

MIL-C-44263  
30 December 1986  
SUPERSEDING  
(see 6.6 )

## MILITARY SPECIFICATION

CLOTH, LAMINATED, WATERPROOF, MOISTURE VAPOR PERMEABLE

AND FLAME RESISTANT (WT. 3.4 OZ)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

### 1. SCOPE

1.1 Scope. This document covers one type of two layer laminated cloth which is waterproof, moisture vapor permeable and flame resistant.

### 2. APPLICABLE DOCUMENTS

#### 2.1 Government documents.

2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

## SPECIFICATIONS

### FEDERAL

PPP-B-1136 - Packaging and Packing of Coated (Plastic; Rubber)  
and Laminated Fabrics

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

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MILITARY

MIL-C-43774 - Cloth, Plain or Pajama Check Weave, Aramid

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods  
FED-STD-601 - Rubber: Sampling and Testing

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by  
Attributes

(Copies of documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained without charge from the Federal Trade Commission, Washington, DC 20580.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issues of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1424 - Tear Resistance of Woven Fabrics by Falling-Pendulum  
(Elmendorf) Apparatus  
E 96 - Water Vapor Transmission of Materials, Procedure B and BW

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

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(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2 and 6.4).

#### 3.2 Materials.

3.2.1 Base cloth. The cloth shall be plain or pajama check weave, aramid conforming to MIL-C-43774. The color shall be Olive Green 106, or natural as specified (see 6.2).

3.2.2 Plastic film. The plastic film shall be polytetrafluoroethylene, microporous,  $0.5 \pm 0.2$  oz/yd<sup>2</sup>. The color shall be natural or white.

3.2.3 Adhesive. The adhesive for laminating the layers together shall be such that the laminated cloth will meet the requirements of this document. The adhesive shall have no adverse health hazard when used as intended.

3.3 Laminated cloth. The cloth specified in 3.2.1 shall be laminated to the plastic film specified in 3.2.2. The face side of the laminated cloth shall be the fabric side.

3.4 Physical requirements. The laminated cloth shall conform to the requirements in table I when tested as specified in 4.4.3.

TABLE I. Physical requirements

Characteristics	Minimum	Maximum
Overall weight, oz/yd <sup>2</sup>	3.4	4.0
Breaking strength, lb:		
Warp	80	-
Filling	70	-
Tearing strength, g:		
Warp	5000	-
Filling	4000	-
Hydrostatic resistance, psi:		
Initial	25	-
After high humidity	25	-
Resistance to leakage	No leakage	
Moisture vapor transmission rate, g/m <sup>2</sup> /24 hrs	700	-

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TABLE I. Physical requirements (cont'd)

Characteristics	Minimum	Maximum
Flame resistance, warp and filling:		
After flame, second	-	2
After glow, second	-	25
Char length, inch	-	5

3.4.1 Width. The minimum overall width of the laminated cloth, without selvages shall be 43 inches.

3.5 Color. The color of the face side of the laminated cloth shall match the standard sample (see 6.3).

3.5.1 Matching. The color shall match the standard sample (see 6.3) when viewed under filtered tungsten lamps which approximate artificial daylight having a correlated color temperature of  $7500 \pm 200$  K with illumination of  $100 \pm 20$  foot candles, and shall be a good match to the standard sample under incandescent lamplight at  $2300 \pm 200$  K.

3.6 Length and put-up. Unless otherwise specified, the laminated cloth shall put-up in rolls in lengths of 80 to 124 yards. There shall be no more than two pieces in each roll and no piece shall contain less than 25 yards. Acceptance of shorter lengths, if permitted, shall be based on the conditions stipulated in the contract (see 6.1). The cloth shall be put-up on full width rolls as specified in 5.1.

3.7 Fiber identification. Each roll shall be labeled and ticketed for fiber content in accordance with the Textile Fiber Products Identification Act.

3.8 Workmanship. The laminated cloth shall conform to the quality of product established by this document and the occurrence of defects shall not exceed the applicable acceptable quality levels (AQL).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Certificate of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for appearance, color and finish defects and shall be tested for the characteristics specified in table III. The presence of any defect or failure of any test shall be cause for rejection of the first article.

