AERONAUTICAL
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 7267

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Revised

RINGS, SEALING, SILICONE RUBBER
Heat Resistant - Low Compression Set
(70 - 80)

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1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. FORM: Molded rings.

3. APPLICATION: Sealing rings for use at temperatures from -85 to +500 F in contact with air. Not suitable for use at the higher temperatures in lubricating oil systems. The cross-section of such rings is usually not over 3/16 in. in diameter or thickness.

4. TECHNICAL REQUIREMENTS:

4.1 Corrosion: The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service. Discoloration of metal shall not be considered objectionable.

4.2 Properties: The product shall conform to the following requirements; tests shall be performed on the product supplied, except for the tests of 4.2.1.4, 4.2.1.5, 4.2.4, 4.2.5.1, and 4.2.6.1, and in accordance with listed ASTM methods insofar as practicable. Tensile strength testing is not required on rings which are too small to permit assembly on rollers for testing and are, after cutting, too short to permit testing as a single strand. Eliminating tensile testing 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. The tests of 4.2.1.4 and 4.2.1.5 are not required for routine control.

4.2.1 As Received:

4.2.1.1	Hardness, Durometer "A" or equiv.	75 ± 5	
4.2.1.2	Tensile Strength, psi, min	650	ASTM D1414-56T
4.2.1.3	Elongation, %, min	125	ASTM D1414-56T
4.2.1.4	Compression-Deflection, at 20% deflection, psi, min		Note 1
	At 70 - 85 F	200	
	At 500 F	150	
4.2.1.5	Compression-Relaxation Rate	To be reported	Note 2
4.2.1.6	Specific Gravity, variation from sample submitted for approval, max	± 0.05	

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4.2.2 Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D471-57T Medium: ASTM Oil No.1 Temperature: 350 F ± 2 Time: 70 hr
4.2.2.1 Hardness Change, Durometer "A" or equiv.	-10 to +5	
4.2.2.2 Tensile Strength, Change, %, max (based on area before immersion)	-30	
4.2.2.3 Elongation Change, %, max	-30	
4.2.2.4 Volume Change (Method A), %	0 to +15	
4.2.3 Dry Heat Resistance:		ASTM D573-53 Temperature: 500 F ± 5 Time: 70 hr
4.2.3.1 Hardness Change, Durometer "A" or equiv.	-5 to +10	
4.2.3.2 Tensile Strength Change, %, max	-35	
4.2.3.3 Elongation Change, %, max	-55	
4.2.3.4 Surface Hardening	None	
4.2.3.5 Bend (flat)	No cracking or checking	
4.2.4 Polymer Reversion:		Note 3
4.2.4.1 Hardness Change, Durometer "A" or equiv., max	-15	
4.2.5 Compression Set:		ASTM D395-55, Method B Temperature: 450 F ± 2 Time: 22 hr Use discs cut from molded slabs. Compress to 75% of original thickness
4.2.5.1 Discs:		
4.2.5.1.1 Percent of original deflection, max	65	
4.2.5.1.2 Percent of original thickness, max	17	

4.2.5.2 Parts: Compression set shall be determined on parts, using the fixture described in Figure 2 and the procedure in Note 4. Compression set on parts or specimens may differ from that on discs but values determined on production rings shall be approximately the same as those on approved samples.

4.2.6 Low Temperature Resistance:		ASTM D746-57T Temperature: -85 F ± 2 Time: 10 min.
4.2.6.1 Brittleness Temperature, Strip specimens, deg Fahr	Pass	
4.2.6.2 Temperature Retraction, Rings TR_{10} point	To be reported	ASTM D1329-58T, modified for testing specimens from rings.

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Note 1. Test in accordance with ASTM D575-46, Method A, except using a compression rate of 0.1 in. per min. and omitting buffing of the surfaces. Specimens shall be discs cut from molded slabs stacked to 0.500 in. ± 0.010 thickness. For tests at 500 F, the compression apparatus shall be surrounded by a suitable heater and the specimen and test fixture stabilized at test temperature for 1 hr before applying the load.

