

MIL-C-24910A  
15 April 1985  
SUPERSEDING  
MIL-C-24910  
25 January 1983

## MILITARY SPECIFICATION

### CLOTH, TROPICAL: POLYESTER AND WOOL

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

#### 1. SCOPE

1.1 This specification covers one type of washable polyester and wool tropical cloth.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

PPP-P-1132 - Packaging of Woolen, Worsted and Wool Blend  
(Synthetic Fiber; Cotton) Fabrics

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Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Officer in Charge, Navy Clothing and Textile Research Facility, 21 Strathmore Road, Natick, MA 01760-2490 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FSC 8305

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MILITARY

MIL-C-43665 - Cloth, Wool Mothproofing Treatment of

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

MIL-STD-655 -Provisions for Evaluating Quality of Cloth, Wool,  
Worsted and Wool Blends

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

Methods of Test for Grades of Wool Top

(Applications for copies should be addressed to the U.S. Department of Agriculture, Agricultural Marketing Service, Washington, DC 20402.)

Rules and Regulations Under the Wool Products Labeling Act of 1939

(Applications for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.2 Other publications The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

Technical Manual of the American Association  
of Textile Chemists and Colorists

Test Method - 135-1978 - Dimensional Changes in Automatic Home Laundering of  
Woven and Knit Fabrics

(Applications for copies should be addressed to the AATCC, P.O. Box 12215,  
Research Triangle Park, NC 27709.)

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American Society for Testing and Materials  
(ASTM) D 1421-63

Test for Tear Resistance of Woven Fabrics  
by Falling Pendulum (Elmendorf) Apparatus

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

### 3. REQUIREMENTS

3.1 Standard sample. The finished cloth shall match the standard sample for shade 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 First article. When specified, the contractor shall furnish sample units for first article inspection and approval (see 4.3. and 6.2).

#### 3.3 Material.

##### 3.3.1 Stock.

3.3.1.1 Wool. The stock shall be fleece or pulled wool or both, not lower in grade than 64's U. S. Standard when tested as specified in 4.4.1.1.

3.3.1.2 Polyester. The stock shall be semi-dull polyester fiber made from polyethylene glycol terephthalate, either homopolymer or modified polymer as appropriate. The fiber shall be 3 denier and the minimum average fiber length shall be 3 inches when tested as specified in 4.4.1.

3.3.2 Polyester/wool yarn. The polyester and wool fibers shall be blended and spun on the worsted system and twisted into a 2-ply yarn for both warp and filling yarns. The finished cloth shall contain 75 percent (maximum) polyester, with the remaining percentage wool, based on the weight obtained from chloroform extraction, when tested as specified in 4.6.

3.4 Color. Unless otherwise specified in the contract, the color of the cloth shall be shade Blue 3346 and shall match the standard sample (see 6.3). The color shall be obtained by top dyeing.

3.4.1 Matching. The color of the finished cloth shall match the standard sample under artificial daylight having a color temperature of 7500 (+ 500) Kelvin and shall be a good approximation to the standard sample under incandescent lamplight at 2850 (+ 100) Kelvin.

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3.4.2 Colorfastness. The finished cloth shall show colorfastness to laundering (3 cycles), wet drycleaning, perspiration, light (40 Standard Fading Hours) and crocking equal to or better than the standard sample. When no standard sample is available, the finished cloth shall show "good" colorfastness to laundering (3 cycles), wet drycleaning, perspiration, crocking and light (40 Standard Fading Hours). Testing shall be as specified in 4.6.

3.5 Mothproofing. Mothproofing of the wool top shall be in accordance with MIL-C-43665, when tested in accordance with 4.6.

3.6 Physical requirements. The finished cloth shall conform to the requirements specified in Table I when tested as specified in 4.6.

TABLE I. Physical requirements

Yarns per inch (minimum)		Weight (ounces) per yd- 56-inch width)	Breaking strength (minimum) (pounds)		Tearing strength (minimum) (pounds)		Shrinkage percent (maximum)		Weave
Warp	Filling		Warp	Filling	Warp	Filling	Warp	Filling	
50	44	10.0 +0.5	100	80	5.0	5.0	3.0	2.5	Plain

3.6.1 Width. Unless otherwise specified (see 6.2), the finished cloth shall be a minimum of 60 inches exclusive of selvages.

3.7 Finish. The cloth shall be scoured, heat set, sheared and decated so as to provide a finish equal to that of the standard sample.

3.7.1 Pilling. The finished cloth shall show no more pilling than that of the standard sample when tested as specified in 4.6.

3.7.2 pH. The pH value of the water extract of the finished cloth shall be no less than 5.5 nor more than 8.5 when tested as specified in 4.6.

3.8 Selvages. The selvages shall be no thicker than sixty-five percent more than the body of the cloth when tested as specified in 4.6.

3.9 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous lengths each not less than 50 yards.

3.10 Wool content label. Cloth manufactured under this specification shall be labeled in accordance with the Wool Products Labeling Act of 1939.

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3.11 Marking. The back of the cloth shall be marked "Back" at both ends of each roll with letters not less than 1/2 inch in height (see 4.4.2.3). The marking shall be clearly legible in any indelible marking used commercially.

3.12 Workmanship. The finished cloth shall conform to the quality established by this specification. The demerit points per 100 square yards when calculated as specified in section 4, shall not exceed the established maximum point value. Each defect shall be marked with a 1-to-1 1/2 inch long string. The string shall be sewn into the selvage near the defect. A red string shall represent a three or four point defect and a white string shall represent a one or two point defect (see 4.4.2.5).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the contractor may use his own or any other facilities suitable for 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 the specification where such inspections are deemed necessary to assure that 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 Classification of inspection. The inspection requirements specified herein are classified as follows:

1. First article inspection (see 4.3).
2. Quality conformance inspection (see 4.4).

4.3 First article inspection. When required, the first article of finished cloth shall be visually inspected for uniformity of shade, color, finish and appearance and shall be tested for chemical and physical properties in accordance with the applicable methods specified in 4.6.

4.4 Quality conformance inspection. Sampling for inspection shall be performed in accordance with MIL-STD-655, except where otherwise indicated.

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

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TABLE II. Component tests

Characteristics	Requirement paragraph	Test method
Polyester identification	3.3.1.2	1/
Length of fiber	3.3.1.2	Visual 1/
Denier	3.3.1.2	4021 1/

1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirements.

4.4.1.1 Wool. The wool shall be visually examined for grade in the undyed top form by comparison with the standard (see 3.3.1.1). In the event of a dispute, the wool grade shall be determined by the width method (wedge). The sample unit shall be 1 yard of undyed top. The sample size (number of sample units) shall be as shown in the table below. The lot size shall be expressed in units of 1 pound. The results from each sample unit shall be reported separately. The lot shall be unacceptable if a single sample unit fails to meet the required grade.

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

4.4.1.2 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to assure that supplies and services conform to prescribed requirements. The Government reserves the right to exclude from consideration for acceptance any material for which the in-process inspection has indicated non-conformance.

4.4.2 Examination of the end item. Examination of the end item shall be in accordance with 4.4.2.1 through 4.4.2.4.

\* 4.4.2.1 Yard-by-yard examination. The yard by yard examination shall be as specified in MIL-STD-655. 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. The fabric quality shall be quality level 15.

4.4.2.1.1 Limit for slubs and knots. Only those knots and slubs which exceed the limits shown on Sears Fabric Defect Scales (see 6.4), D for slubs and C for knots, shall be scored.

4.4.2.2 Examination for length. Examination for length shall be as specified in MIL-STD-655.

4.4.2.3 Examination for back marking and compliance with the Wool products Labeling Act. Examination for back marking and compliance with the Wool Products Labeling Act shall be as specified in MIL-STD-655.

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4.4.2.4 Examination for shade and finish.

4.4.2.4.1 Individual rolls. Each roll in the lot shall be examined visually for shade match (see 3.4.1) and finish (see 3.7). A roll shall be unacceptable if it fails to meet the requirements for shade match and finish. The sample unit shall be a 4 inch by 20 inch swatch of the cloth. A sample unit shall be drawn from each roll in the lot.

