SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3647C

Issued JAN 1964
Revised APR 1993
Reaffirmed JAN 2006

Superseding AMS 3647B

Polyfluoroethylene Propylene Film and Sheet

1. SCOPE:

1.1 Form:

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

1.2 Application:

These products have been used typically 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. Usage is not limited to such applications.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 149 Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D 374 Thickness of Solid Electrical Insulation
ASTM D 618 Conditioning Plastics and Electrical Insulating Materials for Testing
ASTM D 792 Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 882 Tensile Properties of Thin Plastic Sheeting

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

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 to 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

3.3.1 Tensile Properties: Shall be as shown in Table 1, determined in accordance with ASTM D 882, Method A, on specimens taken both parallel and perpendicular to the direction of extrusion:

TABLE 1A - Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength psi	Elongation at Break %
0.0005	2000	175
0.001 to 0.020, incl	2500	250

TABLE 1B - Minimum Tensile Properties, SI Units

Nominal Thickness Millimeter	Tensile Strength MPa	Elongation at Break %
0.013	13.8	175
0.03 to 0.51, incl	17.2	250

3.3.2 Specific Gravity at 23/23 °C (73/73 °F): Shall be 2.13 to 2.17, determined in accordance with ASTM D 792, Method A.

3.3.3 Dielectric Strength at 23 °C ± 1 (73 °F ± 2): Shall be as shown in Table 2, determined in accordance with ASTM D 149, short time test, using rod electrodes on specimens conditioned in accordance with ASTM D 618, Procedure A, and using a voltage rise of 500 to 600 volts per second to breakdown:

TABLE 2A - Minimum Dielectric Strength, Inch/Pound Units

Nominal Thickness Inch	Dielectric Strength Volts per mil
Up 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 2B - Minimum Dielectric Strength, SI Units

Nominal Thickness Millimeter	Dielectric Strength Kilovolts per mm
Up to 0.03, incl	157
Over 0.03 to 0.05, incl	138
Over 0.05 to 0.13, incl	98
Over 0.13 to 0.25, incl	71
Over 0.25 to 0.51, incl	55

3.4 Quality:

The product, as received by purchaser, shall be uniform in quality and condition, smooth, and free from pinholes and foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances:

Shall be as shown in Table 3; measurements shall be made in accordance with ASTM D 374, Method C.

TABLE 3A - Tolerances, Inch/Pound Units

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 3B - Tolerances, SI Units

Nominal Thickness Millimeter	Thickness Tolerance, Millimeter 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	0.025
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 for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, on each lot, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

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

4.3 Sampling and Testing:

Sufficient product shall be taken at random from 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. 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 product shall be approved by purchaser before product for production use is supplied, unless such approval be waived by purchaser. Results of tests on production product 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 product which are essentially the same as those used on the approved sample. 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 ingredients and/or processing and, when requested, sample product. Production product made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements. This report shall include the purchase order number, lot number, AMS 3647C, vendor's compound number, form, size, and quantity.