Note 2. This test shall be run on the specimens used for compression-deflection test immediately after completion of that test. On reaching the 30% deflection point during final compression of the specimen, the machine shall be stopped so that the deflection is maintained and a suitable timer started simultaneously. The load shall be read and recorded at 10 sec, 20 sec, and subsequent 20 sec intervals for a total of 120 seconds. Calculate the ratio of S/S_o for each 20 sec interval where:

S = load in lb at time t
S_o = load in lb at 10 sec

Plot S/S_o in decreasing numerical order on the linear scale and time in seconds on the logarithmic scale of semi-log paper. If plotted values do not plot in a straight line, draw the mean straight line curve. Calculate the slope of this curve, and report as a negative value, from the formula:

$$\frac{\text{Log } 20 - \text{Log } 100}{(S/S_o \text{ at } t = 100) - (S/S_o \text{ at } t = 20)}$$

Note 3. Specimen shall be discs 1.129 in. ± 0.005 in diameter stacked to a total thickness of 0.500 - 0.550 in. Hardness of the stacked discs 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 lb-in. torque. The fixture shall be placed in an oven at 500 F ± 5 for 6 hr, removed, cooled to room temperature in not less than 2 hr, and disassembled. Test specimen shall be removed and hardness again determined.

Note 4. Twelve sections of rings, each embracing 7/8 in. of ring circumference, shall be used as specimens. A plain washer, item 2 of Figure 2, shall be placed on the bolt, item 1, followed by a compression washer, item 3, a spacer washer, item 4, and two ring sections, and a compression washer, item 5. Additional spacer washers, ring sections, and compression washers shall be placed on the bolt until all ring sections and spacer washers have been installed. A final compression washer, item 3, shall be installed and the thickness over all compression washers measured (L_o). Another plain washer, item 2, and a nut, item 6, shall be assembled on the bolt, the nut tightened to a torque of approximately 200 lb-in., and the thickness over the compression washers again measured (C). The assembly shall then be heated in an oven at 450 F ± 2 for 22 hours. The assembly shall then be removed from the oven and the nut immediately loosened to relieve all compression on the specimens. The assembly shall be allowed to cool to room temperature in not less than 1 hr, and the thickness of the assembly over the compression washers again measured (L_1). Compression set based on original deflection shall be computed from the equation:

$$\text{Compression Set} = \frac{L_o - L_1}{L_o - C} \times 100\%$$

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5. QUALITY: The product shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from imperfections detrimental to fabrication, appearance, or performance of parts.

6. REPORTS: Unless otherwise specified, the vendor shall furnish with each shipment three copies of a report stating that the product conforms to the requirements of this specification. This report shall include the purchase order number, material specification number, vendor's compound number and batch number, values to be reported, part number, and quantity.

7. PACKAGING AND MARKING:

7.1 Individual rings shall be packaged and identified in accordance with the latest issue of AMS 2817, except that cure date is not required.

7.2 Sheets or strips of individual ring packages shall be packed in cartons in such a manner that the rings, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any normal hazard. Each carton shall be marked to give the following information:

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PART NUMBER _____
PURCHASE ORDER NUMBER _____
QUANTITY _____
COMPOUND NUMBER _____
MANUFACTURER'S IDENTIFICATION _____
DATE OF SHIPMENT _____

8. APPROVAL:

8.1 To assure adequate performance characteristics, compound shall be approved by purchaser before rings for production use are supplied, unless such approval be waived. Results of tests on production rings shall be essentially equivalent to those on the approved sample.

8.2 Vendor shall use the same compound and manufacturing processes for production rings as for approved sample rings. If necessary to make any change in mold, compound, or processing, vendor shall obtain written permission from purchaser prior to incorporating such change.

9. REJECTIONS: Parts not conforming to this specification or to authorized modifications will be subject to rejection.

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