.127 mm (0.001 to 0.005 in.).

1.2 PTFE film and sheet are made by several different processes and the properties of the products reflect both the different starting polymers and the different processes. Properties that are affected include, but are not limited to: tensile strength and elongation at break, porosity, anisotropy, and molecular weight. Related standards are Specifications D 3293 and D 3308. It is important to examine each of the other standards to select the one appropriate for the application.

1.3 The values in SI units are to be regarded as standard. The SI units given in parentheses are for information only.

NOTE 1—There is no similar or equivalent ISO standard.

1.4 The following precautionary caveat pertains only to the test methods portion, Section 6, 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.*

2. Referenced Documents

2.1 ASTM Standards:

D 149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies²

D 374 Test Methods for Thickness of Solid Electrical Insulation²

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing³

D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement³

¹ This specification is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

Current edition approved July 10, 1996. Published September 1996. Originally published as D 3369 – 75. Last previous edition D 3369 – 91a.

In this revision, the Inspection, Rejection and Rehearing, and Certification Sections were revised.

² Annual Book of ASTM Standards, Vol 10.01.

³ Annual Book of ASTM Standards, Vol 08.01.

D 1389 Test Method for Proof-Voltage Testing of Thin Solid Electrical Insulating Materials²

D 1898 Practice for Sampling of Plastics³

D 3293 Specification for PTFE Resin Molded Sheet⁴

D 3308 Specification for PTFE Resin Skived Tape⁴

D 3892 Practice for Packaging/Packing of Plastics⁴

D 4895 Specification for Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion⁵

3. Classification

3.1 This specification covers one type of TFE-fluorocarbon resin cast film.

4. Physical Requirements

4.1 The film shall conform to the property values specified in Table 1.

4.2 The length and width of the film shall be as agreed upon between the purchaser and the manufacturer. The tolerance in length and width shall be + 6.35 mm, – 0 mm (+ 0.25 in., – 0 in.).

4.3 Thickness tolerances shall be as specified in Table 2 when measured at any point at a temperature range from 23 to 30°C (73.4 to 86°F).

4.4 The film shall be natural in color and may vary from cloudy to milky transparent, depending upon thickness.

4.5 The material shall be essentially free of surface blisters, wrinkles, cracks, and other surface defects, unless otherwise agreed upon between purchaser and manufacturer.

4.6 As may be agreed upon between purchaser and manufacturer, one or both sides of the material shall be given a surface treatment to enable the surface to take adhesives or printing inks.

5. Sampling

5.1 Unless otherwise agreed upon between the purchaser and the manufacturer, the materials shall be sampled in accordance with the sampling procedure prescribed in Practice D 1898. Adequate statistical sampling shall be considered an acceptable alternative. A lot shall consist of all material of the same thickness delivered at the same time.

⁴ Annual Book of ASTM Standards, Vol 08.02.

⁵ Annual Book of ASTM Standards, Vol 08.03.

TABLE 1 Property Requirements

Thickness, ^A mm (in.)	Tensile Strength, MPa (psi)	Elongation min, %	Melting Point, °C	Dielectric Strength, ^B min, V/mil	Electrical Flaws at 800 V/mil, per 30.5 m (100 ft) length, max
0.025 (0.001)	29.67 (4300)	400	327 ± 10	4200	8
0.051 (0.002)	29.67 (4300)	400	327 ± 10	4000	4
0.076 (0.003)	29.67 (4300)	400	327 ± 10	3400	2
0.102 (0.004)	31.05 (4500)	400	327 ± 10	3000	0
0.127 (0.005)	31.05 (4500)	370	327 ± 10	2400	...

^A When intermediate thicknesses are specified, the property values shall be in accordance with agreement between purchaser and manufacturer.

^B For thickness where dielectric strength has not been specified, interpolate on the basis of dielectric strength varying inversely as the square root of the thickness.

TABLE 2 Thickness Tolerance

Nominal Thickness, in.	Tolerance, plus or minus, mm (in.)
0.001	0.0025 (0.0001)
0.002 to 0.005, incl	0.0127 (0.0005)

6. Test Methods

6.1 *Conditioning*—For those tests where conditioning is required, condition the test specimens in accordance with Procedure A of Practice D 618 for a period of at least 4 h prior to test. If the test material has been exposed to temperatures below 20°C within 24 h prior to test, the conditioning shall be for at least 24 h.

6.2 *Test Conditions*—Conduct tests at the standard laboratory temperature of 23 ± 2°C (70 to 77°F). The maintenance of constant humidity is not necessary. In reference cases, the standard atmosphere, 50 ± 5 % relative humidity, shall apply.

6.3 *Thickness*—Make measurements of thickness in accordance with Method A of Test Methods D 374.

6.4 *Melting Point*—Determine the melting point in accordance with Specification D 4895.

6.5 *Tensile Properties*—Determine the tensile strength and elongation in accordance with Specification D 4895, using five specimens.

6.6 *Dielectric Strength*—Determine the dielectric strength by testing five specimens in accordance with Test Method D 149, using the short-time test and the 6.25-mm (0.25-in.) diameter electrodes in air.

6.7 *Electrical Flaws*—Test Method D 1389, except use 12.7-mm (0.5-in.) wide sponge electrodes wet with 1 % saline solution in place of metal electrodes. Conduct the test on a specimen 7.6 m (25 ft) in length and if the specimen fails to meet requirements make a retest on two additional specimens each 30.5 m (100 ft) in length.

7. Number of Tests

7.1 One set of test specimens as prescribed in Section 6 shall be considered sufficient for testing each batch. The average result of the specimens tested shall conform to the requirements of this specification.

8. Inspection

8.1 *Lot-Acceptance Inspection*—The lot-acceptance inspection shall consist of those tests that ensure process control during manufacture as well as those necessary to ensure the certifiability.

8.2 *Periodic-Check Inspection*—The periodic-check inspection shall consist of the tests specified for all appropriate requirements of the material under this specification.

9. Rejection and Rehearing

9.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

10. Certification

10.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed in this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished.

10.2 Upon the request of the purchaser in the contract or order, the certification of an independent third party indicating conformance to the requirements of this specification may be considered.

11. Packaging and Package Marking


11.1 *Packaging*—The material shall be packaged in standard commercial containers so constructed as to ensure acceptance by common or other carriers for safe transportation at the lowest rate to the point of delivery, unless otherwise specified in the contract or order.

11.2 *Marking*—Shipping containers shall be marked with the name of the material, type, size, and quantity contained therein. Each roll of tape shall be marked to designate type, grade, and lot number. The marking will preferably be on the core.

11.3 All packing, packaging, and marking provisions of Practice D 3892 shall apply to this specification.

12. Keywords

12.1 dispersion PTFE; fluorocarbon; fluoropolymers; polymers; polytetrafluoroethylene; PTFE; PTFE basic shapes; PTFE cast film; PTFE film

 **D 3369**

The American Society for Testing and Materials 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 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, 100 Barr Harbor Drive, West Conshohocken, PA 19428.