Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3668A
Superseding AMS 3668
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POLYTETRAFLUOROETHYLENE MOLDINGS
Premium Grade, As Sintered

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1. SCOPE:

1.1 Form: This specification covers one grade of polytetrafluoroethylene in the form of molded rods, tubes, and shapes. This specification does not apply to rods and tubes over 12 in. (305 mm) in dimension parallel to the direction of applied molding pressure, rods less than 0.750 in. (19.05 mm) in diameter, and tubes having wall thickness less than 0.500 in. (12.70 mm).

1.2 Application: Primarily for parts, such as seals, bearings, insulators, and back-up rings, requiring chemical inertness and superior mechanical and electrical properties at temperatures up to 260° C (500° F). When dimensional stability is important, the product may be stress-relief annealed but best results will be obtained by machining 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 Society of Automotive Engineers, Inc., 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 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 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: The product 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.

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

3.3.1 Tensile Strength at 23° C ± 1 (73.4° F ± 1.8)	4000 psi (27.6 MPa)	4.5.1
3.3.2 Elongation at 23° C ± 1 (73.4° F ± 1.8), min	300%	4.5.1
3.3.3 Specific Gravity at 23°/23° C	2.14 - 2.20	ASTM D792 Add 2 drops of wetting agent to the water
3.3.4 Dielectric Strength, Short Time Test, min	1000 V per mil (39,370 V/mm)	4.5.2

3.4 Quality: The product shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from internal and external imperfections detrimental to fabrication, appearance, or performance of parts.

3.5 Tolerances: Unless otherwise specified, the following tolerances apply at 23° - 30° C (73.4° - 86° F):

3.5.1 Rods:

TABLE I

Nominal Diameter Inches	Tolerance, Inch plus only
0.750 to 2.000, incl	0.062
Over 2.000 to 3.000, incl	0.125
Over 3.000 to 5.000, incl	0.187
Over 5.000 to 12.000, incl	0.250

TABLE I (SI)

Nominal Diameter Millimetres	Tolerance, Millimetres plus only
19.05 to 50.80, incl	1.57
Over 58.80 to 76.20, incl	3.18
Over 76.20 to 127.00, incl	4.75
Over 127.00 to 304.80, incl	6.35

3.5.2 Tubes:

TABLE II

Nominal OD or ID Inches	ID Tolerance, Inch minus only	OD Tolerance, Inch plus only
Up to 2.000, incl	0.062	0.062
Over 2.000 to 3.000, incl	0.125	0.125
Over 3.000 to 5.000, incl	0.187	0.187
Over 5.000 to 12.000, incl	0.250	0.250

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TABLE II (SI)

Nominal OD or ID Millimetres	ID Tolerance, Millimetres minus only	OD Tolerance, Millimetres plus only
Up to 50.80, incl	1.57	1.57
Over 50.80 to 76.20, incl	3.18	3.18
Over 76.20 to 127.00, incl	4.75	4.75
Over 127.00 to 304.80, incl	6.35	6.35

3.5.3 Shapes: As agreed upon by purchaser and vendor.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as ø required by 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests.

4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, qualification test ø material shall be submitted to the cognizant qualification agency as directed by the request for procurement, the procuring activity, or the contracting officer.

4.3 Sampling: Sufficient material shall be taken from each lot to perform all required tests in triplicate; a ø lot shall be all product produced in a single production run from the same batch of raw material and presented for vendor's inspection at one time.

4.4 Approval:

4.4.1 Sample material shall be approved by purchaser before material for production use is supplied, unless such approval be waived. Results of tests on production material 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 material which are essentially the same as those used on the approved sample material. ø If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in materials and processing and, when requested, sample material. Production material 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 (22.22 mm ± 0.13) and the speed of testing shall be 2 in. (51 mm) per minute. Specimens shall be prepared from slices 0.031 in. ± 0.002 (0.79 mm ± 0.05) thick cut from the product.

4.5.2 Dielectric Strength: Shall be determined in accordance with ASTM D149 under oil on 0.020-in. ± 0.002 (0.51-mm ± 0.05) thick specimens. When practicable, specimens shall be 1 in. (25 mm) in nominal diameter but may be 0.50 in. (6.4 mm) in nominal diameter if 1 in. (25 mm) diameter specimens cannot be obtained from the product. Electrodes shall be of corrosion-resistant steel, nominally 0.25 in. (6.4 mm) in diameter with 0.031 in. (0.79 mm) radius at the edges for 1-in. (25-mm) diameter specimens and nominally 0.062 in. (1.57 mm) in diameter with rounded edges for 0.5-in. (12.7-mm) diameter specimens.

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4.6 Reports:

4.6.1 The vendor of the product 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 ø shall include the purchase order number, material specification number and its revision letter, vendor's compound number, form and size or part number, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, supplier's compound number, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.7 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for ø each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Packaging shall be accomplished in such a manner as to ensure that the product, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any normal hazard.

5.1.2 Each package shall be permanently and legibly marked to show not less than the following information:

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POLYTETRAFLUOROETHYLENE MOLDINGS
Premium Grade, As Sintered
AMS 3668A
SIZE OR PART NUMBER _____
LOT NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
MANUFACTURER'S IDENTIFICATION _____

5.1.3 Packages shall be prepared for shipment in accordance with commercial practice to ensure carrier ø acceptance and safe transportation to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.1.4 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-794, Level A ø or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.3 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Material not conforming to this specification or to authorized modifications will be subject to rejection.

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