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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS-3306 REV A

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Submitted for recognition as an American National Standard

Superseding AMS-3306

RUBBER, SILICONE
1200 psi (8.27 MPa), High Modulus
55 - 65

1. SCOPE:

1.1 Form: This specification covers a silicone elastomer in the form of sheet, strip, tubing, extrusions, and molded shapes.

1.2 Application: Primarily for parts required to operate or seal from -65° to +225°C (-85° to +437°F), compounded especially for high strength. Silicone rubber is resistant to deterioration by weathering and by high-aniline-point petroleum-base lubricating oil and phosphate ester hydraulic fluid, and remains flexible over the temperature range noted. This material is not normally suitable for use in contact with hydrocarbon-based fuels and low-aniline-point petroleum-base fluids due to excessive swelling of the elastomer.

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 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.

2.1.1 Aerospace Material Specifications:

AMS-2279 - Tolerances, Rubber Products
MAM-2279 - Tolerances, Metric, Rubber Products
AMS-2810 - Identification and Packaging, Elastomeric Products
AMS-3021 - Fluid, Reference, For Testing Di-Ester (Polyol) Resistant Material

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 297 - Rubber Products - Chemical Analysis
ASTM D 395 - Rubber Property - Compression Set
ASTM D 412 - Rubber Properties in Tension
ASTM D 471 - Rubber Property - Effect of Liquids
ASTM D 573 - Rubber - Deterioration in an Air Oven
ASTM D 624 - Rubber Property - Tear Resistance
ASTM D 635 - Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
ASTM D 797 - Rubber Property - Young's Modulus at Normal and Subnormal Temperatures
ASTM D 2137 - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D 2240 - Rubber Property - Durometer Hardness

2.3 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3.1 Military Standards:

MIL-STD-810 - Environmental Test Methods and Engineering Guidelines

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a compound, based on a silicone elastomer, suitably cured to produce a product meeting the requirements of 3.2.

3.2 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:

3.2.1 As Received:

3.2.1.1	Hardness, Durometer "A" or equivalent	60 ± 5	ASTM D 2240
3.2.1.2	Tensile Strength, minimum	1200 psi (8.27 MPa)	ASTM D 412, Die B or C
3.2.1.3	Elongation, minimum	400%	ASTM D 412, Die B or C
3.2.1.4	Tensile Stress at 100% Elongation, minimum	150 psi (1.03 MPa)	ASTM D 412, Die B or C

3.2.1.5	Tear Resistance, minimum	150 pounds force per inch (26 kN/m)	ASTM D 624, Die B
3.2.1.6	Specific Gravity	Preproduction Value ±0.03	ASTM D 297
3.2.2	Synthetic-Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: AMS 3021 Temperature: 150°C ± 3 (302°F ± 5) Time: 70 hours ± 0.5
3.2.2.1	Hardness Change, Durometer "A" or equivalent	-20 to +5	
3.2.2.2	Tensile Strength Change, maximum	-45%	
3.2.2.3	Elongation Change, maximum	-40%	
3.2.2.4	Volume Change	0 to +35%	
3.2.2.5	Decomposition	None	
3.2.2.6	Surface Tackiness	None	
3.2.3	Phosphate Ester Hydraulic Fluid Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: Low Density Aviation Hydraulic Test Fluid Temperature: 70°C ± 3 (158°F ± 5) Time: 70 hours ± 0.5
3.2.3.1	Hardness Change, Durometer "A" or equivalent	-20 to +5	
3.2.3.2	Tensile Strength Change, maximum	-45%	
3.2.3.3	Elongation Change, maximum	-40%	
3.2.3.4	Volume Change	0 to +35%	
3.2.3.5	Decomposition	None	

3.2.3.6 Surface Tackiness	None		
3.2.4 Dry Heat Resistance:		ASTM D 573	
		Temperature:	225°C ± 3 (437°F ± 5)
3.2.4.1 Hardness Change, Durometer "A" or equivalent	0 to +10	Time:	70 hours ± 0.5
3.2.4.2 Tensile Strength Change, maximum	-35%		
3.2.4.3 Elongation Change, maximum	-40%		
3.2.5 Compression Set:		ASTM D 395, Method B	
		Temperature:	175°C ± 3 (347°F ± 5)
3.2.5.1 Percent of Original Deflection, maximum	30	Time:	22 hours ± 0.5
3.2.6 Low Temperature Resistance:			
3.2.6.1 Brittleness	Pass	ASTM D 2137, Method A	
		Temperature:	-65°C ± 3 (-85°F ± 5)
		Time:	3 minutes ± 0.3
3.2.6.2 Young's Modulus, maximum (See 8.2)	10,000 psi (68.9 MPa)	ASTM D 797	
		Temperature:	-50°C ± 1 (-58°F ± 2)
		Time:	5 hours ± 0.2
3.2.7 Thermal Shock:	No cracking, surface tackiness, or degradation	MIL-STD-810, Method 503.2	
		Low Temperature:	-65°C ± 3 (-85°F ± 5)
		High Temperature:	225°C ± 3 (437°F ± 5)
3.2.8 Flame Resistance:		ASTM D 635	
3.2.8.1 Burning Rate, maximum	2.5 inches (63.5 mm) per minute		

3.2.9 Weather Resistance: The product shall have weather resistance acceptable to purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.10 Corrosion: The product shall not cause cracking, pitting, or other corrosive effects on other materials with which it is in contact when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and vendor. 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 materials as commercially practicable, and free from imperfections detrimental to usage of the product.

3.4 Tolerances: Shall conform to AMS-2279 or MAM-2279.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all Ø 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:

4.2.1 Acceptance Tests: Tests for the following requirements are acceptance tests, and shall be performed on each lot:

Test	Paragraph Reference
Hardness, as received	3.2.1.1
Tensile Strength, as received	3.2.1.2
Elongation, as received	3.2.1.3
Specific Gravity	3.2.1.6

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

4.2.2.1 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: Shall be as follows:
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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.