



AEROSPACE MATERIAL SPECIFICATION

AMS7270™**REV. M**Issued 1949-03
Revised 2022-03

Superseding AMS7270L

Rubber: Acrylonitrile-Butadiene (NBR)
Fuel Resistant
65 to 75 Type A Hardness
for Seals in Fuel

RATIONALE

The document is being revised to fix errors from revision L.

1. SCOPE

1.1 Form

This specification covers an acrylonitrile-butadiene (NBR) rubber in the form of molded rings, compression seals, molded O-ring cord, and molded-in-place gaskets for aeronautical and aerospace applications. For sheet, strip, tubing, extrusions, and molded shapes, refer to the AMS3215 specification, which is intended for that use.

1.2 Application

These rings have been used typically as sealing rings at temperatures as low as -67 °F (-55 °C) where resistance to fuel is required, but usage is not limited to such applications. The cross-section of such rings is usually not over 0.275 inch (6.98 mm) in diameter or thickness. Each application, however, should be considered individually.

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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Documents

Document Sharing Hub

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.

AMS2817	Packaging and Identification of Molded Elastomeric Seals and Sealing Components
AIR851	O-Ring Tension Testing Calculations
AS568	Aerospace Size Standard for O-Rings
AS871	Manufacturing and Inspection Standard for Preformed Packings (O-Rings)
AS6837	Required O-Ring Sizes for Quality Conformance Testing

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	Standard Test Methods for Rubber Products - Chemical Analysis
ASTM D395	Standard Test Methods for Rubber Property - Compression Set Method B
ASTM D471	Standard Test Methods for Rubber Property - Effects of Liquids
ASTM D573	Standard Test Methods for Rubber Property - Deterioration in an Air Oven
ASTM D1414	Standard Test Methods for Rubber - Testing O-Rings
ASTM D2240	Standard Test Methods for Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be a compound, based on an acrylonitrile-butadiene (NBR) elastomer, suitably cured to produce product meeting the requirements of 3.2.

3.2 Properties

Rings shall conform to the requirements shown in Table 1; tests shall be performed on the rings, in accordance with ASTM D1414, insofar as practicable. Tensile strength testing is not required on rings which are too small to permit assembly on rollers and are, after cutting, too short to permit testing at a single strand. Eliminating testing for tensile strength does not eliminate testing for elongation; elongation test can be done by stretching a ring over a mandrel of a size which will stretch the ring sufficiently to produce the required elongation when figured on the ID of the ring. Calculations of tensile strength and elongation may be made in accordance with AIR851.

Table 1 - Properties

Paragraph	Property	Requirement	Test Method
3.2.1	Hardness, Durometer "A"	70 ± 5	ASTM D2240
3.2.2	Tensile Strength, min	1500 psi (10.3 MPa)	ASTM D1414
3.2.3	Elongation, min	150%	ASTM D1414
3.2.4	Corrosion	Nil	3.2.12
3.2.5	Specific Gravity	Preproduction value ± 0.02	ASTM D297 (Hydrostatic Method)
3.2.6	Aromatic Fuel Resistance		ASTM D471 (ASTM Ref Fuel B) Temperature: 68 to 86 °F (20 to 30 °C) Time: 168 hours ± 0.5 hour
3.2.6.1	Hardness Change, Durometer "A"	-25 to 0	
3.2.6.2	Tensile Strength Change, max	-65%	
3.2.6.3	Elongation Change, max	-55%	
3.2.6.4	Volume Change	0 to +40%	
3.2.7	Aromatic and Non-Aromatic Fuel Resistance		4.6.1
3.2.7.1	Volume Change, max (based on unimmersed volume) Ring Cross Section Diameter, 0.066 to 0.110 inch (1.68 to 2.79 mm), incl Over 0.110 inch (2.79 mm)	-8% -5%	
3.2.8	Oil Resistance		ASTM D471 IRM 903 Temperature: 302 °F ± 5 °F (150 °C ± 3 °C) Time: 70 hours ± 0.5 hour
3.2.8.1	Hardness Change, Durometer "A"	-25 to 0	
3.2.8.2	Volume Change	+15 to +35%	
3.2.9	Dry Heat Resistance		ASTM D573 Temperature: 212 °F ± 2 °F (100 °C ± 1 °C) Time: 70 hours ± 0.5 hour
3.2.9.1	Hardness Change, Durometer "A"	0 to +10	
3.2.9.2	Tensile Strength Change, max	-25%	
3.2.9.3	Elongation Change, max	-40%	
3.2.9.4	Bend (Flat)	No cracking or checking	
3.2.10	Compression Set Percent of Original Deflection, max Ring Cross Section Diameter 0.066 to 0.110 inch (1.68 to 2.79 mm), incl Over 0.110 inch (2.79 mm)	85 75	ASTM D395 Method B Temperature: 257 °F ± 4 °F (125 °C ± 2 °C) Time: 70 hours ± 0.5 hour
3.2.11	Low-Temperature Brittleness	Pass	4.6.2

3.2.12 Corrosion

The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and supplier. Discoloration of metal shall not be considered objectionable.

3.3 Quality

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 rings. Surface imperfections shall be no greater than permitted by AS871 for minor defects.

3.4 Sizes and Tolerances

Shall be as specified on the drawing. Standard sizes are as shown in AS568. Inspection for conformance to dimensional requirements shall be made in accordance with AS871.