

# AEROSPACE MATERIAL SPECIFICATIONS

## AMS 3356A

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N.Y. 10017

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### SILICONE RUBBER Lubricating Oil and Compression Set Resistant, Electrical Grade 55 - 65

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **FORM:** Sheet, strip, tubing, molded shapes, extrusions, or as ordered.
3. **APPLICATION:** Primarily for rubber-like parts required to operate or seal at temperatures from -55 to +230 C (-67 to +446 F), compounded especially for lubricating oil resistance, low compression set, and controlled dielectric strength. Silicone rubber is resistant to deterioration by weathering and by high aniline point petroleum base oils, and remains flexible over the temperature range noted. This material is not normally suitable for use in contact with low aniline point petroleum base fluids, including fuels, due to excessive swelling. This material may produce toxic vapors when heated and should not be used where air contamination would be undesirable.
4. **TECHNICAL REQUIREMENTS:**
  - 4.1 **General:**
    - 4.1.1 **Condition:** Unless otherwise specified, a suitably cured product shall be furnished.
    - 4.1.2 **Weathering:** When specified, the product shall have weather resistance acceptable to the purchaser as determined by a procedure agreed upon by purchaser and vendor.
    - 4.1.3 **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 and in accordance with the issue of specified ASTM methods listed in the latest issue of AMS 2350, insofar as practicable. When the product supplied is an extrusion of such shape that suitable test specimens cannot be cut from the product, a separate flat strip test sample shall be supplied upon request. This strip shall be prepared from 1 in.  $\pm$  1/16 OD by 0.075 in.  $\pm$  0.008 thick wall tubing which shall be mechanically split and flattened into a strip while being extruded and then cured in the same manner as production material.

4.2.1 **As Received:**

∅ 4.2.1.1	Hardness, Durometer "A" or equiv.	60 $\pm$ 5	ASTM D676
4.2.1.2	Tensile Strength, psi, min	600	ASTM D412, Die B or C
4.2.1.3	Elongation, %, min	175	ASTM D412, Die B or C
4.2.1.4	Tensile Stress at 50% Elongation, psi, max	250	ASTM D412, Die B or C
4.2.1.5	Tear Resistance, lb per in., min	50	ASTM D624, Die B

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only and are not to be used as a basis for design or construction. The user is responsible for determining the applicability of these reports and for obtaining the necessary permission to use by anyone engaged in industry or trade is entirely voluntary. There is no obligation on the part of the user to conform to or be guided by any technical report. In formulating and applying technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

4.2.1.6	Dielectric Strength, v per mil, min	350	ASTM D149, Continuous Voltage Rise Method Electrode Diameter: 2 in. Specimen Thickness: 0.075 - 0.080 in.
4.2.2	<u>Lubricating Oil Resistance:</u> ∅ (Immediate Deteriorated Properties)		ASTM D471 Medium: ASTM Oil No. 1 Temperature: 175 C ± 3 (347 F ± 5.4) Time: 70 hr
4.2.2.1	Hardness Change, Durometer "A" or equiv.	-15 to +5	
4.2.2.2	Tensile Strength Change, %, max (based on area before immersion)	-35	
4.2.2.3	Elongation Change, %, max	-20	
4.2.2.4	Volume Change, %	0 to +15	
4.2.2.5	Decomposition	None	
4.2.2.6	Surface Tackiness	None	
4.2.3	<u>Water Resistance:</u> ∅ (Immediate Deteriorated Properties)		ASTM D471 Medium: Distilled Water Temperature: 20 - 30 C (68 - 86 F) Time: 48 hr
4.2.3.1	Volume Change, %	0 to +5	
4.2.3.2	Dielectric Strength Change, %, max	-15	
∅ 4.2.4	<u>Dry Heat Resistance:</u>		ASTM D573 Temperature: 225 C ± 3 (437 F ± 5.4) Time: 24 hr
4.2.4.1	Hardness Change, Durometer "A" or equiv.	0 to +10	
4.2.4.2	Tensile Strength Change, %, max	-15	
4.2.4.3	Elongation Change, %, max	-20	
4.2.4.4	Bend (flat)	No cracking or checking	
∅ 4.2.5	<u>Compression Set:</u>		ASTM D395, Method B Temperature: 175 C ± 3 (347 F ± 5.4) Time: 22 hr
4.2.5.1	Per cent of original deflection, max	40	
∅ 4.2.5.2	Per cent of original thickness, max	10	
4.2.6	<u>Low Temperature Resistance:</u>		
4.2.6.1	Brittleness ∅	Pass	ASTM D746, Procedure B Temperature: -65 C ± 3 (-85 F ± 5.4) Time: 10 min.

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4.2.6.2	Young's Modulus, psi, max Ø (See Note 1)	10,000	ASTM D797 Temperature: -50 C ± 3 (-58 F ± 5.4) Time: 5 hr
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Note 1. This test is not normally required but is intended to be used as a referee test in case of disagreement on the results of the brittleness test.

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

6. **TOLERANCES:** Unless otherwise specified, the following tolerances apply:

6.1 **Sheet and Strip:**

Nominal Thickness Inches	Tolerance, Inch Plus and Minus
Up to 1/8, incl	1/64
Over 1/8 to 1/2, incl	1/32
Over 1/2	3/64

6.2 **Tubing:**

6.2.1	Nominal OD or ID (not both), Inches	Tolerance Plus and Minus	Ovality, % (See Note 2)
	Up to 1/2, incl	0.020 in.	10
	Over 1/2 to 1, incl	0.030 in.	15
	Over 1	4%	15

Note 2. Ovality applies to tubing ordered in straight lengths with wall thickness of 1/16 in. and over, and shall be computed from the difference of the minor and major axis diameter measurements, taken at the same transverse plane on the tube, expressed as a percentage of the nominal diameter.

6.2.2	Nominal Wall Thickness Inches	Tolerance Plus and Minus
	Up to 1/16, excl	0.005 in.
	1/16 and over	10%

7. **REPORTS:**

7.1 Unless otherwise specified, the vendor of the product 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, form or part number, and quantity.

7.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, supplier's compound number, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.