AEROSPACE MATERIAL SPECIFICATION

AMS7269™ REV. C

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Superseding AMS7269B

(R) Rubber: Silicone Rubber (PVMQ) Low Outgassing, Low Temperature Resistant 45 - 55 Shore “A” Hardness For Seals in Space and Vacuum Service

RATIONALE

For Five-Year Review - Complete Revision and reformatting to latest AMS7XXX series Template and added QPL requirement. Removed obsolete NASA specifications.

1. SCOPE

1.1 Form

This specification covers a Silicone (PVMQ) Rubber compound in the form of molded rings.

1.2 Application

Primarily for use in interplanetary space and other hard vacuums from -103 to +302 °F (-75 to +150 °C), with a minimum of condensable outgassing products. While within the earth's atmosphere, the silicone rubber compound is resistant to deterioration by ozone, smog, and weathering. Seals conforming to this specification are intended for use in electrical connectors, components, assemblies, and vehicle segments on the external configuration of spacecraft, where no condensation can be tolerated on critical surfaces (windows, optics, thermal control coatings, etc.) when such critical surfaces may be as cold as 73 °F (23 °C) and the seal may be as hot as 302 °F (150 °C).

The use of materials that are deemed acceptable in accordance with this specification does not ensure that the system or component will remain uncontaminated. Therefore, subsequent functional, developmental, and qualification tests should be used, as necessary, to ensure that the material’s performance is satisfactory for its intended use. Seals for man-inhabited areas of spacecraft may require additional testing and approval. 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

Nothing in this document supersedes applicable laws and regulations unless a specific exemption has been obtained. 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 (excluding this document)

2. Applicable purchaser’s drawing

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
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://standards.sae.org/AMS7269C

3. Specification referenced on the drawing

4. This document

5. All specifications referenced in this document

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.

AMS2817 Packaging and Identification of Molded Elastomeric Seals and Sealing Components

ARP3050 Suitable Test Sizes for O-Ring Specifications

ARP5316 Storage of Elastomer Seals and Seal Assemblies Which Include an Elastomer Element Prior to Hardware Assembly

AS568 Aerospace Size Standard for O-Rings

AS5752 Aerospace - Visual Inspection Standard for Elastomeric Sealing Elements Other Than O-Rings

AS6414 Manufacturing Processing Requirements for Molded Elastomer Components Used in Aerospace Applications

AS9100 Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations

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 Rubber Property - Compression Set, Method B

ASTM D573 Rubber Property - Deterioration in an Air Oven

ASTM D624 Rubber Property - Tear Resistance

ASTM D1329 Evaluating Rubber Property - Retraction at Low Temperature (TR Test)

ASTM D1414 Testing Rubber O-Rings

ASTM D2240 Rubber Property - Durometer Hardness

ASTM E595 Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment

2.3 ISO Publications

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

ISO 3601-1 Fluid Power Systems - O-Rings - Part 1: Inside Diameter, Cross Sections, Tolerances and Size Identification Code

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

2.4 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.pri-network.org.

PD2000 Procedures for an Industry Qualified Product Management Process

PD2102 Aerospace Quality Assurance, Product Standards, Qualification Procedure, Elastomeric Seals

2.5 Other

Available from NCSL International, 2995 Wilderness Place, Suite 107, Boulder, CO 80301, Tel: 303-440-3339, 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 a methyl-phenyl-vinyl silicone (PVMQ) elastomer, suitably cured, and post cured, and otherwise processed to outgas a minimal amount of condensable material in hard vacuum (below 1 x 10-6 torr) when heated to any temperature up to 302 °F (150 °C) and meeting the requirements of 3.2. Material used shall be based on 100% virgin PVMQ elastomer. No reprocessed or non-PVMQ polymer is acceptable.

3.2 Properties

The product shall conform to the following requirements; tests shall be performed on the product supplied, except for the test of 3.2.1.5 , and in accordance with ASTM D1414 insofar as practical:

Table 1 - Qualification properties

Paragraph	Property	Test Sample	Requirements	Test Method
3.2.1	**As Received**			
3.2.1.1	Hardness, Durometer Type “A”	Button or Plied Platens	50 ± 5	ASTM D2240
3.2.1.2	Hardness, Durometer Type “M”	-214 O-rings	Report	ASTM D1414
3.2.1.3	Tensile Strength, minimum	-214 O-rings	900 psi (6.2 MPa)	ASTM D1414
3.2.1.4	Elongation, minimum	-214 O-rings	400%	ASTM D1414
3.2.1.5	Tear Resistance, minimum	ASTM Platens	100 ppi (17.5 kN/m)	ASTM D624, Die B
3.2.1.6	Specific Gravity/Relative Density	-214 O-rings	Preproduction Value ± 0.03	ASTM D1414 (D297) (Hydrostatic Method)