

AEROSPACE MATERIAL SPECIFICATION



AMS3272

REV. B

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Superseding AMS3272A	

Cloth, Nylon, Polyurethane Coated
Thermally, Radio Frequency, or Ultrasonically Sealable

RATIONALE

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1. SCOPE:

- 1.1 Form: This specification and its supplementary detail specifications cover a woven nylon cloth coated with polyether (EU) urethane.
- 1.2 Application: Primarily for use in inflatable survival equipment requiring a cloth which is thermally, radio frequency, or ultrasonically sealable and having air holding characteristics.
- 1.3 Classification: This product shall be classified by weight and type of weave as shown in the detail specifications.
- 1.4 Safety - Hazardous Materials: While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.
2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

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- 2.1 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 751 - Testing Coated Fabrics
ASTM D 1682 - Breaking Load and Elongation of Textile Fabrics
ASTM D 2137 - Rubber Property - Brittleness Point of Flexible Polymers and Coated Fabrics
ASTM D 2261 - Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Extension Tensile Testing Machine)
ASTM D 3775 - Fabric Count of Woven Fabric
ASTM D 3776 - Mass per Unit Area (Weight) of Woven Fabric

- 2.2 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 and as noted in 2.2.4.

2.2.1 Federal Specifications:

PPP-P-1136 - Packaging of Coated (Plastic, Rubber) and Laminated Fabrics

2.2.2 Federal Standards:

FED-STD-191 - Textile Test Methods

2.2.3 Military Standards:

MIL-STD-1487 - Glossary of Cloth Coating Imperfections

- 2.2.4 Other Publications: Available from the Federal Trade Commission, Washington, DC 20580.

Rules and Regulations under the Textile Fiber Products Identification Act

- 2.3 AATCC Publications: Available from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709-2215; also published in the ASTM Book of Standards.

AATCC Test Method 16-1978 - Colorfastness to Light: General Method
AATCC Test Method 61-1975 - Colorfastness to Washing, Domestic; and Laundering, Commercial: Accelerated

3. TECHNICAL REQUIREMENTS:

- 3.1 Detail Specifications: The requirements for a specific cloth shall consist of all requirements specified herein in addition to requirements specified in the applicable detail specification. In case of conflict between requirements of this basic specification and an applicable detail specifications, requirements of the detail specification shall govern.

- 3.2 Material and Fabrication: Cloth shall consist of a single ply of woven nylon fabric of the type specified in the applicable detail specification and in 3.2.1, coated, only on one side, with a polyether (EU) urethane compound as specified in 3.2.2 and containing a suitable water repellent finish.
- 3.2.1 Base Cloth: Shall be a continuous filament nylon. A vendor's report certifying the material identity shall be acceptable.
- 3.2.2 Coating Compound: Shall be a polyether (EU) urethane containing not less than 60% by volume of elastomer. A vendor's certification of composition shall be acceptable.
- 3.3 Properties: Shall conform to requirements specified in the applicable detail specification, determined in accordance with test methods specified in 4.5.
- 3.4 Quality: Cloth, as received by purchaser, shall be uniform in quality and condition, as free from foreign materials as commercially practicable, and free from imperfections detrimental to usage of the cloth.
- 3.4.1 Acceptance quality levels for the quality of the cloth shall be as specified by purchaser.
- 3.4.2 Classification of imperfections is shown in Table I; see MIL-STD-1487 for definition of terms relating to coated fabric imperfections.

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TABLE I
IMPERFECTION CLASSIFICATION

Imperfection	Classification	
	Major	Minor
<u>Uncoated Side:</u>		
Any hole, cut, or tear	X	
Any slub, smash, or multiple float	X	
Baggy, ridgy, or wavy cloth	X	
Any strike thru of coating		X
Any spot or stain		X
<u>Coated Side:</u>		
Any cut, hole, tear, scratch, or abrasion in the coating that bares the base cloth	X	
Any scratch or abrasion in the coating that does not bare the base cloth		X
Any area where coating is noticeably thinner	X	
Any blister, tunnel, or delamination of the coating	X	
Any lump or heavier coated area		X
Foreign matter imbedded in the coating	X	
Crease or wrinkle that results in doubling or adhesion of surfaces that cannot be corrected by manual pressure	X	
Cracked or checked coating	X	
Lack of coating over full width of fabric	X	
Any pinhole	X	
Any light area or window resulting from improper distribution of pigment	X	
Coating streak		X
Any ripple, waviness, or dimensional distortion	X	
Any spot, stain, or streak having a combined length and width dimension of 1 inch (25 mm) or over	X	
Any spot, stain, or streak having a combined length and width dimension less than 1 inch (25 mm)		X
Width less than minimum specified		X
Color not as specified, off shade, uneven, mottled		X
Any evidence of uncleanness		X
Any tackiness	X	
Any odor other than that which is characteristic of the coating compound		X

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the cloth shall supply all samples for vendor's tests and shall be responsible for performing all required tests. 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 for the following requirements are acceptance tests and shall be performed on each lot:

Requirement	Reference
Type of Weave	See detail specification
Height	See detail specification
Breaking Strength, as received	See detail specification
Breaking Strength, after humidity aging	See detail specification
Tear Strength	See detail specification
Coating Adhesion	See detail specification
Quality	See 3.4

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of cloth to a purchaser, when a change in ingredients and/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, contracting officer, or request for procurement.

