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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 3248A

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Superseding AMS 3247

ETHYLENE PROPYLENE (EPM) RUBBER
Phosphate Ester Resistant
55 - 65

1. SCOPE:

1.1 Form: This specification covers an ethylene propylene (EPM) rubber in the form of sheet, strip, tubing, molded shapes, and extrusions.

1.2 Application: Primarily for parts such as gaskets, grommets, and seals requiring resistance to phosphate esters or to ozone. Not suitable for use in contact with petroleum-base fluids due to excessive swell.

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 2279 - Tolerances, Rubber Products
MAM 2279 - Tolerances, Metric, Rubber Products
AMS 2350 - Standards and Test Methods
AMS 2810 - Identification and Packaging, Elastomeric Products

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D297 - Rubber Products - Chemical Analysis
ASTM D395 - Rubber Property - Compression Set
ASTM D412 - Rubber Properties in Tension
ASTM D471 - Rubber Property - Effect of Liquids
ASTM D518 - Rubber Deterioration - Surface Cracking
ASTM D573 - Rubber - Deterioration in an Air Oven
ASTM D624 - Rubber Property - Tear Resistance
ASTM D1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens)
ASTM D2137 - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D2240 - Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a compound based on an ethylene propylene (EPM) 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 equiv.	60 ± 5	ASTM D2240
3.2.1.2 Tensile Strength, min		
3.2.1.2.1 For parts other than extrusions	2500 psi (17 MPa)	ASTM D412, Die B or C
3.2.1.2.2 For extruded parts	2000 psi (14 MPa)	
3.2.1.3 Elongation, min		ASTM D412, Die B or C
3.2.1.3.1 For parts other than extrusions	400%	
3.2.1.3.2 For extruded parts	320%	
3.2.1.4 Tensile Stress at 200% Elongation, max	Preproduction Value ±20%	ASTM D412, Die B or C Stretch specimens to 225% elongation twice within 5 min. before testing.
3.2.1.5 Tear Resistance, min		ASTM D614, Die B

3.2.1.5.1	For parts other than extrusions	150 lb per in. (26.0 kN/m)	
3.2.1.5.2	For extruded parts	120 lb per in. (21.0 kN/m)	
3.2.1.6	Specific Gravity	Preproduction Value ±0.02	ASTM D297
3.2.1.7	Total Ash	Preproduction Value ±10%	ASTM D297
3.2.2	Phosphate Ester Resistance: (Immediate Deteriorated Properties)		ASTM D471 Medium: Tri-n-butyl phosphate Temperature: 100°C + 1 (212°F ± 2) Time: 70 hr ± 0.5
3.2.2.1	Hardness Change, Durometer "A" or equiv.	0 to -10	
3.2.2.2	Tensile Strength Change, max	-20%	
3.2.2.3	Elongation Change, max	-20%	
3.2.2.4	Volume Change	0 to +15%	
3.2.3	Dry Heat Resistance:		ASTM D573 Temperature: 125°C + 1 (260°F ± 2) Time: 70 hr ± 0.5
3.2.3.1	Hardness Change, Durometer "A" or equiv.	0 to +10	
3.2.3.2	Tensile Strength Change, max	-15%	
3.2.3.3	Elongation Change, max	-20%	
3.2.4	Compression Set:		ASTM D395, Method B Temperature: 100°C + 1 (212°F ± 2) Time: 70 hr ± 0.5
3.2.4.1	Percent of Original Deflection, max	20	
3.2.5	Low-Temperature Resistance:		
3.2.5.1 Ø	Brittleness	Pass	ASTM D2137, Method A Temperature: -55°C + 1 (-65°F ± 2) Time: 10 min. ± 0.5

3.2.6 Ø Weathering: The product shall show no evidence of cracking when tested in accordance with ASTM D1149 for seven days at 40°C+ 1 (105°F + 2). Test specimens shall be prepared and mounted in accordance with ASTM D518, Method B.

3.2.7 Corrosion: The product shall not have a corrosive effect on other Ø materials 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 Ø and condition, clean, smooth, as free from foreign materials as commercially practicable, and free from imperfections detrimental to usage of the product.

3.4 Tolerances: Shall be in accordance with all applicable requirements of Ø 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. Results of such tests shall be reported to the purchaser as required by 4.5. 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 to determine conformance to the following requirements are classified as acceptance tests and shall be performed on each lot:

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Requirement	Paragraph Reference
Hardness, as received	3.2.1.1
Tensile Strength, as received	3.2.1.2
Elongation, as received	3.2.1.3
Volume Change in oil	3.2.2.4
Compression Set	3.2.4

4.2.2 Preproduction Tests: Tests to determine conformance to all technical Ø requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of the product to a purchaser, when a change in material, processing, or both 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 Ø requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: 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. 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 shall be supplied upon request. This strip shall be prepared from tubing 1.00 in. ± 0.063 (25 mm ± 1.60) in OD by 0.075 in. ± 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 material. When the product is a molded shape from which test specimens cannot be cut, a slab 6 x 6 in. (150 x 150 mm) by 0.080 in. ± 0.008 (2.00 mm ± 0.20) molded from the same batch of compound shall be supplied upon request.

4.3.1.1 A lot shall be all product from the same batch of compound processed in one continuous run and presented for vendor's inspection at one time. An inspection lot shall not exceed 500 lb (225 kg).

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

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5.1 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

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 by purchaser. 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 used on the approved sample material. 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 material, processing, or both and, when requested, sample material. Production material made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports: