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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7267G

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Superseding AMS 7267F

Rings, Sealing, Silicone (VSI) Rubber Heat-Resistant, Low Compression Set 70 - 80

1. SCOPE:

1.1 Form:

This specification covers a silicone (VSI) rubber in the form of molded rings.

1.2 Application:

These rings have been used typically as sealing rings for service from -65 to +260 °C (-85 to +500 °F) in contact with air, 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.

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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2817	Packaging and Identification, Preformed Packings
AS568	Aerospace Size Standard for O-rings
AIR851	O-ring Tension Testing Calculations
AS871	Manufacturing and Inspection Standards for Preformed Packings (O-rings)

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 471	Rubber Property-Effect of Liquids
ASTM D 575	Rubber Properties in Compression
ASTM D 1414	Testing Rubber O-rings

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be a compound, based on a silicone (VSI) elastomer, suitably cured to produce sealing rings meeting the requirements of 3.2.

3.1.1 Color: Shall be rust.

3.2 Properties:

Rings shall conform to the requirements shown in Table 1; tests shall be performed on the rings supplied and, except as otherwise specified herein, in accordance with ASTM D 1414, 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 as a single strand. Eliminating testing for tensile strength does not eliminate testing for elongation; elongation test can be made 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" or equivalent	75 ± 5	
3.2.2	Tensile Strength, min	650 psi (4.48 MPa)	
3.2.3	Elongation, min	125%	
3.2.4	Compression-Deflection, at 20% deflection, min		4.5.1
	At 20 to 30 °C (68 to 86 °F)	200 psi (1.40 MPa)	
	At 250 °C ± 3 (482 °F ± 5)	150 psi (1.05 MPa)	
3.2.5	Corrosion	Nil	
3.2.6	Specific Gravity	Preproduction Value ± 0.05	
3.2.7	Lubricating Oil Resistance: ASTM Oil No. 1 (Immediate Deteriorated Properties)		ASTM Oil No. 1 (ASTM D 471) 175 °C ± 3 (347 °F ± 5) 70 hours ± 0.5
3.2.7.1	Hardness Change, Durometer "A" or equivalent	-10 to +5	
3.2.7.2	Tensile Strength Change, max (based on area before immersion)	-30%	
3.2.7.3	Elongation Change, max	-30%	
3.2.7.4	Volume Change	0 to +15%	
3.2.8	Dry Heat Resistance:		250 °C ± 3 (482 °F ± 5) 70 hours ± 0.5
3.2.8.1	Hardness Change, Durometer "A" or equivalent	-5 to +10	
3.2.8.2	Tensile Strength Change, max	-30%	
3.2.8.3	Elongation Change, max	-45%	
3.2.9	Polymer Reversion		4.5.2
3.2.9.1	Hardness Change, max Durometer "A" or equivalent	-10	
3.2.10	Compression Set:		225 °C ± 3 (437 °F ± 5) 22 hours ± .25
	Percent of Original Deflection, max		
	Ring Cross Section Diameter		
	0.066 to 0.110 inch (1.68 to 2.79 mm), incl	70	
	Over 0.110 inch (2.79 mm)	60	
3.2.11	Low-Temperature Resistance:		
	Temperature Retraction, TR10 point, max	-42 °C (-44 °F)	

3.3 Quality:

Rings, 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. Inspection for conformance to dimensional requirements shall be made in accordance with AS871. Standard sizes are as shown in AS568.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of rings shall supply all samples for required 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 rings conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for requirements shown in Table 2 are acceptance tests and shall be performed on each lot.

TABLE 2 - Acceptance Tests

Requirement	Paragraph Reference
Hardness	3.2.1
Tensile Strength	3.2.2
Elongation	3.2.3
Specific Gravity	3.2.6
Volume Change in Oil	3.2.7.4
Compression Set	3.2.10

4.2.2 Periodic Tests: Tests for requirements shown in Table 3 are periodic tests and shall be performed at a frequency selected by the manufacturer unless frequency of testing is specified by purchaser.

