

AN AMERICAN NATIONAL STANDARD

**SAE** The Engineering Society  
For Advancing Mobility  
Land Sea Air and Space®  
**INTERNATIONAL**  
400 Commonwealth Drive, Warrendale, PA 15096-0001

**AEROSPACE  
MATERIAL  
SPECIFICATION**

**AMS 3802E**

Issued 1 MAR 1944

Revised 1 JAN 1993

Superseding AMS 3802D

Submitted for recognition as an American National Standard

CLOTH, AIRPLANE, COTTON, MERCERIZED  
50 Pounds (220 N) Breaking Strength

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of July, 1992. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to revision "D" of the subject specification.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

**PREPARED UNDER THE JURISDICTION OF AMS COMMITTEE "CP".**

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

AN AMERICAN NATIONAL STANDARD



400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION

**AMS 3802D**  
Superseding AMS 3802C

Issued 3-1-44  
Revised 1-1-84

## CLOTH, AIRPLANE, COTTON, MERCERIZED 50 lb (220 N) Breaking Strength

### 1. SCOPE:

1.1 Form: This specification covers one strength and one weave of mercerized cotton 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 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 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

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

# AMS 3802D

## 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 1- or 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 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 specified test methods:

- 3.2.1 Weight: ASTM D1910  
oz per sq yd, max 3.5  
(g/m<sup>2</sup>, max) (120)
- 3.2.2 Thread Count, ends per in. (25.4 mm): ASTM D1910  
Warp and Fill, each max 110
- 3.2.3 Breaking Strength, each direction: ASTM D1862,  
Ravelled strip  
method  
lbf per in. width, min 50  
(N/25 mm width, min) (220)
- 3.2.4 Elongation: ASTM D1862,  
(See 4.5.1)  
At 44 lb (195 N) load, max Warp    Fill  
13%    11%
- 3.2.5 Sizing, Finishing, and Other  
Non-Fibrous Materials, max: ASTM D629,  
Equation 3  
2.5%
- 3.2.5.1 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:

Ø

| Nominal Width<br>Inches | Tolerance, Inches<br>plus and minus | Nominal Width<br>Millimetres | Tolerance, Millimetres<br>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 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<br>Inches | Roll Length<br>Yards | Nominal Width<br>Millimetres | Roll Length<br>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 Responsibility for Inspection: 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 or processing, or both, requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

# AMS 3802D

- 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). 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 the cloth.
- 4.3.1.1 A lot shall be all cloth produced in a single production run under the same 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 small quantities under the basic lot approval provided the 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 or 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 measured from a base line on the chart to a point at which the curve intersects 44 lb (195 N) load ordinate with the base line passing through the point where the curve leaves the zero ordinate.

**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 3802D, vendor's material designation, lot number, width, 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, AMS 3802D, 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.

**5. PREPARATION FOR DELIVERY:**

5.1 Identification: The cloth shall incorporate a continuous marking to show not less than the manufacturer's name or trade mark and AMS 3802D. This marking may be along the selvage.

**5.2 Packaging:**

5.2.1 Packaging shall be accomplished in such a manner as to ensure that the cloth, during shipment and storage, will not be permanently distorted and will be protected against damage from exposure to moisture, weathering, or any other normal hazard.