

Issued	1942-12
Reaffirmed	2003-11
Revised	2013-03
Superseding	

Acrylonitrile Butadiene (NBR) Rubber
Hot Oil and Coolant Resistant, Low Swell
55 - 65

RATIONALE

Document was revised for five year review.

1. SCOPE

1.1 Form

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

1.2 Application

Primarily for hose, packings, bushings, grommets, and seals in contact with hot, petroleum-base lubricating oils and glycol-type coolants typically from -40 to +212 °F (-40 to +100 °C).

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.

2.1 SAE Publications

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

AMS2279 Tolerances, Rubber Products

AMS2810 Identification and Packaging, Elastomeric Products

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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 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 2137 Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

ASTM D 2240 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 a product meeting the requirements of 3.2.

3.1.1 Color

Shall be black.

3.2 Properties

The product shall conform to the requirements in Table 1; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable:

TABLE 1

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	1500 psi (10.3 MPa)	ASTM D 412, Die B or C
3.2.1.3	Elongation, minimum	300%	ASTM D 412, Die B or C
3.2.1.4	Specific Gravity	Preproduction Value ± 0.02	ASTM D297

TABLE 1 (CONT.)

3.2.2	Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: IRM 901 Oil Temperature: 302 °F ± 5 (150 °C ± 3) Time: 70 hours ± 0.5
3.2.2.1	Hardness Change, Durometer "A" or equivalent	-10 to +10	
3.2.2.2	Tensile Strength Change, maximum	-50%	
3.2.2.3	Elongation Change, maximum	-50%	
3.2.2.4	Volume Change	0 to +10%	
3.2.2.5	Decomposition	None	
3.2.2.6	Surface Tackiness	None	
3.2.3	Processing Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: IRM 903 Oil Temperature: 302 °F ± 5 (150 °C ± 3) Time: 70 hours ± 0.5
3.2.3.1	Hardness Change, Durometer "A" or equivalent	-20 to +5	
3.2.3.2	Elongation Change, maximum	-75%	
3.2.3.3	Volume Change	0 to +45%	
3.2.3.4	Decomposition	None	
3.2.3.5	Surface Tackiness	None	
3.2.4	Coolant Resistance: (Immediate Deteriorated Properties)		ASTM D 471 Medium: Ethylene Glycol 97%, Water 3% Temperature: 302 °F ± 5 (150 °C ± 3) Time: 70 hours ± 0.5
3.2.4.1	Hardness Change, Durometer "A" or equivalent	-15 to ±15	
3.2.4.2	Tensile Strength Change, maximum	-25%	
3.2.4.3	Elongation Change, maximum	-60%	
3.2.4.4	Volume Change	0 to +25%	
3.2.4.5	Decomposition	None	
3.2.4.6	Surface Tackiness	None	

TABLE 1 (CONT.)

3.2.5	Dry Heat Resistance:		ASTM D 573
			Temperature: 212 °F ± 2 (100 °C ± 1)
3.2.5.1	Hardness Change, Durometer "A" or equivalent	0 to +10	Time: 70 hours ± 0.5
3.2.5.2	Tensile Strength Change, maximum	-25%	
3.2.5.3	Elongation Change, maximum	-40%	
3.2.6	Compression Set:		ASTM D 395, Method B
3.2.6.1	Percent of Original Deflection, maximum	50	Temperature: 257 °F ± 4 (125 °C ± 2)
			Time: 70 hours ± 0.5
3.2.7	Low-Temperature Resistance:		ASTM D 2137, Method A
3.2.7.1	Brittleness	Pass	Temperature: -40 °F ± 2 (-40 °C ± 1)
			Time: 5 minutes ± 0.2

3.2.8 Weathering

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

3.2.9 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 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 material 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 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.