

ETHYLENE TETRAFLUOROETHYLENE MOLDINGS
Stress-Relieved

1. SCOPE:

1.1 Form: This specification covers a melt-processible, copolymer resin of ethylene and tetrafluoroethylene (ETFE) in the form of molded rods, tubes, and shapes.

1.2 Application: Primarily for parts such as seals, insulators, back-up rings, valve liners, and bearings requiring good mechanical, chemical, electrical, environmental (including radiation resistance), and elevated-temperature properties. ETFE offers improved mechanical properties compared to both polytetrafluoroethylene and polyfluoroethylene propylene, while offering essentially the same outstanding chemical, electrical, and environmental performance of these other materials. It is capable of continuous operation up to 150°C (300°F) and, depending on exposure time, load, and environment, can be used intermittently up to 200°C (390°F).

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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

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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: Shall be molded from ethylene tetrafluoroethylene copolymer resin pellets without admixture of fillers, pigments, or adulterants.

3.1.1 Moldings shall be stress-relief annealed after molding for dimensional stability.

3.2 Color: Shall be translucent white. Minor discoloration will be acceptable.

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

- | | | |
|---|------------------------------|---|
| 3.3.1 Tensile Strength at 23°C $\pm$ 1 (73°F $\pm$ 2), min | 5500 psi (38 MPa) | 4.5.1 |
| 3.3.2 Elongation at 23°C $\pm$ 1 (73°F $\pm$ 2), min | 225% | 4.5.1 |
| 3.3.3 Specific Gravity at 23°/23°C (73°/73°F) | 1.68 - 1.73 | ASTM D792;
add 2 drops
of wetting agent
to the water |
| 3.3.4 Dielectric Strength, Short Time Test, min | 1800 V per mil (70,870 V/mm) | 4.5.2 |
| 3.3.5 <u>Dimensional Stability:</u> Rods and shapes 2.000 in. (50.00 mm) and under in nominal diameter or distance between parallel sides and all tubes shall not change in length, diameter, or distance between parallel sides by more than 0.5%, determined as in 4.5.3. Dimensional stability of rods and shapes 2.000 in. (50.00 mm) in nominal diameter or distance between parallel sides shall be as agreed upon by purchaser and vendor. | | |

3.4 Quality: Moldings, 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 moldings.

3.5 Tolerances: 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
Over 12.000	As agreed upon by purchaser and vendor.

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	4.75
Over 125.00 to 300.00, incl	6.25
Over 300.00	As agreed upon by purchaser and vendor.

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