Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 3564C
Superseding AMS 3564B
Issued 3-1-44
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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 (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York, 10001.

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, Pennsylvania 19103.

ASTM D619 - Testing Vulcanized Fiber Used for Electrical Insulation

3. TECHNICAL REQUIREMENTS:

3.1 Material and Fabrication: The product 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, bleached free from gelatinizing agent, and dried.

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

3.2 Properties: The product 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, % (See 3.2.1.1)	3.0 max
Silica, %	0.3 max
Zinc Chloride, %	0.2 max

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

3.2.2 Properties:

3.2.2.1 Tensile Strength, min

Nominal Thickness		Lengthwise	Crosswise
Inches	(Millimetres)	psi (MPa)	psi (MPa)
Up to 0.125, incl	(Up to 3.18, incl)	8000 (55.2)	6000 (41.4)
Over 0.125 to 0.500, incl	(Over 3.18 to 12.70, incl)	7500 (51.7)	5500 (37.9)
Over 0.500	(Over 12.70)	7000 (48.3)	5000 (34.5)

3.2.2.2 Compressive Strength, Flatwise, min 20,000 psi (138 MPa)

3.2.2.3 Water Absorption (Weight Gain) at 77° F ± 5 (25° C ± 2.8), max

Nominal Thickness		Immersion Time	
Inches	(Millimetres)	2 hr	24 Hr
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%

3.2.2.4 Density, min

Nominal Thickness		
Inches	(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

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

3.2.2.6 Machinability: The product shall be capable of being drilled, tapped, sawed, machined, punched, and stamped in any direction without cracking or splitting. When material is machined, chips shall curl, not crumble.

3.3 Quality: The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication, appearance, or performance of parts.

3.4 Tolerances: Unless otherwise specified, thickness tolerances shall be as specified in Table I.

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 1.02, 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 the product shall supply all samples 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 perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to material and fabrication (3.1), composition (3.2.1), tensile strength (3.2.2.1), compressive strength (3.2.2.2), water absorption (3.2.2.3), density (3.2.2.4), and tolerance (3.4) requirements are classified as acceptance or routine control tests.

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification or periodic control tests and may be the basis for approval of the product (see 4.4.1).

4.3 Sampling:

4.3.1 Acceptance Tests: Each lot shall be sampled as required by ASTM D619; a lot shall be all product of one size manufactured from the same lots of paper in one production run and presented for inspection at one time.

4.3.2 Qualification Tests: Sampling for corrosion and machinability tests shall be as agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample material shall be approved by purchaser before material for production use is supplied, unless such approval be waived. Results of tests on production material 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 material which are essentially the same as those used on the approved sample material. If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit samples for reapproval unless purchaser grants written approval after review of a detailed statement of materials and processing used on the approved sample and those proposed. No production material made by the revised procedure shall be shipped prior to receipt of approval of such procedure.

4.5 Test Methods:

4.5.1 Corrosion: Specimens, approximately 1 in. (25 mm) square shall be clamped between pairs of 3-in. (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 - 100% relative humidity at 120° F ± 5 (48.9° C ± 2.8) for 24 hr ± 15 minutes. 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 considered unacceptable.

4.6 Reports:

4.6.1 The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests made on the product to determine conformance to the acceptance test requirements of this specification and a statement that the product conforms to all other technical requirements. This report shall include the purchase order number, material specification number and its revision letter, vendor's material designation, lot number, size, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, supplier's material designation, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.7 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product 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 product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Each sheet shall be marked near one corner with AMS 3564C and manufacturer's identification. The characters shall be of such size as to be clearly legible, 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 in such a manner as to ensure that the product, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to weather or any normal hazard.