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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3669B
Superseding AMS 3669A

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POLYTETRAFLUOROETHYLENE SHEET, MOLDED
Premium Grade, As Sintered

1. SCOPE:

1.1 Form: This specification covers one grade of polytetrafluoroethylene resin in the form of molded sheet.

1.2 Application: Primarily for parts requiring higher mechanical and electrical properties than AMS 3667 and chemical resistance up to 260°C (500°F). When dimensional stability is important, sheet may be stress-relief annealed but best results will be obtained by machining parts almost to size, stress-relief annealing, and taking a thin, finishing cut.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D149 - Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D638 - Tensile Properties of Plastics
ASTM D792 - Specific Gravity and Density of Plastics by Displacement
ASTM D1708 - Tensile Properties of Plastics by Use of Microtensile Specimens

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: Sheet shall be molded from virgin polytetrafluoroethylene powder without admixture of fillers, pigments, or adulterants and shall be sintered.

3.2 Color: Shall be opaque white. Minor discolorations or contamination shall not in themselves be unacceptable.

3.3 Properties: Sheet shall conform to the following requirements; tests shall be performed on the sheet supplied and in accordance with specified test methods, insofar as practicable:

3.3.1	Tensile Strength at 23°C ± 1 (73°F ± 2), min	4000 psi (27.5 MPa)	4.5.1
3.3.2	Elongation at 23°C ± 1 (73°F ± 2), min	300%	4.5.1
3.3.3	Specific Gravity at 23°/23°C (73°/73°F)	2.14 - 2.19	ASTM D792 Add 2 drops of wetting agent to the water
3.3.4	Dielectric Strength, Short Time Test, min	600 V per mil (23,600 V/mm)	4.5.2

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

3.5 Tolerances: Unless otherwise specified, the following tolerances apply at 23° - 30°C (73° - 86°F):

3.5.1 Thickness:

TABLE I

Nominal Thickness (T) Inches	Tolerance, Inch plus	Tolerance, Inch minus
0.0312 to 0.0625, incl	0.015	0.005
Over 0.0625 to 0.0938, incl	0.020	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	0.10 T	0.10 T

TABLE I (SI)

Nominal Thickness (T) Millimetres	Tolerance, Millimetres plus	Tolerance, Millimetres minus
0.780 to 1.562, incl	0.38	0.12
Over 1.562 to 2.345, incl	0.50	0.12
Over 2.345 to 3.12, incl	0.40	0.20
Over 3.12 to 3.908, incl	0.45	0.22
Over 3.908 to 4.688, incl	0.55	0.28
Over 4.688 to 6.25, incl	0.75	0.38
Over 6.25 to 9.38, incl	0.95	0.48
Over 9.38 to 12.50, incl	1.15	0.55
Over 12.50 to 15.62, incl	1.35	0.68
Over 15.62 to 18.75, incl	1.75	0.88
Over 18.75 to 25.00, incl	2.18	1.08
Over 25.00 to 31.25, incl	2.55	1.28
Over 31.25 to 37.50, incl	2.95	1.48
Over 37.50 to 43.75, incl	3.35	1.68
Over 43.75 to 50.00, incl	3.75	1.88
Over 50.00	0.10 T	0.10 T

3.5.2 Width and Length: Shall not vary more than +0.250 in. (+6.25 mm), -0.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of sheet shall supply all samples Ø for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. 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:

4.2.1 Acceptance Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of sheet to a purchaser, when a change in material or processing, or both, requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when Ø requested, preproduction sheet shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient sheet shall be taken at random from each Ø 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 Ø compound in one production run and presented for vendor's inspection at one time.

4.3.1.2 An inspection lot shall be not more than 200 lb (90 kg) of sheet. A lot Ø may be packaged or delivered in small quantities under the basic lot approval provided lot identification is maintained.

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have Ø 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 4.6.1 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor. Ø

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 material or processing, or both, 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 D638, using the microtensile specimen of ASTM D1708. The initial jaw separation shall be 0.875 in. ± 0.005 (22.00 mm ± 0.12) and the speed of testing shall be 2 in. (50 mm) per minute. Sheet over 0.062 to 0.625 in. (1.55 to 16.00 mm), excl, in nominal thickness shall be machined to 0.062 in. ± 0.010 in. (1.55 mm ± 0.25) thick before cutting specimens. From sheet 0.625 in. (16.00 mm) and over in nominal thickness, a slice somewhat thicker than 0.062 in. (1.55 mm) shall be cut in a plane parallel to, and not less than 0.5 in. (12 mm) from, the plane of one end of the sheet; this slice shall be machined on both faces to 0.062 in. ± 0.010 (1.55 mm ± 0.25) thick and the specimen 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.

4.5.2 Dielectric Strength: Shall be determined in accordance with ASTM D149 on specimens 0.060 in. ± 0.010 (1.50 mm ± 0.25) thick. Tests shall be conducted under oil using electrodes of corrosion-resistant steel, nominally 0.25 in. (6.25 mm) in diameter with 0.031 in. (0.80 mm) radius at the edges.

4.6 Reports:

4.6.1 The vendor of sheet shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 3669B, vendor's compound number, size, and quantity.