

MIL-C-44121  
5 April 1984

MILITARY SPECIFICATION

CLOTH, TWILL, POLYESTER

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 polyester twill cloth.

2 APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

SPECIFICATIONS

FEDERAL

PPP-P-1133 - Packaging of Synthetic Fiber Fabrics

STANDARDS

FEDERAL

FED-STD-4\* - Glossary of Fabric Imperfections  
FED-STD-191 - Textile Test Methods

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 and Development Center, Natick, MA 01760 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 8305

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

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

OTHER GOVERNMENT DOCUMENTS

Laws and Regulations

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. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Chromatic Transference Scale

(Application for copies should be addressed to the American Association of Textile Chemists and Colorists, P. O. Box 12215, Research Triangle Park, NC 27709.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1424 - Tear Resistance of Woven Fabrics by Falling Pendulum  
(Elmendorf) Apparatus

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

(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.

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## 3. REQUIREMENTS

3.1 Standard sample. The finished cloth shall match the standard sample for shade and appearance and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 Material. The yarns shall be 100 percent filament polyester. The warp yarns shall be 70 denier or 75 denier nominal and the filling yarns shall be 100 denier nominal.

3.3 Physical requirements. The finished cloth shall conform to the requirements specified in table I when tested as specified in 4.2.3.

TABLE I. Physical requirements

Characteristic	Requirement
Weight, oz./sq yd. min.	2.4
Yarns per inch, min,	
Warp	124
Filling	76
Breaking strength, lbs., min.	
Warp	140
Filling	110
Tear strength, lbs., min.	
Warp	5.0
Filling	3.0

3.3.1 Weave. The weave shall be a 2/1 right hand twill.

3.4 Width. The width of the finished cloth shall be as specified (see 6.2). The minimum acceptable width shall be inclusive of woven selvages when fly-shuttle looms are used and exclusive of the lock-in selvage when shuttleless looms are used. Cut raw edges shall not be permitted.

3.5 Color. The color of the finished cloth shall be Army Green 461 or Blue 334, as specified (see 6.2) and shall match the standard sample for shade.

3.5.1 Matching. The color of the finished cloth shall match the standard sample under artificial daylight having a color temperature of  $7000 \pm 500$  K and shall be a good approximation to the standard sample under incandescent lamplight at  $2850 \pm 100$  K.

3.5.2 Colorfastness. The finished cloth shall show fastness to laundering, wet-dry cleaning, crocking, and perspiration equal to or better than the standard sample. When no standard sample is available, the finished cloth

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shall show a minimum of "good" fastness to laundering, wet-dry cleaning, and perspiration and shall show an AATCC Chromatic Transference Scale rating for crocking of 3.5, or better when tested as specified in 4.2.3.

3.6 Finish. The cloth shall be scoured and heat set.

3.7 Dimensional stability. The cloth shall not shrink or elongate more than 2.0 percent in the warp and filling direction when tested as specified in 4.2.3.

3.8 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous length, each not less than 50 yards. Each length shall be put-up in a roll as specified in 5.1.

3.9 Fiber identification. Each roll shall be labeled, or ticketed for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

3.10 Face identification. The face of the cloth shall be the warp flush side. The face of the cloth shall be identified by stamping one side with the word "Face" at each end of the roll.

3.11 Workmanship. The finished cloth shall conform to the quality of product established by this document. The occurrence of defects shall not exceed the point level specified.

#### 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 deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

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

4.2.1 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.

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4.2.2 End item examination.

4.2.2.1 Yard-by-yard examination. Each roll in the sample shall be examined on the face side only. When the total yardage in the roll does not exceed 100 yards, the entire yardage in the roll shall be examined. When the total yardage in the roll exceeds 100 yards, only 100 yards shall be examined. All defects, as defined in section III of FED-STD-4, which are clearly noticeable at normal inspection distance (3 feet) shall be scored and assigned demerit points as listed in 4.2.2.1.1. No linear yard (increments of 1 yard on the measuring device of the inspection machine) from any one roll within the sample shall be penalized more than four points. The sample size shall be 20 rolls selected from 20 containers. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds 25.0 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 38.0 points. If one roll exceeds 38.0 points per 100 square yards, a second sample of 20 rolls shall be examined only for individual roll quality. The lot shall be unacceptable if one or more rolls in the second sample exceeds 38.0 points per 100 square yards. Point computation for lot quality and individual roll quality shall be as follows:

$$\frac{\text{Total points scored in sample} \times 3600}{\text{Contracted width of cloth (inches)} \times \text{Total yards inspected}} = \text{Points per 100 square yards}$$

4.2.2.1.1 Demerit points. Demerit points shall be assigned as follows:

For defects up to 3 inches in any dimension	- one point
For defects exceeding 3 inches, but not exceeding 6 inches in any dimension	- two points
For defects exceeding 6 inches, but not exceeding 9 inches in any dimension	- three points
For defects exceeding 9 inches in any dimension	- four points

The following defects, when present, shall be scored four points for each yard in which they occur:

- Objectionable odor
- Width less than specified
- Poor dye penetration, mottled, streaky, or cloudy
- Bias or bowed filling - distortion at any point, 2 inches or more from normal alignment
- Turned selvage which cannot be flattened by manual pressure

4.2.2.2 Examination for length.

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4.2.2.2.1 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.

