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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7257C

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Submitted for recognition as an American National Standard

Superseding AMS 7257B

Rings, Sealing, Perfluorocarbon (FFKM) Rubber High Temperature Fluid Resistant 70 - 80

1. SCOPE:

1.1 Form:

This specification covers a perfluorocarbon (FFKM) rubber in the form of molded O-rings.

1.2 Application:

These sealing rings have been used typically for applications in contact with air or a variety of fuels, lubricants, and hydraulic fluids from -15 to +290 °C (+5 to 554 °F), but usage is not limited to such applications. Each application, however, has to be considered individually. Instances are known when these rings have been used below -15 °C (+5 °F) and above 290 °C (554 °F). 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
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2.1 SAE Publications:

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

AMS 2817	Packaging and Identification, Preformed Packings
AMS 3021	Reference Fluid for Testing Di-Ester (Polyol) Resistant Materials
AIR851	O-Ring Tension Testing Calculations
AS568	Aerospace Size Standard for O-Rings
AS871	Manufacturing and Inspection Standards for Preformed Packings (O-Rings)
AS1241	Fire Resistant Hydraulic Fluid for Aircraft

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 471	Rubber Property - Effect of Liquids
ASTM D 1414	Testing Rubber O-Rings
ASTM D 2240	Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be a compound, based on a perfluorocarbon (FFKM) elastomer, suitably cured to produce a product meeting the requirements of 3.2.

3.2 Properties:

Rings shall conform to the requirements shown in Table 1; tests shall be performed on slabs and rings as in 4.3.1.1 and in accordance with ASTM D 1414, insofar as practicable, except that hardness shall be determined in accordance with ASTM D 2240. Calculations of tensile strength and elongation may be made in accordance with AIR851.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Methods
3.2.1	Hardness, Durometer “A” or equivalent	70 to 80	ASTM D 2240
3.2.2	Tensile Strength, minimum	1500 psi (10.3 MPa)	
3.2.3	Elongation, minimum	120%	
3.2.4	Synthetic Lubricant Resistance		AMS 3021 175 °C ± 3
3.2.4.1	Hardness Change, Durometer “A” or equivalent	-5 to +5	(347 °F ± 5) 70 hours ± 0.5
3.2.4.2	Tensile Strength Change, maximum	-10%	
3.2.4.3	Elongation Change, maximum	-15%	
3.2.4.4	Volume Change	0 to +5%	
3.2.5	Hydraulic Fluid Resistance:		AS1241, Type IV,
3.2.5.1	Hardness Change, Durometer “A” or equivalent	-15 to 0	Class 1 or Class 2 125 °C ± 3
3.2.5.2	Tensile Strength Change, maximum	-40%	(255 °F ± 5) 70 hours ± 0.5
3.2.5.3	Elongation Change, maximum	-15%	
3.2.5.4	Volume Change	0 to +15%	
3.2.6	Aromatic Fuel Resistance:		ASTM Ref. Fuel B (ASTM D 471)
3.2.6.1	Hardness Change, Durometer “A” or equivalent	-5 to +5	20 to 30 °C (68 to 86 °F) 70 hours ± 0.5
3.2.6.2	Tensile Strength Change, maximum	-20%	
3.2.6.3	Elongation Change, maximum	-15%	
3.2.6.4	Volume Change	0 to +5%	
3.2.7	Dry Heat Resistance:		290 °C ± 3 (554 °F ± 5)
3.2.7.1	Hardness Change, Durometer “A” or equivalent	-5 to +5	70 hours ± 0.5
3.2.7.2	Tensile Strength Change, maximum	-20%	
3.2.7.3	Elongation Change, maximum	-5%	
3.2.7.4	Weight Loss, maximum	5%	
3.2.8	Compression Set: Percent of Original Deflection, maximum	40%	230 °C ± 3 (446 °F ± 5) 70 hours ± 0.5
3.2.9	Low-Temperature Resistance: Temperature Retraction TR10 Point, maximum	+5 °C (+41 °F)	

3.3 Quality:

Rings, as received by purchaser, shall be uniform in quality and condition, smooth, as free from foreign materials as commercially practicable, and free from internal imperfections detrimental to usage of the rings. Surface imperfections shall, unless otherwise specified, be no greater than permitted by AS871 for minor defects.

3.4 Sizes and Tolerances:

Shall be as specified on the drawing. Standard sizes are shown in AS568. Inspection for conformance to dimensional requirements shall be made in accordance with AS871, unless otherwise specified.

3.5 Part Numbers:

Shall consist of the following:

1. This specification number (AMS 7257)

2. A dash followed by the appropriate dash number from AS568.

Example 1	Example 2
AMS 7257-014	AMS 7257-121

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of rings 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 rings conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Tests for requirements shown in Table 2 are acceptance tests and shall be performed on each batch of compound.

TABLE 2 - Acceptance Tests

Requirement	Paragraph Reference
Hardness	3.2.1
Tensile Strength	3.2.2
Elongation	3.2.3
Compression Set	3.2.8

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 vendor unless frequency of testing is specified by purchaser.

TABLE 3 - Periodic Tests

Requirement	Paragraph Reference
Tensile Strength Change in Synthetic Lubricant	3.2.4.2
Elongation Change in Synthetic Lubricant	3.2.4.3
Volume Change in Synthetic Lubricant	3.2.4.4
Volume Change in Hydraulic Fluid	3.2.5.4
Hardness Change After Dry Heat Exposure	3.2.7.1
Temperature Retraction, TR_{10} Point	3.2.9

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 to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient rings and slabs shall be taken at random from each batch of compound 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 Samples for acceptance tests shall be AS568-214 rings and slabs not less than 0.065 inch (1.65 mm) thick.

4.3.1.2 A batch shall be the quantity of compound processed through a mill or mixer at one time and shall not exceed 100 pounds (45.4 kg).

4.3.1.3 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5 shall state that such plan was used.

4.3.2 For Periodic Tests: As in 4.3.1.

4.3.3 For Preproduction Tests: As agreed upon by purchaser and vendor.