



AEROSPACE MATERIAL SPECIFICATION

AMS3224™

REV. A

Issued 2001-02
Reaffirmed 2007-06
Revised 2018-08

Superseding AMS3224

Nitrile-Butadiene Rubber
Fuel, Fire, and Ozone Resistant
65 – 75

RATIONALE

General update for Five-Year review.

1. SCOPE

1.1 Form

This specification covers nitrile-butadiene elastomer in the form of molded sheet and shapes, color coded yellow per ARP1527.

1.2 Application

Primarily for parts such as grommets, tube supports, clamp cushions, bushings, gaskets, and seals requiring resistance to aromatic and aliphatic fuels, hydrocarbon-based hydraulic fluids, and diester base lubricating oils, flame resistant, and ozone resistance, but usage is not limited to such applications. This material is not suitable for use in contact with ketones or phosphate ester-based hydraulic fluids. Each application, however, should be considered individually.

This nitrile-butadiene (NBR) elastomer has a typical service temperature range of -65 to 275 °F (-54 to 135 °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 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.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2018 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE AMS3224A

SAE values your input. To provide feedback
on this Technical Report, please visit
<http://standards.sae.org/AMS3224A>

Documents

Document Sharing Hub

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.

AMS2629	Fluid, Jet Reference
AMS3020	Oil, Reference, for "L" Stock Rubber Testing
AMS4943	Titanium Alloy, Hydraulic, Seamless Tubing 3.0Al - 2.5V Annealed
ARP1527	Color Coding - Elastomers for Tube Clamp Cushions

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
ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D471	Standard Test Method for Rubber Property-Effect of Liquids
ASTM D573	Standard Test Method for Rubber - Deterioration in an Air Oven
ASTM D624	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D2240	Standard Test Method for Rubber Property-Durometer Hardness

2.3 U.S. Government Publications

Copies of these documents are available online at <http://quicksearch.dla.mil>.

MIL-C-85052	Clamp, Loop, Cushion, General Specification for
MIL-STD-810	Environmental Test Methods and Engineering Guidelines

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be a compound based on a nitrile-butadiene elastomer, suitably cured to produce a product meeting the requirements of 3.2 and colored yellow in accordance with ARP1527.

3.2 Properties

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

Table 1 - Properties

Property	Requirement	Test Method
3.2.1 As Received		
3.2.1.1 Hardness, Durometer "A"	70 ± 5	ASTM D2240
3.2.1.2 Tensile Strength, min	13.7 MPa (2000 psi)	ASTM D412, Die B or C
3.2.1.3 Elongation, min	500%	ASTM D412, Die B or C
3.2.1.4 Tear Resistance, min	52 kN/m (300 pounds force/inch)	ASTM D624, Die B
3.2.1.5 Specific Gravity	Preproduction Value ±0.02	ASTM D297
3.2.2 Fuel Resistance		ASTM D471 Medium: AMS2629, Type 1 Temperature: 100 °F ± 5.4 °F (38.8 °C ± 3 °C) Time: 168 hours ± 0.5 hours
3.2.2.1 Hardness Change, Durometer "A"	-20 to 0	
3.2.2.2 Tensile Strength Change, max	-30%	
3.2.2.3 Elongation Change, max	-10%	
3.2.2.4 Tear Resistance, max	-35%	
3.2.2.5 Volume Change in 168 hours	+15%	