4.2.2.2.2 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 tickets.

4.2.2.2.3 Shade and appearance examination. During the yard-by-yard examination, each roll in the sample shall be examined for shade and appearance. Any roll in the sample off shade or shaded side to side, side to center, or end to end or any roll not having the same appearance as the standard sample shall be cause for rejection of the entire lot represented by the sample.

4.2.2.2.4 Roll identification examination. During the yard-by-yard examination, each roll in the sample shall be examined for defects listed below. The lot shall be unacceptable if two or more defects are present in the sample:

Face identification missing from either or both ends.

Not labeled or ticketed in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

4.2.3 End item testing. The cloth shall be tested for the characteristics listed in table II. The methods of testing specified in FED-STD-191 wherever applicable and as listed in table II shall be followed. The physical and chemical values specified in section 3, except where otherwise specified, apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test methods. The sample unit shall be 3-1/2 continuous yards full width of the finished cloth. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified. The sample size shall be in accordance with the following:

<u>Lot size (yards)</u>	<u>Sample size (number of sample units)</u>
800 or less	2
800 up to and including 22,000	3
22,001 and over	5

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TABLE II. End item tests

Characteristic	Requirement paragraph	Test method
Fiber identification	3.2	<u>1/</u>
Yarn (filament and denier)	3.2	<u>1/</u>
Weight	3.3	5041
Yarns per inch	3.3	5050
Breaking strength	3.3	5100
Tearing strength	3.3	ASTM D-1424
Weave	3.3.1	Visual <u>2/</u>
Colorfastness to:		
Laundering	3.5.2	5614
Wet-dry cleaning	3.5.2	5622
Crocking	3.5.2	5651
Perspiration	3.5.2	5680
Finish	3.6	<u>1/</u>
Dimensional stability	3.7	5556 <u>3/</u>

1/ Unless otherwise specified, a certificate of compliance shall be submitted and will be acceptable for the stated requirement.

2/ One determination shall be made from each sample unit and the results shall be reported as "pass" or "fail".

3/ The "cotton" procedure shall be used.

4.2.4 Packing inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1133.

## 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-1133.

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 packaged in accordance with the applicable requirements of PPP-P-1133.

5.3 Marking. In addition to any special marking required by the contract or purchase order, shipments shall be marked in accordance with the applicable requirements of PPP-P-1133.

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6. NOTES

6.1 Intended use. This cloth is intended to be used as garment lining.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Width of cloth required (see 3.4).
- c. Color of cloth required (see 3.5).
- d. Minimum length if other than specified (see 3.8).
- e. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

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

Custodians:

Army - GL  
Navy - NU  
Air Force - 11

Preparing activity:

Army - GL  
Project No. 8305-0937

Review activities:

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

User activity:

Navy - MC

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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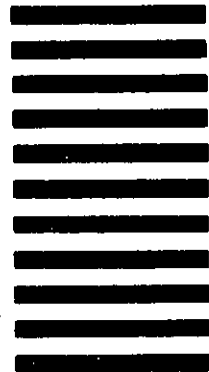


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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

<b>1. DOCUMENT NUMBER</b> MIL-C-44121	<b>2. DOCUMENT TITLE</b> Cloth, Twill, Polyester
<b>3a. NAME OF SUBMITTING ORGANIZATION</b>  	<b>4. TYPE OF ORGANIZATION (Mark one)</b> <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER (Specify): _____
<b>b. ADDRESS (Street, City, State, ZIP Code)</b>  	
<b>5. PROBLEM AREAS</b> <b>a. Paragraph Number and Wording:</b>          <b>b. Recommended Wording:</b>          <b>c. Reason/Rationale for Recommendation:</b>          	
<b>6. REMARKS</b>          	
<b>7a. NAME OF SUBMITTER (Last, First, MI) - Optional</b>  	<b>b. WORK TELEPHONE NUMBER (Include Area Code) - Optional</b>  
<b>c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional</b>  	<b>8. DATE OF SUBMISSION (YYMMDD)</b>  