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400 COMMONWEALTH DRIVE WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3668B
Superseding AMS 3668A

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POLYTETRAFLUOROETHYLENE MOLDINGS
Premium Grade, As Sintered

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. (300 mm) in dimension parallel to the direction of applied molding pressure, rods less than 0.750 in. (19 mm) in diameter, and tubes having wall thickness less than 0.500 in. (12.50 mm).

1.2 Application: Primarily for parts, such as seals, bearings, insulators, and backup-rings, requiring chemical inertness and superior mechanical and electrical properties up to 260°C (500°F). When dimensional stability is important, moldings 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 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: 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.

3.3 Properties: Moldings 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 Ø	Tensile Strength at 23°C ± 1 (73°F ± 2), min	4000 psi (27.5 MPa)	4.5.1
3.3.2 Ø	Elongation at 23°C ± 1 (73°F ± 2), min	300%	4.5.1
3.3.3 Ø	Specific Gravity at 23°/23°C (73°/73°F)	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 (39,400 V/mm)	4.5.2

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

3.5 Tolerances: Unless otherwise specified, the following tolerances apply at 23° - 30°C (73° - 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
18.75 to 50.00, incl	1.55
Over 50.00 to 75.00, incl	3.12
Over 75.00 to 125.00, incl	4.70
Over 125.00 to 300.00, incl	6.25

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

TABLE II (SI)

Nominal OD or ID Millimetres	ID Tolerance, Millimetres minus only	OD Tolerance, Millimetres plus only
Up to 50.00, incl	1.55	1.55
Over 50.00 to 75.00, incl	3.12	3.12
Over 75.00 to 125.00, incl	4.70	4.70
Over 125.00 to 300.00, incl	6.25	6.25

3.5.3 Shapes: As agreed upon by purchaser and vendor.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of moldings shall supply all samples for vendor's tests and shall be responsible for performing all Ø 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 moldings conform 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 requirements of this specification are classified as preproduction tests Ø and shall be performed prior to or on the initial shipment of moldings 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 moldings 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 moldings shall be taken at random from Ø 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 moldings of the same configuration made from the same Ø batch of 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 moldings. A Ø lot 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.

4.4 Approval:

4.4.1 Sample moldings shall be approved by purchaser before moldings for production use are supplied, unless such approval be waived by purchaser. Results of tests on production moldings 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 moldings which are essentially the same as those used on the approved sample moldings. 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 moldings. Production moldings 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. Specimens shall be prepared from slices 0.031 in. ± 0.002 (0.80 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 (0.50-mm ± 0.05) thick specimens. When practicable, specimens shall be 1 in. (25 mm) in nominal diameter but may be 0.50 in. (12.5 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. (6.25 mm) in diameter with 0.031 in. (0.80 mm) radius at the edges for 1-in. (25-mm) diameter specimens and nominally 0.062 in. (1.55 mm) in diameter with rounded edges for 0.50-in. (12.5-mm) diameter specimens.

4.6 Reports:

4.6.1 The vendor of moldings 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 3668B, vendor's compound number, form and size or part number, and quantity.