Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3301E
Superseding 3301D
Issued 10-1-50
Revised 6-15-75

SILICONE RUBBER
General Purpose
35 - 45

1. SCOPE:

1.1 Form: This specification covers a silicone rubber in the form of sheet, strip, tubing, extrusions, and molded shapes.

1.2 Application: Primarily for rubber-like parts required to operate or seal at temperatures from -65° to +205°C (-85° to +401°F). Silicone elastomer is resistant to deterioration by weathering and petroleum-base lubricating oil and remains flexible over the temperature range noted. This material is not normally suitable for use in contact with gasoline or aromatic fuels and low-aniline-point petroleum-base fluids due to excessive swelling of the elastomer.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2810 - Identification and Packaging, Elastomeric Products

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM D297 - Chemical Analysis of Rubber Products
ASTM D395 - Compression Set of Vulcanized Rubber
ASTM D412 - Tension Testing of Vulcanized Rubber
ASTM D471 - Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids
ASTM D573 - Accelerated Aging of Vulcanized Rubber by the Oven Method
ASTM D624 - Tear Resistance of Vulcanized Rubber
ASTM D797 - Young's Modulus in Flexure of Elastomers at Normal and Subnormal Temperatures
ASTM D2137 - Low-Temperature Impact Test for Brittleness Determination of Flexible Polymeric Materials or Fabrics Coated Therewith, or Both
ASTM D2240 - Indentation Hardness of Rubber and Plastics by Means of a Durometer

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be a compound based on a silicone elastomer suitably cured to produce a product ø meeting all technical requirements of this specification.

Printed in U.S.A.

3.2 Properties: The product shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with specified ASTM methods, insofar as practicable:

3.2.1 As Received:

Ø 3.2.1.1 Hardness, Durometer "A" or equiv.	40 ± 5	ASTM D2240
3.2.1.2 Tensile Strength, min	500 psi (3.45 MPa)	ASTM D412, Die B or C
3.2.1.3 Elongation, min	250%	ASTM D412, Die B or C
3.2.1.4 Tensile Stress at 100% Elongation, max	200 psi (1.38 MPa)	ASTM D412, Die B or C Stretch specimen to 125% elongation twice within 5 min. before testing.
3.2.1.5 Tear Resistance, min	55 lb per in. (9.63 kN/m)	ASTM D624, Die B
Ø 3.2.1.6 Specific Gravity	Qualification value ± 0.03	ASTM D297
3.2.2 Petroleum-Base Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D471 Medium: ASTM Oil No. 1 Temperature: 175°C ± 3 (347°F ± 5.4) Time: 70 hr ± 0.5
3.2.2.1 Hardness Change, Durometer "A" or equiv.	-20 to + 5	
3.2.2.2 Tensile Strength Change, max	-60%	
3.2.2.3 Elongation Change, max	-30%	
3.2.2.4 Volume Change	0 to +20%	
3.2.2.5 Decomposition	None	
3.2.2.6 Surface Tackiness	None	
3.2.3 Dry Heat Resistance:		ASTM D573 Temperature: 225°C ± 3 (437°F ± 5.4) Time: 24 hr ± 0.5
3.2.3.1 Hardness Change, Durometer "A" or equiv.	-5 to +10	
3.2.3.2 Tensile Strength Change, max	-15%	
3.2.3.3 Elongation Change, max	-20%	
3.2.3.4 Bend (flat)	No cracking or checking	

3.2.4 Compression Set:		ASTM D395, Method B Temperature: 175°C ± 3 (347°F ± 5.4) Time: 22 hr ± 0.5
3.2.4.1 Percent of Original Deflection, max	72	
3.2.5 Low Temperature Resistance:		
Ø 3.2.5.1 Brittleness	Pass	ASTM D2137, Method A Temperature: -65°C ± 3 (-85°F ± 5.4) Time: 3 min. ± 0.3
3.2.5.2 Young's Modulus, max (See 8.3)	10,000 psi (69 MPa)	ASTM D797 Temperature: -50°C ± 1 (-58°F ± 1.8) 5 hr ± 0.2

3.2.6 Weathering: When specified, the product shall have weather resistance acceptable to the purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.7 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.

3.3 Quality: The product shall be uniform in quality and condition, clean, smooth, as free from foreign material as commercially practicable, and free from imperfections detrimental to fabrication, appearance, or
Ø performance of parts.

3.4 Tolerances: Unless otherwise specified, the following tolerances shall apply:

3.4.1 Sheet and Strip:

TABLE I

Nominal Thickness Inches	Tolerance, Inch plus and minus
Up to 0.125, incl	0.016
Over 0.125 to 0.500, incl	0.032
Over 0.500	0.047

TABLE I (SI)

Nominal Thickness Millimetres	Tolerance, Millimetres plus and minus
Up to 3.18, incl	0.41
Over 3.18 to 12.70, incl	0.81
Over 12.70	1.19

3.4.2 Tubing:

3.4.2.1 Diameter:

TABLE II

Nominal OD or ID (not both), Inches	Tolerance plus and minus	Ovality, % (See 3.4.2.1.1)
Up to 0.500, incl	0.020 in.	10
Over 0.500 to 1.000, incl	0.030 in.	15
Over 1.000	4%	15

TABLE II (SI)

Nominal OD or ID (not both), Millimetres	Tolerance plus and minus	Ovality, % (See 3.4.2.1.1)
Up to 12.70, incl	0.51 mm	10
Over 12.70 to 25.40, incl	0.76 mm	15
Over 25.40	4%	15

3.4.2.1.1 Ovality applies to tubing ordered in straight lengths with wall thickness of 0.063 in. (1.60 mm) 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.

3.4.2.2 Wall Thickness:

TABLE III

Nominal Wall Thickness Inches	Tolerance plus and minus
Up to 0.063, excl	0.005 in.
0.063 and over	10%

TABLE III (SI)

Nominal Wall Thickness Millimetres	Tolerance plus and minus
Up to 1.60, excl	0.13 mm
1.60 and over	10%

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: