SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3320H

Issued 1949-11
Reaffirmed 2001-04
Revised 2010-05

Superseding AMS3320G

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

RATIONALE

AMS3320H results from a Five Year Review and update of this specification.

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 -67 to +401 °F (-55 to +205 °C), 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

2.1 The purchase order date shall stipulate the published document that shall be in effect. The supplier may work to a subsequent revision unless a particular revision is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published revision shall apply

2.2 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2817 Packaging and Identification, Preformed Packings
AMS3824 Cloth, Glass, Finished for Resin Laminates

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS3320H

2.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

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 AMS3824, 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 – INITIAL TEST REQUIRMENTS

Paragraph	Test	Requirement	Test Method
3.2.1	Original Properties		
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 Temperature: 347 °F ± 5 (175 °C ± 3) Time: 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 Temperature: 437 °F ± 5 (225 °C ± 3) Time: 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 Temperature: -67 °F ± 2 (-55 °C ± 1) Time: 5 hours ± 0.5
3.2.5.1	Flex	Pass	
3.2.5.2	Delamination	None	

3.2.6 Weather Resistance

The product shall show no evidence of cracking when tested in accordance with ASTM D 1149, Method B, Procedure B2 for seven days at 105 °F ± 2 (40 °C ± 1). The ozone pressure shall be 50±5 mPa.

3.3 Dimensions and Tolerances

Dimensions and tolerances shall be as specified in the parts standard, drawing or purchase document. If not specified, thickness tolerance shall be ±0.015 inch (±0.38 mm).

3.4 Toxicological Formulations

The material shall have no adverse effects on the health of personnel when used for its intended purpose in accordance with manufacturer's instructions and with appropriate handling procedures.

3.5 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.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacturer of the product shall be responsible for performance of all required tests. Purchaser reserves the right to sample and perform any testing deemed necessary to ensure that the product conforms to the AMS requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

TABLE 2 – ACCEPTANCE TESTS

Requirement	Paragraph Reference
Hardness	3.2.1.1
Breaking Strength	3.2.1.2

4.2.1.1 Lot: A quantity of one size of product processed and packaged as one production entity from a batch

4.2.1.2 Batch: The quantity of compound run through a mill or mixer at one time.

4.2.1.3 Random Sampling

The method shall be as specified in the parts standard, drawing or purchase document. If not specified, product shall be taken at random from each lot to perform all the required acceptance tests. The number of test iterations for each requirement shall be specified in the applicable test procedure.

4.2.1.4 Sample shall be from a production batch/lot

4.3 Test Methods

4.3.1 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.

4.3.2 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 347 °F ± 5 (175 °C ± 3) for 22 hours ± 0.5.

4.4 Sampling and Testing

Shall be as follows:

4.4.1 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.

4.4.1.1 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 4.5.1 and the report of 4.7 shall state that such plan was used.

4.4.2 For Preproduction Tests

As agreed upon by purchaser and vendor.

4.5 Approval

4.5.1 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.

4.5.2 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.

4.6 Reports

The supplier of the product shall make readily available a report showing the results of tests to determine conformance to the acceptance requirements and stating that the product conforms to the other technical requirements. This report shall include AMS number with revision, manufacturer's identification and product designation, batch/lot number and date of manufacture. For products requiring source inspection, reports shall be stamped by the third party source inspector.

4.7 Resampling and Retesting

If any specimen fails, a retesting of three additional specimens for each nonconforming specimen shall be necessary for product acceptance. The same batch/lot of product used for the failed test shall be used for retesting. Failure of any retest specimen shall be cause for rejection. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Identification and Packaging

Shall be as specified in the parts standard, drawing or purchase document. If not specified, shall be as follows: Packaging shall be in accordance with AMS2817. A lot may be packaged in small quantities and delivered under the basic lot approval provided lot information in maintained.