Standard Specification for PTFE Resin Skived Tape

This standard is issued under the fixed designation D3308; 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 (e) indicates an editorial change since the last revision or reapproval.

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 D1600.

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

1.3 The following hazard caveat 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 3—This specification and ISO 13000-1 and ISO 13000-2 differ in approach or detail, and data obtained using either may not be technically equivalent.

2. Referenced Documents

2.1 ASTM Standards:

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

D374 Test Methods for Thickness of Solid Electrical Insulation

D618 Practice for Conditioning Plastics for Testing

D638 Test Method for Tensile Properties of Plastics

D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

D882 Test Method for Tensile Properties of Thin Plastic Sheeting

D883 Terminology Relating to Plastics

D1389 Test Method for Proof-Voltage Testing of Thin Solid Electrical Insulating Materials

D1600 Terminology for Abbreviated Terms Relating to Plastics

D3892 Practice for Packaging/Packing of Plastics

D4894 Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials

D882 Test Method for Tensile Properties of Thin Plastic Sheeting

D1389 Test Method for Proof-Voltage Testing of Thin Solid Electrical Insulating Materials

D1600 Terminology for Abbreviated Terms Relating to Plastics

D3892 Practice for Packaging/Packing of Plastics

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D3892 Practice for Packaging/Packing of Plastics

D4894 Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials

2.2 ISO Standards:

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

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

3. Terminology

3.1 Definitions:
Definitions are in accordance with Terminology D883 unless otherwise specified.

3.2 Definitions of Terms Specific to this Standard:

3.2.1 lot, n—One production run, or a uniform blend of two or more production runs.

3.2.2 film, n—Full-width material received as finished film.

3.2.3 Mil, n—1/1000 (0.001) of an inch.

4. Classification

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

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

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

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

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*A Summary of Changes section appears at the end of this standard

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

4.2 Types I, II, III, and IV may be subdivided into two 
grades in accordance with the base resin used as follows:

4.2.1 Grade 1—Made only from virgin resin.

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

4.3 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:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Standard Number : Type : Grade : Class : Special Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D3308 : 06</td>
</tr>
</tbody>
</table>

Example: Specification D3308 – 06

For this example, the line callout would be: Specification 
D3308 – 06, 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 specifica-
cation 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 
umerals and Arabic digits. Provision for “Special Notes” is 
included so that other information can be provided when 
required. This example would be premium PTFE tape without 
special requirements. When Special Notes are used, they 
should be preceded by a comma.

5. Physical Requirements

5.1 The tape shall be made from unpigmented PTFE resin.

5.2 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.

5.3 The melting point for all types of tape shall be 327 ± 
10°C (621 ± 18°F).

5.4 The thickness tolerances for skived tape shall be as 
shown in Table 2.

5.5 Tensile strength and elongation shall meet the require-
ments shown in Table 3.

5.6 The requirements for specific gravity shall be as shown 
in Table 3.

5.7 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.

Type I: $S = 1000$ times square root of $(20/t)$

Type II (thickness ≥0.003 in.): $S = 840$ times square root of 
$(20/t)$

Type II (thickness <0.003 in.): $S = 630$ times square root of 
$(20/t)$

Type III: $S = 500$ times square root of $(20/t)$

Type IV: No requirement for dielectric strength

5.8 The number of non-dielectric strength failure mode 
electrical flaws shall be determined in accordance with Test 
Method D1389.

6. Sampling

6.1 Sampling shall be statistically adequate to satisfy the 
requirements of 9.4.

7. Number of Tests and Retests

7.1 One set of test specimens as prescribed in Section 8 
shall be considered sufficient for testing each batch. The 
average result of the specimens shall conform to the require-
ments of this specification.

8. Test Methods

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

8.1.1 Conditioning—For those tests where conditioning is 
required, condition the test specimens in accordance with 
Procedure A of Practice D618 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.

8.1.2 Test Conditions—Conduct tests at the standard lab-
atory 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.

8.1.3 Thickness—Measure thickness in accordance with 
Method A of Test Methods D374, for all thicknesses.

8.1.4 Melting Point—Determine the melting point on one 
 specimen in accordance with the test method stated in Speci-
fication D4894.
NOTE 4—Use of alternate methods or equipment for the measurement of thickness is permitted with agreement between producer and buyer.

8.1.5 Tensile Properties—Determine the tensile strength and percentage elongation at break in accordance with Test Method D638, for tapes or films 1.0 mm (0.04 in.) thick or greater, using Type I specimen at 20 in./min ± 10%. For tapes or films less than 1.0 mm (0.04 in.) thick, determine the tensile strength and percentage elongation at break in accordance with Test Method D882.

8.1.6 Dielectric Strength—Determine the dielectric strength in accordance with Test Methods D149 using the short time test. Use air as the test medium for tapes up to and including 0.254 mm (0.010 in.) thick. For tapes greater than 0.254 mm (0.010 in.) thick, or where specimen configuration could result in flashover or partial discharge (corona) during the test, the test medium shall be oil. Use three specimens in determining the dielectric strength of each lot of tape.”

NOTE 5—Dielectric values obtained in oil is a requirement for the laminate industry. Therefore, it is necessary to test dielectric strength in oil when requested by these customers. Values obtained when testing thin skived tape in oil are significantly different than those obtained using the air method.

8.1.7 Specific Gravity—Determine the specific gravity on two specimens in accordance with Method A of Test Methods D792. Add 2 drops of a wetting agent (liquid detergent or other surfactant) to the water in order to reduce the surface tension and ensure complete wetting of the sample.

8.1.8 Electrical Flaws—Use Test Method D1389 for the determination of electrical flaws.

9. Inspection

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 shall be the basis on which acceptance or rejection of the lot is made. Lot-acceptance testing shall consist of the tests seen in Section 8.

9.3 Periodic check inspection with reference to a specification based on this classification system shall consist of the tests for all requirements of the material under the specification.

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 (line callout).

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 Marking

10.1 Packaging—The material shall be packaged in standard commercial containers so constructed as to ensure acceptability 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.

10.2 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 be, preferably, on the core.

10.3 All packing, packaging, and marking provisions of Practice D3892 shall apply to this specification.

10.4 Packaging and marking requirements defined by the purchaser shall take precedence over the above.

11. Keywords

11.1 fluorocarbon polymer; fluoropolymers; granular PTFE; polytetrafluoroethylene; PTFE; PTFE basic shapes; PTFE film; PTFE skived tape

### SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D3308 - 06) that may impact the use of this standard. (August 1, 2012)

(1) Reworded 5.8.
(2) Added Note 4, and re-numbered Note 5.
(3) Reworded 8.1.8.