



AEROSPACE MATERIAL SPECIFICATION

AMS3226™**REV. J**

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Superseding AMS3226H

(R) Elastomer: Acrylonitrile Butadiene Rubber (NBR)
Hot Oil and Coolant Resistant, Low Swell
45 to 55 Type 'A' Durometer Hardness
for Products in Engine Oil Systems/Coolant Systems

RATIONALE

Periodic Five-Year Review and to update this specification to the latest AMS3XXX series format. This revision also adds a 5-year preproduction re-test requirement.

1. SCOPE

1.1 Form

This specification covers an Acrylonitrile Butadiene Rubber (NBR) that can be used to manufacture product in the form of sheet, strip, tubing, extrusions, and molded shapes. For molded rings, compression seals, O-ring cord, and molded-in-place gaskets for aeronautical and aerospace applications, use the AMS7000 series specification.

1.2 Application

This material type has resistance to hot petroleum based lubricating oils as well as glycol-type coolants, but usage is not limited to such applications. This material type has a typical service temperature range of -40 to +212 °F (-40 to +100 °C). The service temperature range of the material is a general temperature range, but the presence of particular fluids and specific design requirements may modify this range. Each application should be considered separately. It is the responsibility of the user to determine that this specification is appropriate for the environments (temperature range, fluids exposure, etc.) in which it is sought to be used.

1.3 Order of Precedence

This specification is in addition to and in no way limiting, superseding, or abrogating any contractual obligation as required by the applicable procurement document. In the event of conflict in requirements, the order of precedence shall be:

1. Procurement Document or Contractual Agreement and all statutory and regulatory requirements (excluding this document)
2. Applicable purchaser's drawing and/or design data
3. Specifications referenced on the drawing
4. This document
5. All specifications referenced in this document

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Documents

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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 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.

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, Elastomer 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 Test Methods for Rubber Property - Compression Set

ASTM D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

ASTM D471 Test Methods for Rubber Property - Effect of Liquids

ASTM D573 Test Methods for Rubber - Deterioration in an Air Oven

ASTM D2137 Test Methods for Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

ASTM D2240 Test Methods for Rubber Property - Durometer Hardness

2.3 Other

Available online from the National Conference of Standards Laboratories, www.ncsli.org.

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be prepared from ingredients as shall be necessary to achieve the requirements detailed in this standard and shall be a compound, based on the polymer specified in 1.1 suitably cured to produce product meeting the requirements of 3.2. The use of reprocessed vulcanized material is not acceptable.

3.2 Properties

The product shall conform to the requirements in Table 1:

Table 1 - Physical property requirements

The following testing shall be performed every 5 years and test reports shall be made available upon request.

Paragraph	Property	Test Sample	Requirement	Test Method
3.2.1	As Received			
3.2.1.1	Hardness, Durometer Type 'A'	BUTTON or Plied Disk	50 ± 5	ASTM D2240
3.2.1.2	Tensile Strength, minimum	ASTM Platen	1200 psi (8.28 MPa)	ASTM D412, Die C
3.2.1.3	Ultimate Elongation, minimum	ASTM Platen	350%	ASTM D412, Die C
3.2.1.4	Specific Gravity/Relative Density	ASTM Platen	Preproduction Value ±0.03	ASTM D297 Hydrostatic Method
3.2.1.5	Compression Set Percent of Original Deflection	ASTM Platen, Plied Discs	50%	ASTM D395, Method B Temperature: 257 °F ± 4 °F (125 °C ± 2 °C) Time: 70 hours ± 0.5 hour
3.2.1.6	Low Temperature Brittleness	ASTM Platen	No Crack/ No Break	ASTM D2137, Method C Temperature: -40 °F ± 2 °F (-40 °C ± 1 °C) Time: 5 minutes ± 0.2 minute
3.2.2	Dry Heat Resistance - ASTM D573			
3.2.2.1	Hardness Change, Durometer Type 'A'	BUTTON or plied platens	0 to +10	ASTM D573 Temperature: 212 °F ± 4 °F (100 °C ± 2 °C) Time: 70 hours ± 0.5 hour
3.2.2.2	Tensile Strength Change, maximum	ASTM Platen	-25%	
3.2.2.3	Ultimate Elongation Change, maximum	ASTM Platen	-50%	
3.2.3	Fluid Resistance #1 - ASTM D471 - IRM901			
3.2.3.1	Hardness Change, Durometer Type 'A'	BUTTON or plied platens	-5 to +15	ASTM D471 Temperature: 302 °F ± 4 °F (150 °C ± 2 °C) Time: 70 hours ± 0.5 hour Fluid: IRM901 Oil
3.2.3.2	Tensile Strength Change, maximum	ASTM Platen	-50%	
3.2.3.3	Ultimate Elongation Change, maximum	ASTM Platen	-50%	
3.2.3.4	Volume Change	ASTM Platen	0 to +10%	
3.2.3.5	Decomposition	ASTM Platen	None	
3.2.3.6	Surface Tackiness	ASTM Platen	None	
3.2.4	Fluid Resistance #2 - ASTM D471 - IRM903			
3.2.4.1	Hardness Change, Durometer Type 'A'	BUTTON or plied platens	-20 to +5	ASTM D471 Temperature: 302 °F ± 4 °F (150 °C ± 2 °C) Time: 70 hours ± 0.5 hour Fluid: IRM903 Oil
3.2.4.2	Volume Change	ASTM Platen	0 to +50%	
3.2.4.3	Decomposition	ASTM Platen	None	
3.2.4.4	Surface Tackiness	ASTM Platen	None	