SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3669E

Issued 1969-05
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Revised 2008-03

Superseding AMS3669D

(R) Polytetrafluoroethylene (PTFE) Sheet, Molded Premium Grade, As Sintered

RATIONALE

AMS3669E results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

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

1.2 Application

This sheet has been used typically for machined parts requiring chemical inertness up to 500 °F (260 °C), with better mechanical properties and/or electrical properties than AMS3667, but usage is not limited to such applications.

1.3 Classification

Sheet covered by this specification is classified as follows:

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

Type 2 For parts requiring chemical inertness and good mechanical properties up to 500 °F (260 °C), where electrical insulation is not a consideration. Dielectric strength test (3.3.4) is not required.

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

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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS3667	Polytetrafluoroethylene Sheet, Molded, General Purpose Grade, As Sintered

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 149	Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 4894	Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials

3. TECHNICAL REQUIREMENTS

3.1 Material

Sheet shall be molded from virgin polytetrafluoroethylene (PTFE) powder ASTM D 4894 Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials without admixture of fillers, pigments, or adulterants and shall be sintered.

3.2 Color

Shall be opaque white. Minor discolorations or contamination are acceptable 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 73 °F ± 2 (23 °C ± 1), minimum	4000 psi (27.6 MPa)	4.3.1
3.3.2	Elongation at 73 °F ± 2 (23 °C ± 1), minimum	300%	4.3.1
3.3.3	Specific Gravity at 73 °F (23 °C)	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	600 Volts per mil (23.6 kV/mm)	4.3.2

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

Unless otherwise agreed between vendor and purchaser, dimension tolerances of molded sheets shall be in accordance with Table 2, determined at 73 to 86 °F (23 to 30 °C):

3.5.1 Thickness

Shall be as shown in Table 2.

TABLE 2 - THICKNESS TOLERANCES

Nominal Thickness (T) Inch (Millimeter)	Tolerance Inch (Millimeter) Plus	Tolerance Inch (Millimeter) Minus
0.0312 (0.792) to 0.0938 (2.382) incl	0.015 (0.38)	0.005 (0.13)
Over 0.0938 (2.382) to 0.125 (3.180) incl	0.016 (0.41)	0.008 (0.20)
Over 0.125 (3.180) to 0.1563 (3.970) incl	0.018 (0.46)	0.009 (0.23)
Over 0.1563 (3.970) to 0.1875 (4.762) incl	0.022 (0.56)	0.011 (0.28)
Over 0.1875 (4.762) to 0.250 (6.350) incl	0.030 (0.76)	0.015 (0.38)
Over 0.250 (6.350) to 0.375 (9.520) incl	0.038 (0.96)	0.019 (0.48)
Over 0.375 (9.520) to 0.500 (12.70) incl	0.046 (1.17)	0.022 (0.56)
Over 0.500 (12.70) to 0.625 (15.88) incl	0.054 (1.37)	0.027 (0.68)
Over 0.625 (15.88) to 0.750 (19.05) incl	0.070 (1.78)	0.035 (0.89)
Over 0.750 (19.05) to 1.000 (25.40) incl	0.087 (2.21)	0.043 (1.09)
Over 1.000 (25.40) to 1.250 (31.75) incl	0.102 (2.59)	0.051 (1.30)
Over 1.250 (31.75) to 1.500 (38.10) incl	0.118 (3.00)	0.059 (1.50)
Over 1.500 (38.10) to 1.750 (44.45) incl	0.134 (3.40)	0.067 (1.70)
Over 1.750 (44.45) to 2.000 (50.80) incl	0.150 (3.81)	0.075 (1.90)
Over 2.000 (50.80)	0.10T	0.05T

3.5.2 Width and Length

Shall not vary more than +0.250 inch (+6.35 mm), -0.00 inch.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of sheet shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any testing deemed necessary to ensure that the sheet conforms to AMS requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Each lot of product shall conform to all technical requirements are and shall be performed prior to shipment of sheet to a purchaser.

4.2.1.1 Sampling

When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan and the report of 4.4 shall state that such plan was used.

4.2.1.2 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.

4.2.1.3 Sufficient sheet(s) 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 Test Methods

4.3.1 Tensile Strength and Elongation

Shall be determined in accordance with ASTM D 4894. Specimens shall be prepared from production sheet(s) of sufficient size, or if production sheet(s) will not yield suitable samples, from a test or suitable production sheet from the same resin lot. All results shall be reported.

4.3.2 Dielectric Strength

Shall be determined in accordance with ASTM D 149 on specimens 0.060 inch ± 0.010 (1.52 mm ± 0.25) thick. Tests shall be conducted under oil using electrodes of corrosion resistant steel, nominally 0.25 inch (6.35 mm) in diameter with 0.031 inch (0.79 mm) radius at the edges.

4.4 Reports

The vendor of sheet shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements. This report shall include the purchase order number, lot number, AMS3669E, type, vendor's compound number, size, and quantity.

4.5 Resampling and Retesting

If any specimen used in the above tests fails to meet the specified requirements, disposition of the sheet may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the sheet represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Identification

5.1.1 Packaging shall be accomplished to ensure that the sheet, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any other normal hazard.

5.1.1.1 A lot of sheet may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.

5.1.2 Each package of sheet shall be permanently and legibly marked with not less than the following information:

POLYTETRAFLUOROETHYLENE SHEET, MOLDED
Premium Grade, As Sintered
AMS3669E
TYPE _____
SIZE _____
LOT NUMBER _____
PURCHASE ORDER NUMBER_____
QUANTITY_____
MANUFACTURER'S IDENTIFICATION _____