

 <i>An SAE International Group</i>	AEROSPACE MATERIAL SPECIFICATION	SAE AMS-R-7362	REV. A
		Issued 1998-06 Reaffirmed 2005-05 Revised 2012-12	
		Superseding AMS-R-7362	
Nitrile Rubber, Synthetic, Solid, Sheet, Strip and Fabricated Parts, Synthetic Oil Resistant			

RATIONALE

To correct errors from the previous revision and update the specification references for the five year review.

NOTICE

The initial SAE publication of this document was taken directly from U.S. Military Standard MIL-R-7362D, Amendment 4. This SAE Standard may retain the same part numbers established by the original military document.

Any requirements associated with Qualified Products Lists (QPL) may continue to be mandatory for DoD contracts. Requirements relating to QPLs have not been adopted by the SAE for this standard and are not part of this SAE document.

1. SCOPE

1.1 This specification covers two types of synthetic rubber for use where resistance to diester synthetic oils is required. This material may not be suitable for use in polyol ester based turbine oils.

1.2 Classification

Synthetic rubber shall be of the following types, as specified (See 6.3):

Type I - O-rings

Type II - Molded parts (other than O-rings), sheets, strips, and extruded shapes

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

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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 724-776-4970 (outside USA), www.sae.org.

AMS2817	Packing and Identification Preformed Packings
AMS3021	Fluid, Reference for Testing Di-Ester (Polyol) Resistant Material
AMS6345	Steel SAE 4130 Normalized or Otherwise Heat Treated
AMS7276	Rings, Sealing, Fluorocarbon Rubber High Temperature
AMS-QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
ARP5316	Storage of Aerospace Elastomeric Seals
AS29561	Packings, Preformed, O-ring, Synthetic Lubricant Resistant
AS5752	Visual Inspection Standard for Elastomeric Sealing Elements Other than O-rings

2.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

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

Available from American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ASME B46.1	Surface Texture (Surface Roughness, Waviness & Lay)
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2.4 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 B 36	Brass Plate, Sheet, Strip and Rolled Bar
ASTM B 139	Phosphor Bronze: Bar, Rod, Shapes
ASTM D 297	Chemical Analysis of Rubber Products
ASTM D 395	Compression Set of Vulcanized Rubber
ASTM D 412	Tensile Testing of Vulcanized Rubber
ASTM D 471	Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids
ASTM D 573	Accelerated Aging of Vulcanized Rubber by the Oven Method
ASTM D 2240	Durometer Hardness
ASTM D 1329	Retraction at Lower Temperatures (TR Test)

ASTM D 1414 Tension Testing of Rubber O-Rings

ASTM D 1974 Standard Practice for Method of Closing, Sealing and Reinforcing Fiberboard Shipping Container

ASTM D 6880 Standard Specification for Wood Boxes

2.5 ISO Publications

Available from the International Organization for Standardization, 1, ch. De la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, Tel: +41 22 749 01 11, www.iso.org.

ISO 3601-3 Fluid Power Systems- O-rings - Part 3: Quality Acceptance Criteria

2.6 Uniform Classification Committee

Available from Uniform Classification Committee, 202 Chicago Union Station, Chicago, IL 60606.

Uniform Freight Classification Rules

2.7 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

A-A-1671 Tape, Gummed (Paper, Reinforced, Asphalt Laminated)

A-A-55057 Panels, Wood/ Wood Based: Construction and Decorative

MIL-PRF-6083 Hydraulic Fluid, Petroleum Base, for Preservation & Operations

MILPRF-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-289 Visual Inspection Guide for Rubber Sheet Material

MIL-STD-298 Visual Inspection Guide for Rubber Extruded Goods

3. REQUIREMENTS

3.1 First Article

The synthetic rubber furnished under this specification shall be a product which has met the first article tests specified herein (See 4.3). First article tests are not necessarily required on all orders (See 6.4). If there are any changes in materials or manufacturing processes, new first article test are required.

3.2 Materials

The synthetic rubber shall be manufactured from compounds which are compatible with diester synthetic oils.

3.2.1 Corrosion and Adhesion

The materials shall not cause any corrosion nor shall it adhere to aluminum alloy, brass, or phosphor bronze, when tested as specified in 4.6.1. It shall not adhere to or cause more than slight corrosion of steel. Discoloration will not be cause for rejection.

3.3 Dimensions

3.3.1 Type I (O-rings)

Dimensions and tolerances of type I (O-rings) shall be as specified on AS29561 or in the contract (See 6.3).

3.3.2 Type II

3.3.2.1 Sheet and Strip

Unless otherwise specified, the width of the sheet material shall be 36 inch ± 1 and the tolerances on thickness shown in Table 1 shall apply. The width of strip material or shapes cut from sheet shall be as specified with tolerances of ± 5 percent. The thickness of strip material, other than shapes cut from sheet, shall be as specified with tolerances of ± 5 percent. The length shall be as specified with a tolerance of ± 1 percent.

TABLE 1 - THICKNESS TOLERANCES FOR SHEET

Nominal Thickness (inch)	Tolerances (inch)
0.031 and less	± 0.010
over 0.031 to 0.063 inclusive	± 0.012
over 0.063 to 0.125 inclusive	± 0.016
over 0.125 to 0.188 inclusive	± 0.020
over 0.188 to 0.375 inclusive	± 0.031
over 0.375 to 0.750 inclusive	± 0.047
over 0.750 to 1.000 inclusive	± 0.093
over 1.000	$\pm 10\%$

3.3.2.2 Molded Parts and Extruded Shapes

Dimension and tolerances shall be as specified on the drawing or in the contract (See 6.3).

3.4 Physical Properties

Physical properties of the synthetic rubber shall conform to Table 2.

TABLE 2 - PHYSICAL PROPERTIES

Property	Type I	Type II
Original:		
Tensile strength, psi, minimum	1200	1500
Ultimate elongation, percent minimum	250	250
Hardness, Shore "A", points	70 $\pm$ 5	70 $\pm$ 5
Temperature retraction 10% (TR-10), °F, maximum	-40	-40
Specific gravity	As determined	As Determined
Air aged - 70 hours at 257 °F $\pm$ 2		
Tensile strength decrease, percent, maximum	20	20
Ultimate elongation decrease, percent, maximum	60	60
Hardness change, Shore "A", points	-0, +20	-0, +20
Oil aged - 70 hours at 257 °F $\pm$ 2		
Tensile strength decrease, percent, maximum	50	50
Ultimate elongation decrease, percent, maximum	60	60
Hardness change, Shore "A", points	$\pm$ 10	$\pm$ 10
Volume change, percent	2 to 15	2 to 15
Cracking, diameter, inches, minimum (type I)	1.75	---
180° Flat bend (cracking) (type II)	---	Shall not crack
Temperature retraction 10% (TR-10), °F, maximum	-30	-30
Compression set, percent maximum	50	60
Air Aged - 22 hours at 257 °F $\pm$ 2		
Compression Set, percent max		
Under 0.110 inch	60	40
Over 0.110 inch	55	

3.4.1 The permissible variations in physical properties during actual production from those values established in the preproduction tests shall be:

TABLE 3

Tensile strength, percent	$\pm$ 15
Elongation, percent	$\pm$ 20
Hardness, points	$\pm$ 3
Specific gravity	$\pm$ 0.02
Compression set	$\pm$ 5 Units of percent
Volume change	$\pm$ 2.5 Units of percent

Also, the original property values for tensile strength, elongation, and hardness shall meet the requirements listed in Table 2.

3.5 Age

Unless otherwise specified, the age limitations for the finished product shall conform to SAE-ARP5316.

3.6 Identification of Product

3.6.1 Type I (O-rings)

Temporary marking of O-rings for the manufacturer's identification shall be permitted at the time of manufacture. The temporary marking shall not, in any way, affect the properties of function of the O-ring.