AEROSPACE
MATERIAL SPECIFICATIONS
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AMS 7278A

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RINGS, SEALING, SYNTHETIC RUBBER
High Temperature Fluid Resistant (70 - 80)
Fluorocarbon Type

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

2. FORM: Molded rings.

3. APPLICATION: Sealing rings for use in contact with air or a variety of fuels, lubricants, and hydraulic fluids at temperatures up to 500 F. Rings may be suitable for use at temperatures appreciably lower than the brittleness point as determined by common tests. 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 4.2.1.5, 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 ø 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 4.2.1.5 and 4.2.1.6 are not required for routine control.

4.2.1 As Received:

4.2.1.1	Hardness, Durometer "A" or equiv.	75 ± 5	
ø 4.2.1.2	Tensile Strength, psi, min	1600	See 4.2.1.7
ø 4.2.1.3	Elongation, %, min	175	See 4.2.1.7
4.2.1.4 ø	Tensile Stress at 100% Elongation, psi, min	350	See 4.2.1.7
4.2.1.5 ø	Compression-Deflection, at 20% deflection, psi, min		See 4.2.1.8
	At 70 - 85 F	To be reported	
	At 500 F	To be reported	
4.2.1.6	Specific Gravity, variation from sample submitted for approval	± 0.02	

ø 4.2.1.7 Use ASTM D1414-56T for "O" rings; use ASTM D412-51T for other rings.

4.2.1.8 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.

4.2.2 Aromatic Fuel Resistance: (Immediate Deteriorated Properties)

ASTM D471-59T
Medium: ASTM Ref. Fuel B
Temperature: 70 - 85 F
Time: 70 hr

4.2.2.1	Hardness Change, Durometer "A" or equiv.	-5 to +5
4.2.2.2	Tensile Strength Change, %, max (based on area before immersion)	-15
4.2.2.3	Elongation Change, %, max	-15
4.2.2.4	Volume Change, %	0 to +10

4.2.3 Synthetic Lubricant Resistance: (Immediate Deteriorated Properties)

See 4.2.3.5
Medium: Di-2-ethylhexyl sebacate +0.5% phenothiazine
Temperature: 400 F ± 5
Time: 70 hr

4.2.3.1	Hardness Change, Durometer "A" or equiv.	-15 to +5
4.2.3.2	Tensile Strength Change, %, max (based on area before immersion)	-40
4.2.3.3	Elongation Change, %, max	-20
4.2.3.4	Volume Change, %	0 to +20

4.2.3.5 Place 140 ml of test fluid in 38 mm OD x 300 mm long test tubes at room temperature. Immerse test tubes in the heating medium so that 2 in. of each tube extends above the level of the heat transfer oil in oil bath heaters or so that 1 in. of each tube extends above the top insulation of aluminum block or air well heaters. Heat the test fluid to 400 F ± 5. For rings 1 in. and under in ID, hang three rings in each tube from corrosion resistant steel wire or wires so that the top points of the rings will be 1, 2-1/2, and 4 in. below the surface of the test fluid. For rings over 1 in. but not over 3 in. ID, cut segments from each of three rings, form to 1 in. ID rings, securing the ends of the segments with corrosion resistant steel wire, and hang as for complete rings. For rings over 3 in. ID, cut 5 in. long segments from each of three rings. Hang each segment by a corrosion resistant steel wire so that the segments do not touch each other or the walls of the test tube and so that the mid-length of each segment is at the approximate mid-depth of the test fluid. Stopper the test tubes with new bare, cork stoppers 1-1/2 in. thick having two 8 mm OD glass tubes through the cork, one 3 in. long extending 1 in. below the bottom of the cork and one 5-1/2 in. long extending 3-1/2 in. above the top of the cork. Force the wire or wires from which the rings are hung into the bottom of the cork before inserting in the test tube. After the immersion period, suspend the rings in fresh test fluid at room temperature and allow to cool in this fluid for approximately 30 min., remove the rings, rinse them briefly in acetone, and blot lightly with filter paper. Determine changes in properties, using the water displacement method for measuring volume change. Report results as the average of the properties for the three specimens.

4.2.4 Dry Heat Resistance:

ASTM D573-53
Temperature: 500 F ± 5
Time: 70 hr

4.2.4.1	Hardness Change, Durometer "A" or equiv.	0 to +15
4.2.4.2	Tensile Strength Change, %, max	-35
4.2.4.3	Elongation Change, %, max	-50
4.2.4.4	Weight Loss, %	- 8.0
4.2.4.5	Surface Hardening	None
4.2.4.6	Bend (flat)	No cracking or checking

Ø 4.2.5 Compression Set:

ASTM D395-55, Method B
Temperature: 400 F ± 5
Time: 70 hr
Compressed to 75% of original cross section diameter. See 4.2.5.3

4.2.5.1	Percent of original deflection, max	65
4.2.5.2	Percent of original thickness, max	17

4.2.5.3 Ø Compression set shall be determined on complete rings if the ID of the ring is 2 in. or less; for larger rings, a section approximately 1 in. long cut from the ring shall be used.

4.2.6 Low Temperature Resistance:

ASTM D1329-60, modified for testing specimens from rings; elongate specimen 50%