4.3 Sampling and Testing: Shall be as follows:

4.3.1 For Acceptance Tests: 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.

4.3.1.1 A lot shall be all cloth produced in one continuous coating operation from the same roll of cloth and the same batch of compound and presented for vendor's inspection at one time. An inspection lot shall not exceed 1000 pounds (454 kg) and 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 has 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 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 cloth.

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 ingredients and/or 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: Shall be in accordance with the following:

Requirement	Test Method
Base Cloth	
Weave Type	Visual, ASTM D 3775
Weight	ASTM D 3776
Yarns per inch (25.4 mm)	FED-STD-191, Method 5050
Breaking Strength	ASTM D 1682
Tearing Strength	ASTM D 2261
Coated Cloth	
Weight	ASTM D 751
Breaking Strength, as received	ASTM D 751
Tearing Strength	ASTM D 2261
Colorfastness	
Water	AATCC Test Method 61-1975
Light	AATCC Test Method 16-1978
Blocking	FED-STD-191, Method 5872
Adhesion of Coating	4.5.1 and ASTM D 751
Air Retention	4.5.2
Low-Temperature Effect	4.5.3
Breaking Strength, Humid aging	4.5.4

- 4.5.1 Adhesion of Coating: Each seam specimen of the coated cloth shall be tested for adhesion. Each specimen shall be cut $1.00 \text{ inch} \pm 0.06$ ($25.4 \text{ mm} \pm 1.5$) wide and not less than 6 inches (152 mm) long, with the length dimension in the warp direction of the coated cloth. One of the specimens shall be superimposed and aligned on another of the specimens with the coated sides in contact. The two specimens shall be heat sealed together, across the entire width, approximately $1/4 \text{ inch}$ (6.4 mm) from one end. The width of the seal, (adhesive bond) shall be $0.125 \text{ inch} \pm 0.031$ ($3.18 \text{ mm} \pm 0.79$). A suitable inspection apparatus equipped with an autographic recording device shall be used to conduct the test. The free ends of the specimen shall be clamped in the jaws (one end in each jaw) of the test apparatus with the bond centered midway between the jaws. The jaws shall be separated until the bond opens or the coating and the base cloth separate. The highest value at this point shall be recorded as the test result. The reported test results for each sample shall be the average of five determinations.
- 4.5.2 Air Retention: Shall be determined by a test jig as shown in Figure 1. The test specimen shall have a diameter not less than 13 inches (330 mm). The specimen shall be placed, coated side down, on the holder and the plate collar tightly bolted thereon. Care shall be taken to ensure that there is no leakage at the seal. A sufficient quantity of water shall be poured on the specimen to keep it completely covered under maximum pressure. Increase the pressure to 10 psi (69 kPa). Air bubbles on the surface of the specimen produced by air pressure closing the spaces between the cloth and the coating shall be removed. The pressure shall be held at 10 psi (69 kPa) for $5.0 \text{ minutes} \pm 0.1$. At the end of the 5.0 minute period, the specimen shall be examined for evidence of bubble formation indicating leakage. Five specimens from each inspection lot shall be tested.
- 4.5.3 Low-Temperature Effect: Shall be performed in accordance with ASTM D 2137, except that determination of hydrostatic resistance shall not be required. Prior to testing, specimen shall be exposed for $4.0 \text{ hours} \pm 0.1$ to $-50^{\circ}\text{C} \pm 1$ ($-58^{\circ}\text{F} \pm 2$). After testing, the specimen shall be examined for evidence of cracking, flaking, or separation.
- 4.5.4 Breaking Strength after Humid Aging: A $4 \times 6 \text{ inch}$ ($102 \times 152 \text{ mm}$) specimen shall be laid flat with the coated side up on a supporting plate. The assembly shall be placed in a desiccator containing water. The lid of the desiccator shall be put in place and the desiccator placed in a circulating-air oven at $95^{\circ}\text{C} \pm 1$ ($203^{\circ}\text{F} \pm 2$) for not less than 7 days. At the end of the aging period, each specimen shall be removed from the desiccator and tested immediately for breaking strength.

- 4.6 Reports: 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. This report shall include the purchase order number, lot number, AMS-3272B and the applicable detail specification number and their revision letters if any, vendor's material designation, and quantity.
- 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 from the same lot 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 Packaging and Identification:
- 5.1.1 Cloth shall be supplied in rolls wound on suitable cores not less than 3 inches (76 mm) in diameter.
- 5.1.1.1 The coated cloth shall be put up on rolls as specified in PPP-P-1136 and shall be in one continuous piece not less than 40 yards (37 m) or more than 250 yards (228 m) long.
- 5.1.2 Each roll shall be legibly identified with not less than the following information, by a label attached on the inside of the core, using characteres which will not obliterated by normal handling.
- CLOTH, NYLON, POLYURETHANE COATED
AMS-3272B*
MANUFACTURER'S IDENTIFICATION _____
LOT NUMBER _____
QUANTITY _____
- *Enter applicable detail specification number.
- 5.1.2.1 Each roll shall be labeled, ticketed, or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act as amended.
- 5.1.3 Packaging shall be accomplished in such manner as to ensure that the cloth, during shipment and storage, will be protected against damage from exposure to moisture, weather, or any other normal hazard.