



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AMS 3806C

Superseding AMS 3806B

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CLOTH, AIRPLANE, COTTON, MERCERIZED
80 lb (355 N) Breaking Strength

1. SCOPE:

- 1.1 Form: This specification covers one strength and one weave of mercerized cotton cloth known as "airplane cloth."
- 1.2 Application: Primarily for covering aircraft surfaces, such as wings, fuselage, ailerons, elevators, and other airfoil surfaces.
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., 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 D629 - Quantitative Analysis of Textiles
ASTM D1682 - Breaking Load and Elongation of Textile Fabrics
ASTM D1910 - Construction Characteristics of Woven Fabrics

- 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:

- 3.1.1 Mercerization: The cloth shall be piece mercerized, or the yarn may be mercerized under tension.
- 3.1.2 Yarn: The cloth shall be woven from 2-ply, combed cotton yarn.
- 3.1.3 Weave: The weave shall be plain (one up and one down).

SAE Technical Board rules provide that: "All technical reports, including standards approved and prepared by SAE, are advisory only. Their use by anyone engaged in industry or commerce is entirely voluntary. There is no agreement to adhere to a standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

3.1.4 **Finishing:** The cloth shall be uniformly finished in accordance with the best practice for high-grade airplane cloth. Finishing shall consist of washing, framing, and calendering. The calendering shall be sufficient to lay any nap present and shall provide a smooth, even surface. Nap may be removed by singeing.

3.2 **Properties:** The cloth shall conform to the following requirements; tests shall be performed on the cloth supplied and in accordance with the specified test methods:

3.2.1 **Weight:** ASTM D1910

3.2.1.1 Oz per sq yd, max

Nominal width: 36 in.	4.0
42 in.	4.0
60 in. and over	4.5

3.2.1.2 g/m², max

Nominal width: 915 mm	135
1065 mm	135
1525 mm and over	152

3.2.2 **Thread Count, ends per in. (25 mm):**

Warp and Fill, each 80 - 84

ASTM D1910

3.2.3 **Breaking Strength, each direction:**

1b (force) per in. width, min 80
(N per 25 mm width, min) (355)

ASTM D1682,
Ravelled strip
method

3.2.4 **Elongation:**

Warp Fill

4.5.1

At 70 lb (310 N) load, (All Widths), max 16% 11%

3.2.5 **Burst Strength:** Mullen, min

170 points

4.5.2

3.2.6 **Sizing, Finishing, and Other
Non-Fibrous Materials, max:**

3.5%

ASTM D629,
Equation 3

3.2.6.1 A desizing operation may be performed to reduce the sizing content to the maximum specified.

3.3 **Quality:** The cotton fibers shall be evenly spun into yarns of proper and uniform yarn count, twist, and diameter to produce the texture and weight required. The yarn shall be reasonably free from nap breaks, broken ends, uneven threads, and knots. Yarns shall be closely woven into fabric uniform in body and appearance and which shall be reasonably free from striations due to variable weaving operations.

3.4 **Tolerances:** Unless otherwise specified, the following tolerances apply:

3.4.1 **Width:**

Nominal Width Inches	Tolerance, Inches plus and minus	Nominal Width Millimetres	Tolerance, Millimetres plus and minus
36	1/2	915	13
42	5/8	1065	16
60	1	1525	25
69	1	1750	25
90	1-1/2	2285	38

3.4.2 Length of Cut: The length of a single cut shall be not less than 40 yd (36.5 m) except that 10% of the total yardage of one width under any contract or order may be in short lengths of from 10 to 25 yd (9 to 23 m). However, short lengths shall be rolled together and the roll properly labeled to indicate that it is composed of short lengths.

3.4.3 Length of Roll: The cloth shall be furnished on rolls containing the following lengths:

Nominal Width Inches	Roll Length Yards	Nominal Width Millimetres	Roll Length Metres
36 and 42	500 to 600	915 and 1065	457 to 548
60 and 69	250 to 300	1525 and 1750	229 to 274
90	175 to 200	2285	160 to 183

4. QUALITY ASSURANCE PROVISIONS:

4.1 The vendor of the cloth 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 such confirmatory testing as he deems necessary to ensure that the cloth conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for weight (3.2.1), thread count (3.2.2), breaking strength (3.2.3), elongation (3.2.4), quality (3.3), and tolerances (3.4) are classified as acceptance tests and shall be performed on each lot.

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 on the initial shipment of cloth to a purchaser, when a change in material 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, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Each lot of cloth shall be 100% visually examined for quality (3.3) and sampled at random for all other tests, with the number of specimens for each test to be as specified in the applicable test procedure or, if not so specified therein, not less than three, taken from 3 yd (3 m) of cloth, full width.

4.3.1.1 A lot shall be all cloth produced in a single production run under the same fixed conditions and presented for vendor's inspection at one time. An inspection lot shall not exceed 5000 yd (4600 m).

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 cloth shall be approved by purchaser before cloth for production use is supplied, unless such approval be waived. Results of tests on production cloth 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 cloth which are essentially the same as those used on the approved sample cloth.
- Ø If any change is necessary 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 and processing and, when requested, sample cloth. Production cloth made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

- 4.5.1 Elongation: Shall be determined in accordance with ASTM D1682, Ravelled Strip Method, at 70 lb (310 N) with elongation measured from a base line on the chart to a point at which the curve intersects 70 lb (310 N) load ordinate with the base line passing through the point where the curve leaves the zero ordinate.
- 4.5.2 Bursting Strength: Shall be determined with a hydraulic type machine in which the cloth is firmly clamped against a rubber diaphragm, through which the pressure is applied to a circular area of approximately 1 sq in. (650 mm²). The pressure required to burst the cloth is registered on an accurate Bourdon tube-type gage, calibrated in pounds per square inch (kPa), the readings of which are designated as points. The bursting strength shall be ascertained by taking the average of not less than 10 tests. Not less than 20 tests shall be made before a delivery of cloth is rejected.

4.6 Reports:

- 4.6.1 The vendor of cloth shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the cloth conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 3806C, vendor's material designation, lot number, width, and quantity.
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- 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, AMS 3806C, contractor or other direct supplier of cloth, supplier's material designation, and quantity. When cloth for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of cloth to determine conformance to the requirements of this specification, and shall include in the report a statement that the cloth 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 cloth 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 cloth represented and no additional testing shall be permitted. Results of all tests shall be reported.
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5. PREPARATION FOR DELIVERY:

- 5.1 Identification: The cloth shall incorporate a continuous marking to show the manufacturer's name or trade mark and AMS 3806C. This marking may be along the selvage.
- 5.2 Packaging: