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400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3315E
Superseding AMS 3315D

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SILICONE RUBBER SHEET, GLASS CLOTH REINFORCED
VMQ Type

1. SCOPE:

1.1 Form: This specification covers a silicone (VMQ) rubber, reinforced with glass cloth, in the form of calendered sheet.

1.2 Application: Primarily for gaskets or seals requiring a thin, resilient, nonporous sheet material suitable for operating from -55° to +205°C (-65° to +400°F). This material is resistant to deterioration by weathering and petroleum-base 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 (AMS) 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 D471 - Rubber Property - Effect of Liquids
ASTM D518 - Rubber Deterioration - Surface Cracking
ASTM D573 - Rubber - Deterioration in an Air Oven
ASTM D751 - Testing Coated Fabrics
ASTM D1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens)
ASTM D2137 - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall consist of a single ply of glass cloth coated on both sides with a silicone rubber compound substantially uniform in thickness on both faces of the cloth, calendered, and the rubber suitably cured to produce a product meeting the requirements of 3.2.

3.1.1 The glass cloth shall conform to AMS 3824 for the style specified for each nominal thickness, as follows:

Nominal Thickness		Glass Cloth
Inch	(Millimetres)	Designation
0.010	0.25	116
0.017	0.43	128
0.032	0.80	162 or 164
0.050	1.25	184

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 Breaking Strength, min — ASTM D751, Cut Strip Method

Nominal Thickness		Warp		Fill	
Inch	(Millimetres)	lb per in.	(kN/m)	lb per in.	(kN/m)
0.010	(0.25)	70	(12.5)	70	(12.5)
0.017	(0.43)	200	(35.0)	150	(26.5)
0.032	(0.80)	400	(70.0)	300	(52.5)
0.050	(1.25)	800	(140.0)	600	(105.0)

3.2.1.2	Hydrostatic Pressure Resistance at 20 psig (240 kPa)	No Leaks	ASTM D751, Method B, Procedure 2 Time: 1 hr, min
3.2.1.3	Adhesion, min	10 lb per in. (1.75 kN/m)	ASTM D751 (See 3.2.1.3.1)

3.2.1.3.1 If it is impossible to strip adhesion test specimens so as to make the test properly, the adhesion shall be considered acceptable.

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	Volume Change	0 to +10%	
3.2.2.2	Decomposition	None	
3.2.2.3	Surface Tackiness	None	
3.2.3	Dry Heat Resistance:		4.5.1
3.2.3.1	Decomposition or Softening	None	
3.2.3.2	Surface Tackiness	None	
3.2.3.3	Bend (flat)	No cracking or checking	
3.2.4	Low-Temperature Resistance:		ASTM D2137, Method B Temperature: -55°C ± 1 (-67°F ± 2)
3.2.4.1	Flex	No cracks	
3.2.4.2	Delamination	None	

3.2.5 Weathering: The sheet, unless otherwise specified, shall show no evidence Ø of cracking when tested in accordance with ASTM D1149 for 7 days at 40°C ± 1 (104°F ± 2). Test specimens shall be prepared and mounted in accordance with ASTM D518, Method B.

3.2.6 Corrosion: The sheet, unless otherwise specified, shall not have a corrosive effect on other materials, determined by a procedure agreed upon by purchaser and vendor. Discoloration of metal shall not be considered objectionable.

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

3.4 Sizes and Tolerances: Unless otherwise specified, sheet shall be supplied in nominal thicknesses of 0.010, 0.017, 0.032, and 0.050 in. (0.25, 0.43, 0.80, and 1.25 mm), as ordered, and nominal width of 36 in. (900 mm) tolerances shall be as specified in 3.4.1 and 3.4.2.

3.4.1 Thickness:

Nominal Thickness		Tolerance, Plus and Minus	
Inch	(Millimetres)	Inch	(Millimetre)
0.010	(0.25)	0.001	(0.03)
0.017	(0.43)	0.002	(0.05)
0.032	(0.80)	0.004	(0.10)
0.050	(1.25)	0.005	(0.13)

3.4.2 Width: ±1 in. (±25 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the sheet shall supply all samples for vendor's tests and shall be responsible for performing all ø 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 requirements for ø material (3.1), properties as received (3.2.1), and sizes and tolerances (3.4) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests ø and shall be performed prior to or on the initial shipment of sheet to a purchaser, when a change in material and/or processing 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 ø 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:

4.3.1 For Acceptance Tests: Sufficient sheet shall be taken at random from each lot to perform all required tests. The number of tests for each Ø 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, ASTM test specimens prepared from the same lot and state of cure shall be used for required tests.

4.3.1.1 A lot shall be all sheet from the same batch of compound and same style Ø 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).

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

4.3.1.3 When a statistical sampling plan and acceptance quality level (AQL) have Ø 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. Ø

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 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 Ø 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 and/or processing 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 Dry Heat Resistance: For determination of decomposition, softening, and surface tackiness, specimens at least 1 sq in. (6.5 cm^2) in surface area shall be clamped finger-tight between aluminum alloy plates, heated in accordance with ASTM D573 at 225°C ± 3 (437°F ± 5) for 2 hr ± 0.2, removed from the oven, cooled to room temperature, and examined immediately after cooling. Specimens for the bend test shall be suspended in the oven in accordance with ASTM D573 at the same temperature for 24 hr ± 0.2, cooled to room temperature, and bent.