



## Standard Specification for PTFE Resin Skived Tape<sup>1</sup>

This standard is issued under the fixed designation D 3308; 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 ( $\epsilon$ ) 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 skived tape in thicknesses from 0.013 to 6.35 mm (0.0005 to 0.250 in.) manufactured by skiving (Note 1) from PTFE resin molding and extrusion materials.

NOTE 1—Skiving is the process of continuously shaving a film on a lathe from the outer surface to the core of a molded cylindrical tube of material.

NOTE 2—Abbreviations have been approved from Terminology D 1600.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following hazard caveat pertains only to the test method portion, Section 7, 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 3—This specification and ISO/FDIS 13000-1 and ISO/FDIS 13000-2 differ in approach or detail, and data obtained using either may not be technically equivalent.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- D 149 Test Methods for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies<sup>2</sup>
- D 374 Test Methods for Thickness of Solid Electrical Insulation<sup>2</sup>
- D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing<sup>3</sup>
- D 638 Test Method for Tensile Properties of Plastics<sup>3</sup>
- D 792 Test Method for Specific Gravity (Relative Density) and Density of Plastics by Displacement<sup>3</sup>

<sup>1</sup> 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 (Section D20.15.12).

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<sup>2</sup> Annual Book of ASTM Standards, Vol 10.02.

<sup>3</sup> Annual Book of ASTM Standards, Vol 08.01.

D 882 Test Methods for Tensile Properties of Thin Plastic Sheeting<sup>2</sup>

D 1389 Methods for Dielectric Proof-Voltage Testing of Thin Solid Electrical Insulating Materials<sup>2</sup>

D 1505 Test Method for Density of Plastics by the Density-Gradient Technique<sup>3</sup>

D 1600 Terminology for Abbreviated Terms Relating to Plastics<sup>4</sup> Microtensile Specimens<sup>3</sup>

D 1898 Practice for Sampling of Plastics<sup>3</sup>

D 3892 Practice for Packaging/Packing of Plastics<sup>5</sup>

D 4894 Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials<sup>4</sup>

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method<sup>6</sup>

#### 2.2 ISO Standards:

ISO/FDIS 13000-1 Plastics—Polytetrafluorethylene (PTFE) Semi-Finished Products Part 1: Requirements and Designation<sup>7</sup>

ISO/FDIS 13000-2 Plastics—Polytetrafluorethylene (PTFE) Semi-Finished Products Part 2: Preparation of Specimens and Determination of Properties<sup>7</sup>

### 3. Classification

3.1 This specification covers four types of PTFE resin skived tape:

3.1.1 *Type I*—Premium; normally used for exacting electrical, mechanical, or chemical applications.

3.1.2 *Type II*—General purpose; for electrical, mechanical, and chemical applications not requiring premium material.

3.1.3 *Type III*—Commercial; for non-critical chemical, electrical, and mechanical applications.

3.1.4 *Type IV*—Utility; having no electrical requirements, and with mechanical properties at lower level.

3.2 Types I, II, III, and IV may be subdivided into two grades according to the base resin used as follows:

3.2.1 *Grade 1*—Made only from virgin resin.

3.2.2 *Grade 2*—May be made using reprocessed resin, or a mixture of virgin and reprocessed resin.

<sup>4</sup> Annual Book of ASTM Standards, Vols 08.01 and 08.04.

<sup>5</sup> Annual Book of ASTM Standards, Vol 08.02.

<sup>6</sup> Annual Book of ASTM Standards, Vol 14.02.

<sup>7</sup> Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

3.3 A one-line system may be used to specify materials covered by this specification. The system uses predefined cells to refer to specific aspects of this specification, as illustrated below:

Specification				
Standard Number	Type	Grade	Class	Special
Block	:	:	:	Notes
:	:	:	:	:
:	:	:	:	:

Example: Specification D 3308 – 97      I      2      ...      "Oil"

For this example, the line callout would be: Specification D 3308 – 97,I2, Oil and would specify a skived tape that has 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.<sup>8</sup> Provision for "Special Notes" is included so that other information can be provided when required. This example would be premium PTFE tape noting that the dielectric strength is to be done in oil. When Special Notes are used, they should be preceded by a comma.

**4. Physical Requirements**

- 4.1 The tape shall be made from unpigmented PTFE resin.
- 4.2 The length and width of the roll shall be as agreed upon between the purchaser and the seller. Width tolerances shall be in accordance with Table 1.
- 4.3 The melting point for all types of tape shall be 327 ± 10°C (621 ± 18°F).
- 4.4 The thickness tolerances for skived tape shall be as shown in Table 2.
- 4.5 Tensile strength and elongation shall meet the requirements shown in Table 3.
- 4.6 The requirements for specific gravity shall be as shown in Table 3.
- 4.7 The minimum required values for dielectric strength *S* (V/mil), shall be computed for applicable thicknesses of materials in accordance with the following formulas, where *t* is the thickness of the tape in mils.

$$\begin{aligned} \text{Type I: } S &= 1000 \sqrt{20/t} \\ \text{Type II: } S &= 840 \sqrt{20/t} \\ \text{Type III: } S &= 500 \sqrt{20/t} \end{aligned}$$

Type IV: No requirement for dielectric strength

- 4.8 The number of permissible electrical flaws shall be as agreed between the purchaser and the seller.

**5. Sampling**

5.1 Unless agreed upon between the purchaser and the seller, 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 tape that is part of one manufacturer's production made from the same nominal raw material under the same conditions, and designed to meet the same specifications. A lot shall not exceed 24 h.

<sup>8</sup> See the ASTM Form and Style Manual. Available from ASTM Headquarters.

**TABLE 1 Width Tolerances for Skived Tape**

Width		Tolerance	
mm	in.	mm	in.
12.7	0.5	-0, +0.51	-0, +0.020
25.4	1	-0, +0.64	-0, +0.025
50.8	2	-0, +0.89	-0, +0.035
76.2	3	-0, +0.89	-0, +0.075
152.4	6	-0, +1.91	-0, +0.125
304.8	12	-0, +3.18	-0, +0.250
609.6	24	-0, +6.35	-0, +0.250

**6. Number of Tests and Retests**

6.1 One set of test specimens as prescribed in Section 7 shall be considered sufficient for testing each batch. The average result of the specimens shall conform to the requirements of this specification.

**TABLE 2 Thickness Tolerances for Skived Tape**

Thickness		Tolerance	
mm	in.	mm	in.
0.013 to 0.025	0.0005 to 0.001	±0.0025	±0.0001
0.028 to 0.048	0.0011 to 0.0019	±0.008	±0.0003
0.051 to 0.076	0.002 to 0.003	±0.008	±0.0003
0.089 to 0.25	0.0035 to 0.010	±0.013	±0.0005
0.28 to 0.38	0.011 to 0.015	±0.026	±0.0010
0.41 to 1.02	0.016 to 0.040	±0.038	±0.0015
1.04 to 1.55	0.041 to 0.061	±0.127	±0.0050
1.58 to 3.18	0.062 to 0.125	±0.13	±0.0050
>3.18	>0.125	±0.254	±0.010

**7. Test Methods**

7.1 The properties enumerated in this specification shall be determined in accordance with the following test methods:

7.1.1 *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.

**TABLE 3 Mechanical Requirements for Skived Tape**

Type	Tensile Strength, <sup>A</sup> min		Elongation, min,%	Specific Gravity
	MPa	psi		
I	27.58	4000	300	2.14 to 2.19
II	19.31	2800	200	2.14 to 2.19
III	11.00	1600	75	2.14 min
IV	9.66	1400	50	2.14 min

<sup>A</sup> Tape 6.35 mm (¼ in.) or wider.

7.1.2 *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.

7.1.3 *Thickness*—Measure thickness in accordance with Method A of Test Methods D 374.

7.1.4 *Melting Point*—Determine the melting point on one specimen in accordance with the test method stated in Specification D 4894.