

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 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 D629 - Quantitative Analysis of Textiles

ASTM D1682 - Breaking Load and Elongation of Textile Fabrics

ASTM D3775 - Fabric Count of Woven Fabric

ASTM D3776 - Mass per Unit Area (Weight) of Woven Fabric

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

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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).

3.1.4 Finishing: The cloth shall be uniformly finished in accordance with the best practice for highgrade 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 specified test methods:

3.2.1 Weight:

ASTM D3776

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:	914 mm	135
	1067 mm	135
	1524 mm and over	152

3.2.2 Thread Count, ends per inch (25.4 mm):

ASTM D3775

Ø Warp and Fill, each 80 - 84

3.2.3 Breaking Strength, each direction:ASTM D1682,
Ravelled strip
method

Pound force per inch width, min	80
N per 25.4 mm width, min	355

3.2.4 Elongation:

Warp Fill 4.5.1

At 70 lb_f (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: Shall be as follows:

3.4.1 Width:

Nominal Width		Tolerances plus and minus	
Inches	Millimetres	Inches	Millimetres
36	914	1/2	12.7
42	1067	5/8	15.9
60	1524	1	25.4
69	1753	1	25.4
90	2286	1-1/2	38.1

3.4.2 Length of Cut: The length of a single cut shall be not less than 40 yd (36.6 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		Roll Length	
Inches	Millimetres	Yards	Metres
36 and 42	914 and 1067	500 to 600	457 to 549
60 and 69	1524 and 1753	250 to 300	229 to 274
90	2286	175 to 200	160 to 183

4. QUALITY ASSURANCE PROVISIONS:

4.1 The vendor of 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 any confirmatory testing deemed 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 prior to or on the initial shipment of cloth 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 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: Shall be as follows:

4.3.1 For Acceptance Tests: Each lot of cloth shall be 100% visually examined for quality (3.3). Sufficient cloth 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, taken from the full width of cloth.

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). A lot may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

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 by purchaser. 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. 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 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 lbf (310 N) with elongation measured from a base line on the chart to a point at which the curve intersects 70 lbf (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 square inch (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 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, lot number, AMS 3806D, vendor's material designation, width, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3806D, 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 either a statement that the cloth conforms or 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.