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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3320G

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Superseding AMS 3320F

Silicone (VMQ) Rubber Sheet, Glass Cloth Reinforced Heat and Weather Resistant 60 - 80

1. SCOPE:

1.1 Form:

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

1.2 Application:

This sheet has been used typically for gaskets or seals requiring a resilient, nonporous sheet material suitable for operation from -55 to +205 °C (-67 to +401 °F), but usage is not limited to such applications. The material is resistant to deterioration 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.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2810 Identification and Packaging, Elastomeric Products
AMS 3824 Cloth, Type "E" Glass, Finished for Resin Laminates

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 395 Rubber Property - Compression Set
ASTM D 471 Rubber Property - Effect of Liquids
ASTM D 573 Rubber - Deterioration in An Air Oven
ASTM D 751 Testing Coated Fabrics
ASTM D 2137 Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D 2240 Rubber Property - Durometer Hardness

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication:

Sheet shall be fabricated from 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 (VMQ) rubber, molded to an overall thickness, after curing, of 0.062 to 0.125 inch (1.57 to 3.18 mm), and suitably cured to produce a product meeting the requirements of 3.2.

3.2 Properties:

Sheet shall conform to the requirements shown in Table 1; tests shall be performed on the sheet supplied and in accordance with specified ASTM methods, insofar as practicable:

TABLE 1 - Properties

Paragraph	Test	Requirement	Test Method
3.2.1	As Received		
3.2.1.1	Hardness, Durometer "A" or equivalent	70 ± 10	4.5.1
3.2.1.2	Breaking Strength, minimum	300 pounds force/inch (52.5 kN/m)	ASTM D 751, Cut Strip Method
3.2.2	Petroleum Lubricating Oil Resistance: (Immediate Deteriorated Properties)		ASTM D 471 ASTM Oil No. 1 175 °C ± 3 (347 °F ± 5) 70 hours ± 0.5
3.2.2.1	Hardness Change, Durometer "A" or equivalent	-15 to +5	
3.2.2.2	Volume Change	0 to +10%	
3.2.3	Dry Heat Resistance:		ASTM D 573 225 °C ± 3 (437 °F ± 5) 22 hours ± 0.5
3.2.3.1	Hardness Change, Durometer "A" or equivalent	-5 to +10	
3.2.3.2	Bend	No Cracking	Bend 180 degrees around a diameter equal to nominal thickness of sheet
3.2.4	Compression Set:		4.5.2
3.2.4.1	Percent of Original Deflection, maximum	35	
3.2.5	Low-Temperature Brittleness:		ASTM D 2137, Procedure B -55 °C ± 1 (-67 °F ± 2) 5 hours ± 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 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 Quality:

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

3.4 Tolerances:

Thickness tolerance shall be ±0.015 inch (±0.38 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. 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 for hardness (3.2.1.1) and breaking strength (3.2.1.2), as received, are acceptance tests and shall be performed on each lot:

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of sheet to a purchaser, when a change in ingredients 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 requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

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 pounds (227 kg).

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 has 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 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 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 ingredients 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 Hardness: Shall be determined in accordance with ASTM D 2240 on sheet specimens stacked as close as practicable to 0.25 inch (6.4 mm) thick.

4.5.2 Compression Set Test: Shall be determined in accordance with ASTM D 395, Method B, on samples molded from the base rubber. Test conditions shall be 175 °C ± 3 (347 °F ± 5) for 22 hours ± 0.5.

4.6 Reports:

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. This report shall include the purchase order number, lot number, AMS 3320G, vendor's material designation, size or part number, and quantity.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the sheet may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the sheet represented. Results of all tests shall be reported.