4.4.2.5 Examination for defect marking. Examination for defect marking shall be as specified in MIL-STD-655.

4.5 Examination of packaging requirements. Examination shall be made in accordance with the provisions of PPP-P-1132 to determine that preservation, packing, and marking comply with section 5 requirements.

4.6 Tests. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in Table III shall be followed. The physical and chemical values specified in section 3 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 4 continuous yards full width of the finished cloth. The lot size shall be expressed in units of 1 yard. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified. All test reports shall contain the individual values utilized in expressing the final result. The sample size (number of sample units) 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 and over	5

TABLE III. Test methods

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test Method</u>
Yarn ply:		
Warp	3.3.2	Visual <u>1/</u>
Filling	3.3.2	Visual <u>1/</u>
Fiber percentage	3.3.2	2102
Colorfastness:		
Laundering	3.4.2	5614 <u>6/ 7/</u>
Wet dry cleaning	3.4.2	5622
Crocking	3.4.2	5651
Perspiration	3.4.2	5680
Light	3.4.2	5660 <u>2/</u>
Mothproofing	3.5	<u>3/</u>
Yarns per inch:		
Warp	3.6	5050
Filling	3.6	5050

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TABLE III. Test methods (cont'd)

Characteristic	Requirement Paragraph	Test Method
Breaking strength:		
Warp	3.6	5100
Filling	3.6	5100
tear Strength:		
Warp	3.6	ASTM D 1424
Filling	3.6	ASTM D 1424
Shrinkage:		
Warp	3.6	5/
Filling	3.6	5/
Weave	3.6	Visual 1/
Weight	3.6	5041
Pilling	3.7.1	5320 4/
pH	3.7.2	2811
Selvage thickness	3.8	5030

- 1/ One determination per sample unit and the results reported as "pass " or "fail".
- 2/ 40 Standard Fading Hours
- 3/ A certificate of compliance shall be submitted and shall be acceptable for this requirement.
- 4/ The pilling test shall be conducted in accordance with Method 5320, except that five specimens of the test cloth and one specimen of the standard sample shall be used concurrently.
- 5/ The test for dimensional stability shall be performed in accordance with AATCC TM 135 - 1978, laundered on a Permanent Press Cycle (140 F<sup>o</sup>) and tumble dried at 140 F<sup>o</sup> for five (5) complete cycles.
- 6/ The specimen shall be dried after each of the 3 laundering cycles.
- 7/ On the color transfer cloth evaluation, only the stain on the polyester and wool fibers of the color transfer cloth shall be evaluated.

## 5. PACKAGING

5.1 Preservation. Preservation shall be A or C (see 6.2).

5.1.1 Level A and C. The cloth, put up as specified (see 3.9) shall be packaged according to PPP-P-1132.

5.2 Packing. Packing shall be level A, B or C (see 6.2).

5.2.1 Level A, B and C. The cloth shall be packed according to PPP-P-1132.

5.3 Marking. In addition to any special marking required by the contract, shipments shall be marked in accordance with PPP-P-1132.



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## 6. NOTES

6.1 Intended use. The cloth covered by this specification is intended for use in the manufacture of apparel for wear by male and female personnel of the U.S. Navy.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. When a first article inspection is required (see 3.2), the item shall be tested and should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, quantity, and testing and approval of the first article.
- c. Width if other than specified (see 3.6.1).
- d. Length if other than specified (see 3.9)
- e. Levels of packaging and packing required (see 5.1 and 5.2).

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

6.4 Sears Fabric Defect scales are available from Sears Roebuck and Company, Department 87, (Attn: BSC 23-29), "Fabric Defect Replica Kit", Chicago, IL 60684.

Custodian:  
Army - GL  
Navy - NU

Preparing Activity:  
Navy - NU

Project No. 8305-0029

Review Activities:  
Coast Guard - CG  
Army - MD  
DLA - CT

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL***(See Instructions – Reverse Side)***1. DOCUMENT NUMBER**

MIL-C-24910A

**2. DOCUMENT TITLE**

CLOTH, TROPICAL: POLYESTER AND WOOL

**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****b. WORK TELEPHONE NUMBER (Include Area Code) – Optional****c. MAILING ADDRESS (Street, City, State, ZIP Code) – Optional****8. DATE OF SUBMISSION (YYMMDD)**

**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.

**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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