



AEROSPACE MATERIAL SPECIFICATION

AMS3238™**REV. K**

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Superseding AMS3238J

Butyl (IIR) Rubber
Phosphate Ester Resistant
65 - 75

RATIONALE

Stabilize this document as no technical changes are needed.

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1. SCOPE

1.1 Form

This specification covers a butyl (IIR) rubber in the form of sheet, strip, tubing, extrusions, and molded shapes.

1.2 Application

This product has been used typically for parts such as grommets requiring resistance to phosphate esters or low permeability to gases, but usage is not limited to such applications. Not suitable for use in contact with petroleum-based fluids due to excessive swell.

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 issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2279 Tolerances, Rubber Products

AMS2810 Identification and Packaging, Elastomeric Products

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D297 Rubber Products - Chemical Analysis

ASTM D395 Rubber Property - Compression Set

ASTM D412 Vulcanized Rubber and Thermoplastic Elastomers -Tension

ASTM D471 Rubber Property - Effect of Liquids

ASTM D573 Rubber - Deterioration in an Air Oven

ASTM D624 Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

ASTM D1149 Rubber Deterioration - Cracking in an Ozone Controlled Environment

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 a butyl (IIR) 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:

Table 1 - Properties

Paragraph	Property	Requirement	Methods
3.2.1	As Received		
3.2.1.1	Hardness, Durometer "A" or equivalent	70 ± 5	ASTM D2240
3.2.1.2	Tensile Strength, minimum	1500 psi (10.3 MPa)	ASTM D412, Die B or C
3.2.1.3	Elongation, minimum	300%	ASTM D412, Die B or C
3.2.1.4	Tear Resistance pounds force per inch (N/m), minimum	80% of Preproduction Value	ASTM D624, Die B or C
3.2.1.5	Specific Gravity	Preproduction Value ± 0.03	ASTM D297
3.2.2	Phosphate Ester Resistance (Immediate Deteriorated Properties)		ASTM D471 Medium: Tri-n-butyl phosphate
3.2.2.1	Hardness Change, Durometer "A" or equivalent	0 to -30	Temperature: 212 °F ± 2 °F (100 °C ± 1 °C) Time: 70 hours ± 0.5 hour
3.2.2.2	Tensile Strength Change, maximum	-30%	
3.2.2.3	Elongation Change, maximum	-20%	
3.2.2.4	Volume Change	0 to +30%	
3.2.3	Dry Heat Resistance		ASTM D573 Temperature: 212 °F ± 2 °F (100 °C ± 1 °C) Time: 70 hours ± 0.5 hour
3.2.3.1	Hardness Change, Durometer "A" or equivalent	0 to +10	
3.2.3.2	Tensile Strength Change, maximum	-20%	
3.2.3.3	Elongation Change, maximum	-40%	
3.2.4	Compression Set		ASTM D395, Method B Temperature: 212 °F ± 2 °F (100 °C ± 1 °C) Time: 70 hours ± 0.5 hour
3.2.4.1	Percent of Original Deflection, maximum	55	
3.2.5	Low-Temperature Resistance		
3.2.5.1	Brittleness	Pass	ASTM D2137, Method A Temperature: -31 °F ± 2 °F (-35 °C ± 1 °C) Time: 10 minutes ± 0.5 minute

3.2.6 Weathering

The product shall show no evidence of cracking when tested in accordance with ASTM D1149 for 7 days at 104 °F ± 2 °F (40 °C ± 1 °C). Test specimens shall be prepared and mounted in accordance with ASTM D1149, Method B2.

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 all applicable requirements of AMS2279.

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 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 specified requirements.

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:

Table 2

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

All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the 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.

4.3 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.

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 $\pm$ 0.063 inch (25.40 mm $\pm$ 1.60 mm) in OD by 0.075 inch $\pm$ 0.008 inch (1.90 mm $\pm$ 0.20 mm) 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 $\pm$ 0.008 inch (1.90 mm $\pm$ 0.20 mm) molded from the same batch of compound shall be supplied upon request.

4.3.1.2 A lot shall be all product from the same batch of compound processed in one continuous production run and presented for vendor's inspection at one time. An inspection lot shall not exceed 1000 pounds (454 kg) and may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

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 When a statistical sampling plan has 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 shall state that such plan was used.