TABLE 3 - Periodic Tests

Requirement	Paragraph Reference
Corrosion	3.2.5
Tensile Strength Change in Oil	3.2.7.2
Elongation Change in Oil	3.2.7.3
Hardness Change after Dry Heat Exposure	3.2.8.1
Temperature Retraction, TR_{10} point	3.2.11

4.2.3 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the first-article shipment of rings by the manufacturer, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient rings shall be taken at random from each lot to perform all required tests; the number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all rings of the same size from the same batch of compound processed in one continuous run and presented for manufacturer's inspection at one time.

4.3.1.2 A batch shall be the quantity of compound run through a mill or mixer at one time.

4.3.1.3 When a statistical sampling plan has been agreed upon by purchaser and supplier, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Periodic Tests: As agreed upon by purchaser and supplier.

4.3.3 For Preproduction Tests: As agreed upon by purchaser and supplier and as follows:

4.3.3.1 Specimens for the compression-deflection test shall be discs cut from molded slabs and stacked to 0.500 inch ± 0.010 (12.70 mm ± 0.25) thickness.

4.3.3.2 Specimens for the polymer reversion test shall be discs 1.129 inches ± 0.005 (28.68 mm ± 0.13) in diameter stacked to a total thickness of 0.500 to 0.550 inch (12.70 to 13.97 mm).

4.4 Approval:

4.4.1 Purchaser may request sample rings for evaluation before rings for production use are supplied.

4.4.2 Manufacturer shall establish, for each size of ring, process control factors which will produce rings meeting the technical requirements. These shall constitute the approved procedure and shall be used for manufacturing production rings. If necessary to make any change in process control factors, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample rings. Production rings incorporating the revised procedures shall not be shipped prior to receipt of reapproval.

4.4.2.1 Process control factors for producing rings include, but are not limited to, the following:

Compound ingredients or proportions thereof within established limits
Sequence of mixing compound ingredients and associated time, temperature, or work input controls
Type of mixing equipment
Method and equipment for preparing preforms
Basic molding procedure (compression, transfer, injection)
Curing time, temperature, and pressure, maintained within statistically derived control limits
Finishing methods
Methods of inspection

4.4.2.1.1 Any of the above process control factors for which parameters are considered proprietary by the manufacturer may be assigned a code designation. Each variation in such parameters shall be assigned a modified code designation.

4.5 Test Methods:

4.5.1 Compression-Deflection: Shall be determined in accordance with ASTM D 575, Method A, on specimens as in 4.3.3.1 except using a compression rate of 0.10 inch per minute ± 0.02 (0.04 mm/s ± 0.008) and omitting buffing of the surfaces. For tests at 250 °C (482 °F), the compression apparatus shall be surrounded by a suitable heater and the specimen and test fixture stabilized at test temperature for 60 minutes ± 5 before applying the load.

4.5.2 Polymer Reversion: Hardness of the stacked discs as in 4.3.3.2 shall be measured and the specimen placed in the cup of the test fixture (see Figure 1). The fixture shall be assembled and the screw cap tightened to 25 pounds force per inch (4378 N/m) torque. The fixture shall be placed in an oven which is at 250 °C ± 3 (482 °F ± 5) for 6 hours ± 0.2, removed, cooled to room temperature in not less than 2 hours, and disassembled. Test specimen shall be removed and hardness again determined.

4.6 Report:

The supplier of rings shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and, when performed, to the periodic test requirements and stating that the rings conform to the other technical requirements. This report shall include the purchase order number, lot number, AMS 7267G, manufacturer's identification, part number, and quantity.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the rings may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the rings represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Marking:

Shall be in accordance with AMS 2817.

5.1.1 A lot of rings may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.

6. ACKNOWLEDGMENT:

Supplier shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS:

Rings not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

8.1 A change bar (**l**) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the “C” revision of this specification. An (R) symbol to the left of the document title indicates a complete revision of the specification, including technical revisions. Change bars and (R) are not used in original publications, nor in specifications that contain editorial changes only.

8.2 Dimensions and properties in inch/pound units and the Celsius temperatures are primary; dimensions and properties in SI units and the Fahrenheit temperatures are shown as the approximate equivalents of the primary units and are presented only for information.