SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3382C

Issued JUL 1993
Revised OCT 1999

Superseding AMS 3382B

Tetrafluoroethylene/Propylene Rubber (FEPM) Hydraulic Fluid and Synthetic Oil Resistant 70 to 80 and 85 to 95

1. SCOPE:

1.1 Form:

This specification covers two classes (durometers) of tetrafluoroethylene/ propylene rubber (FEPM) in the form of extrusions, sheet, strip, and molded shapes.

1.2 Application:

These products have been used typically for components requiring continuous operation in dry air, hydraulic fluids, and synthetic engine oils at temperatures from -5 to +232 °C (+23 to 450 °F) or in high pH chemical decontamination solutions, but usage is not limited to such applications. Each application should be considered individually.

1.3 Classes:

Product is classified as follows:

Class 1 - 70 to 80 Durometer "A" hardness
Class 2 - 85 to 95 Durometer "A" hardness

1.3.1 The class supplied shall be the class ordered.

1.4 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 the necessary precautionary measures to ensure the health and safety of all personnel involved.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2. APPLICABLE DOCUMENTS:

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

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2279	Tolerances, Rubber Products
MAM 2279	Tolerances, Metric, Rubber Products
AMS 2810	Identification and Packaging, Elastomeric Products
AMS 3023	Fluid, Reference for Testing Polyol Ester (and Diester) Resistant Material
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft

2.2 ASTM Publications:

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

ASTM D 297	Rubber Products - Chemical Analysis
ASTM D 395	Rubber Property - Compression Set
ASTM D 412	Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
ASTM D 471	Rubber Property - Effect of Liquids
ASTM D 518	Rubber Deterioration - Surface Cracking
ASTM D 573	Rubber - Deterioration in an Air Oven
ASTM D 1149	Rubber Deterioration - Surface Ozone Cracking in a Chamber
ASTM D 1329	Rubber Property - Retraction at Lower Temperatures (TR Test)
ASTM D 2137	Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D 2240	Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be a compound, based on a tetrafluoroethylene/propylene elastomer, suitably cured to produce a product meeting the requirements of 3.2, specified and tested either as Class 1 or Class 2.

3.2 Properties:

The product shall conform to the requirements shown in Table 1, 3.2.13, and 3.2.14; tests shall be performed on the product supplied and, except as otherwise specified herein, in accordance with specified methods, insofar as practicable.

TABLE 1 - Properties

	Property	Requirement Class 1	Requirement Class 2	Test Method
3.2.1	Hardness, Durometer “A” or equivalent	75 ± 5	90 ± 5	ASTM D 2240
3.2.2	Tensile Strength, min	1800 psi (12.4 MPa)	2000 psi (13.8 MPa)	ASTM D 412, Die B or C
3.2.3	Elongation, min	200%	100%	ASTM D 412, Die B or C
3.2.4	Specific Gravity	Preproduction Value ± 0.02		ASTM D 297
3.2.5	Synthetic Lubricant Resistance: (Immediate Deteriorated Properties)			ASTM D 471 AMS 3023 (See 8.2) 200 °C ± 3 (392 °F ± 5) 70 hours ± 0.5
3.2.5.1	Hardness Change, Durometer “A” or equivalent, max	-25	-25	
3.2.5.2	Tensile Strength Change, max	-30%	-30%	
3.2.5.3	Elongation Change, max	-20%	-25%	
3.2.5.4	Volume Change, max	+30%	+30%	
3.2.6	Oil Resistance:			ASTM D 471 IRM 903 (See 8.3) 150 °C ± 3 (302 °F ± 5) 70 hours ± 0.5
3.2.6.1	Hardness Change, Durometer “A” or equivalent	0 to -12	0 to -12	
3.2.6.2	Tensile Strength Change, max	-20%	-25%	
3.2.6.3	Elongation Change, max	-20%	-20%	
3.2.6.4	Volume Change, max	+20%	+20%	

TABLE 1 - Properties (Continued)

