

ETHYLENE TETRAFLUOROETHYLENE EXTRUSIONS

1. SCOPE:

1.1 Form: This specification covers a melt-processible, copolymer resin of ethylene and tetrafluoroethylene (ETFE) in the form of extruded 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

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 extruded from ethylene tetrafluoroethylene copolymer resin pellets without admixture of fillers, pigments, or adulterants.

3.1.1 Annealing of the product is optional. However, if dimensional stability is critical, extrusions shall be annealed when so specified by purchaser.

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

3.3 Properties: Extrusions shall conform to the following requirements; tests shall be performed on the extrusions 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	1500 V per mil (59,060 V/mm)	4.5.2
3.4 <u>Quality:</u> Extrusions, 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 extrusions.		
3.5 <u>Tolerances:</u> The following tolerances apply at 23° - 30°C (73° - 86°F):		

3.5.1 Rods:TABLE I

Nominal Diameter Inches	Tolerance, Inch plus only
Up to 0.250, incl	0.006
Over 0.250 to 0.500, incl	0.009
Over 0.500 to 0.750, incl	0.012
Over 0.750 to 1.000, incl	0.015
Over 1.000 to 1.250, incl	0.018
Over 1.250 to 1.500, incl	0.021
Over 1.500 to 1.750, incl	0.024
Over 1.750 to 2.000, incl	0.027
Over 2.000 to 2.250, incl	0.030
Over 2.250 to 2.500, incl	0.033
Over 2.500	As agreed upon by purchaser and vendor

TABLE I (SI)

Nominal Diameter Millimetres	Tolerance, Millimetres plus only
Up to 6.25, incl	0.15
Over 6.25 to 12.50, incl	0.22
Over 12.50 to 18.75, incl	0.30
Over 18.75 to 25.00, incl	0.38
Over 25.00 to 31.25, incl	0.42
Over 31.25 to 37.50, incl	0.52
Over 37.50 to 43.75, incl	0.60
Over 43.75 to 50.00, incl	0.68
Over 50.00 to 56.25, incl	0.75
Over 56.25 to 62.50, incl	0.82
Over 62.50	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
Over 0.187 to 2.000, incl	0.062	0.062