AN AMERICAN NATIONAL STANDARD

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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 3564D
Superseding AMS 3564C

Issued 3-1-44
Revised 10-1-85

VULCANIZED FIBER SHEET

1. SCOPE:

1.1 Form: This specification covers vulcanized fiber in the form of sheet.

1.2 Application: Primarily for gaskets and reinforcements on packaging enclosures.

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

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

ASTM D619 - Testing Vulcanized Fiber Used for Electrical Insulation

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

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 specified (See 8.2).

3.2 Properties: Sheet shall conform to the following requirements; tests shall be performed on the product supplied and in accordance with ASTM D619 or as otherwise specified, insofar as practicable;

3.2.1 Composition:

Ash, max (See 3.2.1.1)	3.0%
Silica, max	0.3%
Zinc Chloride or other gelatinizing agent, max	0.2%

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

3.2.2 Tensile Strength, min

Nominal Thickness		Lengthwise		Crosswise	
Inches	Millimetres	psi	MPa	psi	MPa
Up to 0.125, incl	Up to 3.12, incl	8000	55.0	6000	41.5
Over 0.125 to 0.500, incl	Over 3.12 to 12.50, incl	7500	52.0	5500	38.0
Over 0.500	Over 12.50	7000	48.5	5000	34.5

3.2.3 Compressive Strength, Flatwise, min 20,000 psi 140 MPa

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

Nominal Thickness		Immersion Time	
Inches	Millimetres	2 hr	24 hr
Up to 0.125, incl	Up to 3.12, incl	55%	65%
Over 0.125 to 0.375, incl	Over 3.12 to 9.38, incl	25%	60%
Over 0.375 to 1.000, incl	Over 9.38 to 25.00, incl	15%	35%
Over 1.000	Over 25.00	8%	20%

3.2.5 Density, min

Nominal Thickness, Inches	Nominal Thickness, Millimetres	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 follows:

TABLE I

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 I (SI)

Nominal Thickness (T) Millimetres	Thickness Tolerance, Millimetres plus and minus
Up to 1.00, incl	0.10T
Over 1.00 to 1.18, incl	0.10
Over 1.18 to 1.58, incl	0.12
Over 1.58 to 2.35, incl	0.18
Over 2.35 to 3.12, incl	0.22
Over 3.12 to 9.38, incl	0.30
Over 9.38 to 15.62, incl	0.38
Over 15.62 to 21.88, incl	0.62
Over 21.88 to 31.25, incl	1.00
Over 31.25	1.50

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. 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
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 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, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 Ø 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 Ø 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 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, 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: Shall be as follows:

4.5.1 Corrosion: Specimens, approximately 1 in. (25 mm) square shall be clamped between pairs of 3-in. (75-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 - 100% relative humidity at 50°C ± 3 (120°F ± 5) for 24 hr ± 0.5. Any evidence of corrosion of any of the panels contacted by the fiber in excess of that on similar panels contacted by filter paper will be unacceptable.