4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.4.2 End item examination.

4.4.2.1 Yard-by-yard examination. The cloth shall be examined on one side only for the defects listed below. However, the sample shall be so alternated that in one out of every three pieces in the sample, the cloth is examined on the opposite side. Visual defects are examined on the opposite side. All defects found shall be counted regardless of their proximity to each other except where two or more defects represents a single local condition, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The lot size shall be expressed in yards. The sample unit shall be 1 linear yard. The inspection level shall be III and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total (major and minor combined) defects. The number of rolls from which the sample yardage is to be selected shall be in accordance with table II. An approximately equal number of yards shall be examined in each roll sampled.

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Defects	Classification	
	Major	Minor
Any hole, cut, or tear, including edges	X	
Abrasion resulting in a thin or weak place	X	
Floats or skips - multiple 1/2 inch, or more in either warp of filling direction		X
Blisters, tunnels or delamination of cloths	X	
Crease or wrinkle - resulting in doubling that cannot be corrected by manual pressure, or adhesion of surfaces against each other, or any diagonal distortion of surface	X	
Any solid lump	X	
Fabric edges rolled, folded, doubled, scalloped or wavy	X	
Any spot, stain, or foreign matter		X
Width less than specified		X
Any odor other than that which is characteristic of the laminating compound or water-repellent finish		X
Color off shade, not uniform, mottled, or spotted		X
Any tackiness	X	

TABLE II. Sample size

Lot size in yards	Sample size in rolls
1200 or less <sup>1/</sup>	3
1201 up to and including 3200	5
3201 up to and including 10,000	8
10,001 up to and including 35,000	13
35,001 up to and including 150,000	20
150,001 and over	32

<sup>1/</sup> If lot contains fewer than three rolls, each roll in the lot shall be examined.

#### 4.4.2.2 Length examination.

4.4.2.2.1 Individual rolls. During the yard-by-yard examination, each roll in the sample shall be examined for length. Any length found to be less than the minimum specified or more than 2 yards less than the length marked on the ticket shall be considered a defect with respect to length. The lot shall be unacceptable if two or more rolls in the sample are defective in respect to length.

4.4.2.2.2 Total yardage in sample. The lot shall be unacceptable if the total of the actual lengths of rolls in the sample is less than the total of the lengths marked on the ticket.

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4.4.2.3 Roll identification examination. During the yard-by-yard examination, each roll in the sample shall be unacceptable if two or more rolls in the sample are not labeled or ticketed in accordance with the Textile Fiber Products Identification Act.

4.4.3 End item testing. The cloth shall be tested for the characteristics listed in table III. The methods of testing specified in FED-STD-191 wherever applicable and as listed in table III shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The sample unit for all testing shall be 3 continuous yards, full width, of the finished cloth supplied on a tube to prevent folding. The lot shall be rejected if one or more sample units fail to meet the requirement specified. The maximum lot size shall be 150,000 linear yards. The sample size shall be in accordance with the following:

<u>Lot size, (yards)</u>	<u>Sample size</u>
800 or less	2
801 up to and including 22,000	3
22,001 up to and including 150,000	5

TABLE III. End item tests

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method 1/</u>
Overall weight	3.4	5041
Breaking strength	3.4	5102
Tearing strength	3.4	ASTM D 1424
Hydrostatic resistance:		
Initial	3.4	5512 2/
After high humidity	3.4	4.5.1
Resistance to leakage	3.4	4.5.2
Moisture vapor transmission rate	3.4	ASTM E 96 3/
Flame resistance	3.4	5903

- 1/ Unless otherwise specified, the methods of testing specified in FED-STD-191 shall be used.
- 2/ The water pressure shall be applied to the face side (fabric side) of the laminated cloth.
- 3/ The back side of the laminated cloth shall face the water. The free stream air velocity shall be  $550 \pm 50$  FPM as measured 2 inches below the fabric specimen. The air flow shall be measured at least 2 inches from any other surface. The test shall be taken at only the start and completion of the test. Five specimens shall be tested.

