SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS3564 REV. F

Issued 1944-03
Revised 1993-01
Reaffirmed 2000-12
Stabilized 2011-11

Superseding AMS3564E

Vulcanized Fiber Sheet

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by SAE AMS P, Polymeric Materials Committee, and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (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/AMS3564F

1. SCOPE:

1.1 Form:

This specification covers vulcanized fiber in the form of sheet.

1.2 Application:

This sheet has been used typically for gaskets and reinforcements on packaging enclosures, but usage is not limited to such applications.

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 applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

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

ASTM D 619 Testing Vulcanized Fiber Used For Electrical Insulation

2.2 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication:

Sheet shall consist of plant-fiber-base paper which has been partially gelatinized by the action of a chemical, usually zinc chloride, and then heavily compressed or rolled to the required thickness, leached free from gelatinizing agent, and dried.

3.1.1 Color: Shall be gray, unless otherwise ordered (See 8.2).

3.2 Properties:

Sheet shall conform to the requirements shown in Table 1, Table 2, Table 3, Table 4, 3.2.3, 3.2.6, and 3.2.7; tests shall be performed on the product supplied and in accordance with ASTM D 619 or as otherwise specified, insofar as practicable.

3.2.1 Composition:

TABLE 1 - Composition

Ingredient	Percentage by Weight, maximum
Ash (See 3.2.1.1)	3.0
Silica	0.3
Zinc Chloride or other gelatinizing agent	0.2

3.2.1.1 If red material is specified, ash may be as high as 7.0%.

3.2.2 Tensile Strength:

TABLE 2A - Minimum Tensile Strength, Inch/Pound Units

Nominal Thickness Inch	Lengthwise psi	Crosswise psi
Up to 0.125, incl	8000	6000
Over 0.125 to 0.500, incl	7500	5500
Over 0.500	7000	5000

TABLE 2B - Minimum Tensile Strength, SI Units

Nominal Thickness Millimeters	Lengthwise MPa	Crosswise MPa
Up to 3.18, incl	55.2	41.4
Over 3.18 to 12.70, incl	51.7	37.9
Over 12.70	48.3	34.5

3.2.3 Compressive Strength, Flatwise, minimum: 20.0 ksi (138 MPa)

3.2.4 Water Absorption (Weight Gain) at 25 °C ± 3 (77 °F ± 5):

TABLE 3 - Maximum Water Absorption

Nominal Thickness Inch	Nominal Thickness Millimeters	After 2 Hours Immersion	After 24 Hours Immersion
Up to 0.125, incl	Up to 3.18, incl	55%	65%
Over 0.125 to 0.375, incl	Over 3.18 to 9.52, incl	25%	60%
Over 0.375 to 1.000, incl	Over 9.52 to 25.40, incl	15%	35%
Over 1.000	Over 25.40	8%	20%

3.2.5 Density:

TABLE 4 - Minimum Density

Nominal Thickness Inches	Nominal Thickness Millimeters	Density g/cm^3
Up to 0.010, incl	Up to 0.25, incl	0.90
Over 0.010 to 0.094, incl	Over 0.25 to 2.39, incl	1.15
Over 0.094 to 0.625, incl	Over 2.39 to 15.88, incl	1.20
Over 0.625 to 1.000, incl	Over 15.88 to 25.40, incl	1.10
Over 1.000 to 1.250, incl	Over 25.40 to 31.75, incl	1.05
Over 1.250	Over 31.75	1.01

3.2.6 Corrosion: Sheet shall not cause corrosion of steel, cadmium plate, aluminum, and magnesium, determined in accordance with 4.5.1.

3.2.7 Machinability: It shall be possible to drill, tap, saw, machine, punch, and stamp the sheet in any direction without cracking or splitting. When sheet is machined, chips shall curl, not crumble.

3.3 Quality:

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

3.4 Tolerances:

Shall be as shown in Table 5.

TABLE 5A - Tolerances, Inch/Pound Units

Nominal Thickness (T) Inches	Thickness Tolerance, Inch plus and minus
Up to 0.040, incl	0.10T
Over 0.040 to 0.047, incl	0.004
Over 0.047 to 0.063, incl	0.005
Over 0.063 to 0.094, incl	0.007
Over 0.094 to 0.125, incl	0.009
Over 0.125 to 0.375, incl	0.012
Over 0.375 to 0.625, incl	0.015
Over 0.625 to 0.875, incl	0.025
Over 0.875 to 1.250, incl	0.040
Over 1.250	0.060

TABLE 5B - Tolerances, SI Units

Nominal Thickness (T) Millimeters	Thickness Tolerance, Millimeters plus and minus
Up to 1.02, incl	0.10T
Over 1.02 to 1.19, incl	0.10
Over 1.19 to 1.60, incl	0.13
Over 1.60 to 2.39, incl	0.18
Over 2.39 to 3.18, incl	0.23
Over 3.18 to 9.52, incl	0.30
Over 9.52 to 15.88, incl	0.38
Over 15.88 to 22.22, incl	0.64
Over 22.22 to 31.75, incl	1.02
Over 31.75	1.52

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 requirements shown in Table 6 are acceptance tests and shall be performed on each lot:

TABLE 6 - Acceptance Tests

Requirement	Paragraph Reference
Material and Fabrication	3.1
Composition	3.2.1
Tensile Strength	3.2.2
Compressive Strength	3.2.3
Water Absorption	3.2.4
Density	3.2.5
Tolerances	3.4

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 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.

4.3.1.1 A lot shall be all sheet of one thickness manufactured from the same lots of paper in one production run and presented for vendor's inspection at one time.

4.3.1.2 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:

Shall be as follows:

4.5.1 Corrosion: Specimens, approximately 1 inch (25 mm) square, shall be clamped between pairs of 3-inch (76-mm) square panels of steel, cadmium plated steel, aluminum, and magnesium so that the specimens will be in intimate contact with the metal. Duplicate assemblies, using neutral filter paper in place of the fiber as the specimens, shall be similarly prepared. All panel assemblies shall be exposed to an atmosphere of 98 to 100% relative humidity at 50 °C ± 3 (122 °F ± 5) for 24 hours ± 0.5. Any evidence of corrosion of any of the panels contacted by the fiber in excess of that on similar panels contacted by the filter paper will be unacceptable.

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 3564F, vendor's compound number, size, 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 specimens to meet the specified requirements shall be cause for rejection of the sheet represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification and Packaging:

Shall be as follows:

5.1.1 Each sheet shall be legibly marked near one corner with AMS 3564F and manufacturer's identification. The characters shall be applied using a suitable marking fluid, and shall not be obliterated by normal handling. Alternatively, the information may appear on a suitable adhesive label affixed to each sheet.

5.1.2 Packaging shall be accomplished to ensure that the sheet, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to moisture, weather, or any other normal hazard.

5.1.3 A lot of sheet may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.