



AEROSPACE MATERIAL SPECIFICATION

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

AMS 3647A
Superseding AMS 3647

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POLYFLUOROETHYLENEPROPYLENE FILM AND SHEET

1. SCOPE:

1.1 Form: This specification covers polyfluoroethylenepropylene in the form of film and sheet 0.020 in. (0.51 mm) and under in nominal thickness.

1.2 Application: Primarily for electrical, electronic, and mechanical applications requiring a chemically-inert film of the fluorocarbon family, having high dielectric strength and volume resistivity and being free from pinholes and electrical flaws.

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 D374 - Thickness of Solid Electrical Insulation

ASTM D618 - Conditioning Plastics and Electrical Insulating Materials for Testing

ASTM D792 - Specific Gravity and Density of Plastics by Displacement

ASTM D882 - Tensile Properties of Thin Plastic Sheeting

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: Shall be manufactured from virgin, unplasticized, fully fluorinated thermoplastic copolymer of ethylene and propylene.

∅ 3.2 Color: May vary from clear to white or light gray.

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

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3.3.1 Tensile Properties: Shall be as follows, determined in accordance with ASTM D882, Method A, on specimens taken both parallel and perpendicular to the direction of extrusion:

Nominal Thickness		Tensile Strength		Elongation
Inch	(Millimetre)	psi	(MPa)	at Break %, min
0.0005	(0.013)	2000	(13.8)	175
0.001 to 0.020, incl	(0.03 to 0.51, incl)	2500	(17.2)	250

3.3.2 Specific Gravity at 23° /23° C (73° /73° F): Shall be 2.13 - 2.17, determined in accordance with ASTM D792, Method A.

3.3.3 Dielectric Strength at 23°C + 1 (73°F + 2): Shall be as shown in Table I, determined in accordance with ASTM D149, short time test, using rod electrodes on specimens conditioned in accordance with ASTM D618, Procedure A, and using a voltage rise of 500 - 600 V per sec to breakdown:

TABLE I

Nominal Thickness Inch	Dielectric Strength V per mil, min
Up to 0.0005, incl	4000
Over 0.0005 to 0.001, incl	4000
Over 0.001 to 0.002, incl	3500
Over 0.002 to 0.005, incl	2500
Over 0.005 to 0.010, incl	1800
Over 0.010 to 0.020, incl	1400

TABLE I (SI)

Nominal Thickness Millimetre	Dielectric Strength V per mm, min
Up to 0.013, incl	157.5
Over 0.013 to 0.03, incl	157.5
Over 0.03 to 0.05, incl	138.0
Over 0.05 to 0.13, incl	98.4
Over 0.13 to 0.25, incl	70.9
Over 0.25 to 0.51, incl	55.1

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

3.5 Tolerances: Unless otherwise specified, the following tolerances apply; measurements shall be made in accordance with ASTM D374, Method C:

TABLE II

Nominal Thickness Inch	Thickness Tolerance, Inch plus and minus
Up to 0.0005, incl	0.00015
Over 0.0005 to 0.001, incl	0.0003
Over 0.001 to 0.002, incl	0.0005
Over 0.002 to 0.005, incl	0.001
Over 0.005 to 0.010, incl	0.0015
Over 0.010 to 0.020, incl	0.003

TABLE II (SI)

Nominal Thickness Millimetre	Thickness Tolerance, Millimetre plus and minus
Up to 0.013, incl	0.0038
Over 0.013 to 0.03, incl	0.008
Over 0.03 to 0.05, incl	0.013
Over 0.05 to 0.13, incl	0.03
Over 0.13 to 0.25, incl	0.038
Over 0.25 to 0.51, incl	0.08

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 required by 4.5. 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 and as qualification tests.
- 4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, qualification test material shall be submitted to the cognizant qualification agency as directed by the procuring activity, the contracting officer, or the request for procurement.
- 4.3 Sampling: Sufficient product shall be taken from each lot to perform all required tests in triplicate; a 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 on the approved sample material. 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 material 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 Reports:
- 4.5.1 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 shall include the purchase order number, material specification number and its revision letter, vendor's compound number, form, size, and quantity.
- 4.5.2 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.