	Property	Requirement Class 1	Requirement Class 2	Test Method
3.2.7	Hydraulic Fluid Resistance:			ASTM D 471 AS1241, Type IV, Class 1 100 °C ± 3 (212 °F ± 5) 70 hours ± 0.5
3.2.7.1	Hardness Change, Durometer “A” or equivalent, max	-20	-25	
3.2.7.2	Tensile Strength Change, max	-35%	-40%	
3.2.7.3	Elongation Change, max	-20%	-25%	
3.2.7.4	Volume Change, max	+30%	+25%	
3.2.8	Dry Heat Resistance:			ASTM D 573 250 °C ± 3 (482 °F ± 5) 70 hours ± 0.5
3.2.8.1	Hardness Change, Durometer “A” or equivalent	+5	+5	
3.2.8.2	Tensile Strength Change, max	-25%	-25%	
3.2.8.3	Elongation Change, max	-25%	-25%	
3.2.8.4	Weight Loss, max	+6%	+6%	
3.2.9	Alkaline Fluid Resistance:			ASTM D 471 50% Sodium Hydroxide 100 °C ± 3 (212 °F ± 5) 70 hours ± 0.5
3.2.9.1	Hardness Change, Durometer “A” or equivalent	±5	±5	
3.2.9.2	Tensile Strength, Change, max	-10%	-10%	
3.2.9.3	Elongation Change, max	-10%	-15%	
3.2.9.4	Volume Change, max	+5%	+5%	

TABLE 1 - Properties (Continued)

	Property	Requirement Class 1	Requirement Class 2	Test Method
3.2.10	Compression Set: Percent of Original Deflection, max	40%	45%	ASTM D 395, Method B 175 °C ± 3 (347 °F ± 5) 22 hours ± 0.5
3.2.11	Long-Term Compression Set: Percent of Original Deflection, max	50%	50%	ASTM D 395, Method B 175 °C ± 3 (347 °F ± 5) 168 hours ± 1.0
3.2.12	Low-Temperature Resistance:			
3.2.12.1	Temperature Retraction TR_{10} point, max	+4 °C (+39 °F)	+4 °C (+39 °F)	ASTM D 1329
3.2.12.2	Brittle Point, max	-35 °C (-31 °F)	-35 °C (-31 °F)	ASTM D 2137, Method A

3.2.13 Weather Resistance: The product shall show no evidence of cracking when tested in accordance with ASTM D 1149 for seven days at 40 °C ± 2 (104 °F ± 4). Test specimens shall be prepared and mounted in accordance with ASTM D 518, Method B.

3.2.14 Corrosion: The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure acceptable to purchaser. Discoloration of metal shall not be considered objectionable.

3.3 Quality:

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

3.4 Tolerances:

Shall conform to all applicable requirements of AMS 2279 or MAM 2279.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of the product shall supply all samples and shall be responsible for the performance of 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 specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Requirements shown in Table 2 are acceptance tests and shall be performed on each lot.

TABLE 2 - Acceptance Test Requirements

Requirement	Paragraph
Hardness	3.2.1
Tensile Strength	3.2.2
Elongation	3.2.3
Specific Gravity	3.2.4
Compression Set	3.2.10

4.2.2 Periodic Tests: Requirements shown in Table 3 are periodic tests and shall be performed at least every six months unless another frequency of testing is specified by purchaser.

TABLE 3 - Periodic Test Requirements

Requirement	Paragraph
Volume Change in Synthetic Lubricant	3.2.5.4
Volume Change in Hydraulic Fluid	3.2.7.4
Weight Loss in Dry Heat	3.2.8.4

4.2.3 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the product by the manufacturer, when a change in ingredients and/or processing requires reapproval as in 4.4.1, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: 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, except as otherwise specified in 4.3.1.4.

4.3.1.1 If specimens cannot be prepared from the product, ASTM test specimens prepared from the same batch and state of cure shall be used. When the product supplied is an extrusion of such shape that suitable test specimens cannot be cut from the product, a separate flat strip test sample, from the same production lot, shall be supplied upon request. This strip shall be prepared from tubing 1.000 inch ± 0.063 (25.40 mm ± 1.60) in OD by 0.075 inch ± 0.008 (1.90 mm ± 0.20) in wall thickness, mechanically slit and flattened into a strip while being extruded, and cured in the same manner as production product. When the product is a molded shape from which test specimens cannot be cut, a slab 6 inches (152 mm) square by 0.075 inch ± 0.008 (1.90 mm ± 0.20) thick, molded from the same batch of compound, shall be supplied upon request.

4.3.1.2 A lot shall be all product of the same batch of compound processed in one continuous run and presented for manufacturer's inspection at one time.

4.3.1.3 A batch shall be the quantity of compound run through a mill or mixer at one time.

4.3.1.4 A statistical sampling plan acceptable to the purchaser may be used in lieu of sampling as in 4.3.1. Sample size for visual and dimensional requirements shall be as shown in Table 4; sample unit shall be one molded part and acceptance based on zero defects.

TABLE 4 - Visual and Dimensional Inspection

Lot Size	Sample Size
2 to 8	Entire Lot
9 to 90	8
91 to 150	12
151 to 280	19
281 to 500	21
501 to 1200	27
1201 to 3200	35
3201 to 10000	38
10001 to 35000	46
35001 to 150000	56
150001 and Over	65