

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard



AMS 3667C

Issued MAR 1966
Revised JAN 1993
Reaffirmed DEC 1998

Superseding AMS 3667B

Polytetrafluoroethylene Sheet, Molded General Purpose Grade, As Sintered

FOREWORD

Changes to this Reaffirm are editorial/format only.

1. SCOPE:

1.1 Form:

This specification covers virgin, unfilled polytetrafluoroethylene resin in the form of sheet, manufactured by compression molding and sintering.

1.2 Application:

This sheet has been used typically for mechanical parts such as insulation, seals, and bearings requiring chemical inertness up to 260 °C (500 °F), but usage is not limited to such applications.

1.3 Classification:

Sheet covered by this specification is classified as follows:

Type 1 - For parts, such as insulators and mounting posts, requiring chemical inertness and good mechanical and electrical properties up to 260 °C (500 °F). Testing of all specified properties is required.

Type 2 - For parts, such as seals, backup rings, and bearings, requiring chemical inertness and good mechanical properties up to 260 °C (500 °F). Dielectric strength test (3.3.4) is not required.

1.3.1 Unless a specific type is ordered, Type 1 shall be supplied.

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1.4 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 149	Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D 638	Tensile Properties of Plastics
ASTM D 638M	Tensile Properties of Plastics (Metric)
ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 1708	Tensile Properties of Plastics by Use of Microtensile Specimens

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Sheet shall be molded from polytetrafluoroethylene powder without the addition of fillers, pigments, or adulterants and shall be sintered.

3.2 Color:

Shall be predominantly white. Surface discoloration from sintering and/or annealing may vary from white to mottled gray or brown. Small gray, brown, or black spots shall not in themselves be unacceptable provided they have no detrimental effect on performance of the finished product.

3.3 Properties:

Sheet shall conform to the requirements shown in Table 1; tests shall be performed on the sheet supplied and in accordance with specified test methods, insofar as practicable.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Method
3.3.1	Tensile Strength at 23 °C ± 1 (73 °F ± 2), minimum	3000 psi (20.7 MPa)	4.5.1
3.3.2	Elongation at 23 °C ± 1 (73 °F ± 2), minimum	200%	4.5.1
3.3.3	Specific Gravity at 23/23 °C (73/73 °F)	2.14 to 2.19	ASTM D 792 Add two drops of wetting agent to the water
3.3.4	Dielectric Strength, applicable only to Type 1 sheet Short Time Test, minimum	500 Volts per mil (19.7 kV/mm)	4.5.2

3.4 Quality:

Sheet, as received by purchaser, shall be uniform in quality and condition, smooth, and free from foreign materials and from imperfections detrimental to usage of the sheet.

3.5 Tolerances:

The following tolerances apply at 23 to 30 °C (73 to 86 °F):

3.5.1 Thickness: Shall be as shown in Table 2.

TABLE 2A - Thickness Tolerances, Inch/Pound Units

Nominal Thickness (T) Inch	Tolerance	Tolerance
	Inch plus	Inch minus
0.0312 to 0.0938, incl	0.015	0.005
Over 0.0938 to 0.125, incl	0.016	0.008
Over 0.125 to 0.1563, incl	0.018	0.009
Over 0.1563 to 0.1875, incl	0.022	0.011
Over 0.1875 to 0.250, incl	0.030	0.015
Over 0.250 to 0.375, incl	0.038	0.019
Over 0.375 to 0.500, incl	0.046	0.022
Over 0.500 to 0.625, incl	0.054	0.027
Over 0.625 to 0.750, incl	0.070	0.035
Over 0.750 to 1.000, incl	0.087	0.043
Over 1.000 to 1.250, incl	0.102	0.051
Over 1.250 to 1.500, incl	0.118	0.059
Over 1.500 to 1.750, incl	0.134	0.067
Over 1.750 to 2.000, incl	0.150	0.075
Over 2.000	0.10T	0.05T

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TABLE 2B - Thickness Tolerances, SI Units

Nominal Thickness (T) Millimeters	Tolerance Millimeters plus	Tolerance Millimeters minus
0.792 to 2.382, incl	0.38	0.13
Over 2.382 to 3.18, incl	0.41	0.20
Over 3.18 to 3.970, incl	0.46	0.23
Over 3.970 to 4.762, incl	0.56	0.28
Over 4.762 to 6.35, incl	0.76	0.38
Over 6.35 to 9.52, incl	0.96	0.48
Over 9.52 to 12.70, incl	1.17	0.56
Over 12.70 to 15.88, incl	1.37	0.68
Over 15.88 to 19.05, incl	1.78	0.89
Over 19.05 to 25.40, incl	2.21	1.09
Over 25.40 to 31.75, incl	2.59	1.30
Over 31.75 to 38.10, incl	3.00	1.50
Over 38.10 to 44.45, incl	3.40	1.70
Over 44.45 to 50.80, incl	3.81	1.90
Over 50.80	0.10T	0.05T

3.5.2 Width and Length: Shall not vary more than +0.250 inch (+6.35 mm), -0.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to the requirements of this specification.

4.2 Classification of Tests:

Tests for all applicable technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of sheet to a purchaser, on each lot, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

- 4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction sheet shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.
- 4.3 Sampling and Testing:
- Shall be as follows:
- 4.3.1 For Acceptance Tests: Sufficient sheet shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.
- 4.3.1.1 A lot shall be all sheet of the same size made from the same batch of compound in one production run and presented for vendor's inspection at one time.
- 4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.
- 4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.
- 4.4 Approval:
- 4.4.1 Sample sheet shall be approved by purchaser before sheet for production use is supplied, unless such approval be waived by purchaser. Results of tests on production sheet shall be essentially equivalent to those on the approved sample.
- 4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production sheet which are essentially the same as those used on the approved sample sheet. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample sheet. Production sheet made by the revised procedure shall not be shipped prior to receipt of reapproval.
- 4.5 Test Methods:
- 4.5.1 Tensile Strength and Elongation: Shall be determined in accordance with ASTM D 638 or ASTM D 638M, using the microtensile specimen of ASTM D 1708. The initial jaw separation shall be 0.875 inch \pm 0.005 (22.22 mm \pm 0.13) and the speed of testing shall be 2 inches (51 mm) per minute. Sheet over 0.062 to 0.625 inch (1.57 to 15.88 mm), exclusive, in nominal thickness shall be machined to 0.062 inch \pm 0.010 (1.57 mm \pm 0.25) thick before cutting specimens. From sheet 0.625 inch (15.88 mm) and over in nominal thickness, a slice somewhat thicker than 0.062 inch (1.57 mm) shall be cut in a plane parallel to, and less than 0.5 inch (13 mm) from, the plane of one end of the sheet; this slice shall be machined on both faces to 0.062 inch \pm 0.010 (1.57 mm \pm 0.25) thick and the specimens cut from the machined slice. In all cases of specimens reduced to specified thickness by machining, tool marks shall be removed by light sanding in a longitudinal direction.