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4.4.4 Packaging examination. The examination shall be in accordance with PPP-P-1136.

4.5 Methods of inspection.

4.5.1 Hydrostatic resistance after high humidity. Three 4 by 4 inch specimens shall be laid flat, face side up, on a supporting plate and the assembly placed in a desiccator containing water in the lower portion. The water level shall be approximately 1 inch below the specimens. The lid of the desiccator shall be put in place and the desiccator placed in a circulating air oven having a temperature of  $160^{\circ} \pm 2^{\circ}\text{F}$  for a period of seven days. At the end of the aging period, each specimen shall be removed from the desiccator and tested immediately in accordance with Method 5512 of FED-STD-191 with the water pressure being applied to the face side.

4.5.2 Leakage. The test for resistance to leakage shall be conducted as specified in Method 5516 of FED-STD-191, except that the face side of the laminated cloth shall contact the water. The hydrostatic head shall be 50 centimeters, and shall be held for three minutes. The report shall only include measurement of the appearance of water drops.

4.5.3 Standard test conditions. Results of physical tests obtained under testing conditions defined in FED-STD-601 or FED-STD-191 will be applicable except in case of dispute and in the determination of moisture vapor transmission rate. In disputed cases, test shall be conducted with both the specimen and test apparatus under standard conditions as defined in FED-STD-191 except as previously noted for moisture vapor transmission rate.

5. PACKAGING

5.1 Put-up and preservation. Put-up and preservation shall be level A or Commercial as specified (see 6.2).

5.1.1 Levels A and Commercial. The cloth shall be put-up and preserved in accordance with the applicable requirements of PPP-P-1136.

5.2 Packing. Packing shall be level A, B or Commercial as specified (see 6.2).

5.2.1 Levels A, B, and Commercial. The cloth shall be packed in accordance with the applicable requirements of PPP-P-1136.

5.3 Marking. In addition to any special marking required in the contract or purchase order, shipments shall be marked in accordance with the requirements of PPP-P-1136.



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## 6. NOTES

6.1 Intended use. The cloth is intended for use in Hood, CVC, Coveralls (Balaclava).

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this document.
- b. First article (see 3.1, 4.3 and 6.4).
- c. Color required (see 3.2.1).
- d. Width of cloth required (see 3.4.1).
- e. Length required, if other than specified (see 3.6).
- f. Selection of applicable levels of preservation and packaging (see 5.1 and 5.2).

6.3 Standard sample. For access to standard sample, address the contracting activity issuing the invitation for bids.

6.4 First article. When a first article sample is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article shall be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be provided. The contracting officer should include specific instructions in all acquisition instruments regarding arrangements for selection, inspection, and approval of the first article.

6.5 Subject term (key word) listing.

Cloth  
Coveralls  
Hood, CVC  
Laminated

6.6 Supersession data. This document includes the requirements of LP/P. DES 13-80, dated 22 December 1980.

## Custodian:

Army - GL  
Navy - NU  
Air Force - 11

## Preparing activity:

Army - GL  
Project No. 8305-0104

## Review activities:

Army - MD  
Navy - MC  
Air Force - 82, 99  
DLA - CT

## User activity:

Air Force - 45

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

MIL-C-44263

2. DOCUMENT TITLE Cloth, Laminated, Waterproof, Moisture  
Vapor Permeable and Flame Resistant (Wt. 3.4 oz)

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

☐

VENDOR

☐

USER

☐

MANUFACTURER

☐

OTHER (Specify): \_\_\_\_\_

b. ADDRESS (Street, City, State, ZIP Code)

## 5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

## 6. REMARKS

7a. NAME OF SUBMITTER (Last, First, MI) - Optional

7b. WORK TELEPHONE NUMBER (Include Area  
Code) - Optional

8a. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8b. DATE OF SUBMISSION (YYMMDD)

DD FORM 1426  
82 MARPREVIOUS EDITION IS OBSOLETE.  
NATICK OP-1, Feb 86

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**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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