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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3320F
Superseding AMS 3320E

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SILICONE RUBBER SHEET, GLASS CLOTH REINFORCED
Heat and Weather Resistant
60 - 80

1. SCOPE:

1.1 Form: This specification covers a heat and weather resistant silicone rubber, reinforced with glass cloth in the form of sheet.

1.2 Application: Primarily for gaskets or seals requiring a resilient, nonporous sheet material suitable for operation from -55° to +205°C (-65° to +400°F). The material is resistant to deterioriation by weathering and aircraft piston engine 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 shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2810 - Identification and Packaging, Elastomeric Products
AMS 3824 - Cloth, Type "E" Glass, Finished for Resin Laminates

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

ASTM D395 - Rubber Property - Compression Set
ASTM D471 - Rubber Property - Effect of Liquids
ASTM D573 - Rubber - Deterioration in An Air Oven
ASTM D751 - Testing Coated Fabrics
ASTM D2137 - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D2240 - Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication: Sheet shall be fabricated of a single ply of woven glass cloth conforming to AMS 3824, Style 162, 182, 184, 1523, or 1564, impregnated with, and bonded between two essentially equal thickness layers of a compound based on a silicone rubber molded to an overall thickness, after curing, of 0.062 - 0.125 in. (1.55 - 3.12 mm), and suitably cured to produce a product meeting the requirements of 3.2.

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

3.2.1 As Received:

3.2.1.1 Hardness, Durometer "A" or equiv.	70 ± 10	4.5.1
3.2.1.2 Breaking Strength, min	300 lb per in. (52.5 kN/m)	ASTM D751, Cut Strip Method
3.2.1.3 Edge Leakage	None	4.5.2
3.2.2 Petroleum Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D471 Medium: ASTM Oil No. 1 Temperature: 175°C ± 3 (347°F ± 5) Time: 70 hr ± 0.5
3.2.2.1 Hardness Change, Durometer "A" or equiv.	-15 to +5	
3.2.2.2 Volume Change	0 to +10%	
3.2.2.3 Decomposition	None	
3.2.2.4 Surface Tackiness	None	
3.2.3 Dry Heat Resistance:		
3.2.3.1 Gasket Test		4.5.3

3.2.3.1.1	Decomposition or Softening	None	
3.2.3.1.2	Surface Tackiness	None	
3.2.3.2 Ø	Hardness Change, Durometer "A" or equivalent	-5 to +10	ASTM D573 Temperature: 225°C ± 3 (437°F ± 5) Time: 22 hr ± 0.5
3.2.3.3	Bend	No Cracking	Bend 180 deg around a diameter equal to nominal thickness of sheet
3.2.4	Compression Set:		ASTM D395, Method B Temperature: 175°C ± 3 (347°F ± 5) Time: 22 hr ± 0.5
3.2.4.1	Percent of Original Deflection, max	72	
3.2.5	Low-Temperature Brittleness:		ASTM D2137, Procedure B Temperature: -55°C ± 1 (-67°F ± 2) Time: 5 hr ± 0.5
3.2.5.1	Flex	Pass	
3.2.5.2	Delamination	None	

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

3.2.7 Corrosion: Sheet shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service, determined by a procedure agreed upon by purchaser and vendor. Discoloration of metal shall not be considered objectionable.

3.3 Ø Quality: Sheet, as received by purchaser, shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from imperfections detrimental to usage of the sheet.

3.4 Tolerances: Unless otherwise specified, thickness tolerance shall be ±0.015 in. (±0.38 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Ø Responsibility for Inspection: The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to the following requirements are classified as acceptance tests and shall be performed on each lot:

Requirement	Paragraph Reference
Hardness, as received	3.2.1.1
Breaking Strength, as received	3.2.1.2
Edge Leakage, as received	3.2.1.3

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of sheet to a purchaser, when a change in material or processing, or both, requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient sheet shall be taken at random from each lot 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. If test specimens cannot be prepared from the sheet, standard ASTM specimens prepared from the same batch and state of cure shall be used for the required tests.

4.3.1.1 A lot shall be all sheet from the same batch of compound and same style of fabric processed in one continuous run and presented for vendor's inspection at one time. An inspection lot shall not exceed 500 lb (225 kg) and may be packaged in small quantities under the basic lot approval provided lot identification is maintained.

4.3.1.2 A batch shall be the quantity of compound run through a mill or mixer at one time.

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have 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 4.6.1 shall state that such plan was used.

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

4.4 Approval:

4.4.1 Sample sheet shall be approved by purchaser before sheet for production use is supplied, unless such approval be waived by purchaser. Results of tests on production sheet shall be essentially equivalent to those on the approved sample.

4.4.2 Ø Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production sheet which are essentially the same as those used on the approved sample sheet. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material or processing, or both, and, when requested, sample sheet. Production sheet made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Hardness: Shall be determined in accordance with ASTM D2240 on sheet specimens stacked to 0.25 in. (6.2 mm) thick.

4.5.2 Edge Leakage: A circular gasket specimen shall be prepared, having ID not less than 2 in. (50 mm) and 1-in. (25-mm) wide faces. The gasket shall be clamped between suitable flanges, using 0.190-32UNF bolts spaced approximately 1 in. (25 mm) on centers for clamping; nuts shall be tightened to 40 lb-in. (4.52 N·m) torque. Air at an edge pressure of 10 psi (69 kPa) shall be applied to the ID of the gasket for not less than 1 min. at room temperature with the assembly immersed in, or coated with, soap solution. There shall be no leakage through the fabric layer.

4.5.3 Gasket Test: A gasket specimen at least 1 sq in. (6.45 cm^2) in surface area shall be clamped fingertight between aluminum plates and conditioned for 2 hr ± 0.25 at 225°C ± 3 (437°F ± 5). Examination for decomposition, softening, and surface tackiness shall be made immediately upon removal from the oven and cooling to room temperature.

4.6 Reports:

4.6.1 Ø The vendor of sheet shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the sheet conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 3320F, vendor's material designation, lot number, size or part number, and quantity.