

MIL-C-29118A  
28 May 1976  
~~SUPERSEDING~~  
MIL-C-29118  
24 January 1973

## MILITARY SPECIFICATION

### CLOTH, TWILL, COTTON

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

#### 1. SCOPE

1.1 Scope This specification covers the requirements for one type of cotton twill cloth.

#### 2. APPLICABLE DOCUMENTS

\* 2.1 Issue of documents The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

PPP-P-1134 - Packaging and Packing of Cotton and Cotton-synthetic  
Fiber Blend Fabrics (Excluding Duck Fabrics)

#### STANDARDS

##### FEDERAL

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

##### MILITARY

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

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

FSC 8305

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## LAWS AND REGULATIONS

### RULES AND REGULATIONS UNDER THE TEXTILE FIBER PRODUCTS IDENTIFICATION ACT

(Copies may be obtained from the Federal Trade Commission, Washington, D.C. 20580.)

## 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 samples of the cloth for first article inspection and approval (see 4.2 and 6.2).

### 3.3 Material

**3.3.1 Yarn** The yarn shall be made of cotton which has been thoroughly cleaned, carded, combed, drawn and evenly spun into two ply yarns for the warp and singles yarn for the filling (see 4.3.1 and 4.4).

**3.4 Color** The cloth shall be dyed to match Yellow 3511.

**3.4.1 Sulfur content** The use of sulfur dyes or dyes containing elementary sulfur or sulfur compounds capable of oxidation to sulfuric acid is prohibited. The finished cloth shall contain no more labile sulfur than shown by the standard sample when tested as specified in 4.4. When no standard sample is available, the dyed and finished cloth shall show no more than a slight trace of labile sulfur as defined in the test method when tested as specified in 4.4.

**3.4.2 Matching** The color of the finished cloth shall match the standard sample under artificial daylight having a color temperature of 7500° Kelvin and shall be a good approximation to the standard sample under incandescent lamplight at 2800 ° Kelvin.

**3.4.3 Colorfastness** The finished cloth shall show fastness to light (20 hours), crocking, perspiration, laundering and salt water and soap equal to or better than the standard sample. When no standard sample is available, the cloth shall show a minimum of "good" fastness to light (20 hours), perspiration, laundering, salt water and soap and a Munsell Value for crocking not lower than 8.5 when tested as specified in 4.4.

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**3.5 Physical requirements** The finished cloth shall conform to the physical requirements shown in Table I when tested as specified in 4.4.

Table I - Physical requirements

Weight oz./sq. yd. (g/m <sup>2</sup> )		Yarns per inch (min.)		Breaking strength (min.) pounds		Tearing strength (min.) pounds	
Min.	Max.	Warp	Filling	Warp	filling	warp	filling
5.7 (193.2)	6.3 (213.5)	110	47	155	55	6.5	6.5

**3.5.1 Weave** The weave shall be a 3/1 right hand twill.

**3.5.2 Width** The width shall be as specified (see 6.2) and shall be the minimum acceptable width, inclusive of selvage.

**3.6 Finish** The cloth shall be closely singed, desized and mercerized. The cloth shall be finished with the filling flush side as the face (twill side down) (see 4.3.1).

**3.7 Nonfibrous materials** The finished cloth shall not exceed 2.0 percent starch and protein content including chloroform-soluble and water-soluble material when tested as specified in 4.4.

**3.8 Dimensional stability** The finished cloth shall not shrink more than 2.0 percent in either the warp or filling direction when tested as specified in 4.4. The pre-shrinking process used shall not be identified by name or trademark; either on the cloth, ticket or package.

**3.9 pH** The pH value of the water extract of the finished cloth shall be not less than 5.0 nor more than 8.5 when tested as specified in 4.4.

**3.10 Marking** The face side of the cloth shall be identified by stamping on that side with the word "FACE" at each end of each piece.

**3.11 Length and put up** Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous lengths, each not less than 40 yard. Each length shall be put up in flat folded pieces or on full width rolls as specified in PPP-P-1134, with the fabric face on the inside.

**3.12 Fiber identification** Each roll or piece of cloth shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

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3.13 Workmanship The finished cloth shall conform to the quality established by this specification. The demerit points per 100 square yards (83.6m<sup>2</sup>), when calculated as specified in Section 4, shall not exceed the established maximum point value.

#### 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, 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 the specification where such inspections are deemed necessary to assure supplies and services conform to the 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 First article inspection When required, the first article of finished cloth shall be visually inspected for color, finish and appearance and shall be tested for chemical and physical properties in accordance with the applicable methods specified in 4.4.

4.3 Inspection Inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

4.3.1 Component and material inspection In accordance with 4.1 above, components and materials shall be inspected and tested in accordance with all requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document. In addition, the supplier shall furnish a certificate of compliance for the cotton fiber identification, the combing requirement and the finishing requirements specified in 3.3.1 and 3.6.

4.3.2 Examination of the end item Examination of the end item shall be in accordance with 4.3.2.1 through 4.3.2.4.

4.3.2.1 Yard-by-yard examination Each piece or roll in the sample shall be examined on the face side only. When the total yardage in the piece or roll does not exceed 100 yards (91.4m), the entire yardage in the piece roll shall be examined. When the total yardage in the piece or roll exceeds 100 yards (91.4m), only 100 yards (91.4m) shall be examined. Defects as defined in Section I of FED-STD-4 which are clearly noticeable at normal inspection distance (3 feet) (.91m) shall be scored and assigned demerit points as listed in 4.3.2.1.1 except that only those slubs and knots which exceed the limits shown on Sears Fabric Defect Scales (see 6.4), "D" for slubs and "C" for knots, shall be scored. No continuous linear yard (increment of one yard (.91m) on the measuring device of the inspection machine) from any one piece

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or roll within the sample, shall be penalized more than 4 points. The sample unit for this examination shall be one linear yard (.91m). The sample size shall be 20 pieces or rolls selected from 20 containers. For determination of acceptability on the average quality of the lot, the lot shall be unacceptable if the points per 100 square yards ( $83.6\text{m}^2$ ) exceeds 30.0 points.<sup>2</sup> The lot shall be unacceptable if the points per 100 square yards ( $83.6\text{m}^2$ ) of two or more individual pieces or rolls exceeds 45.0 points. If no individual piece or roll exceeds the point level, the lot shall be accepted. If one piece or roll exceeds the point level, a second sample of 20 pieces or rolls shall be selected for individual piece or roll quality examination only. If no piece or roll in the second sample exceeds the point value, the lot shall be accepted. If one or more piece or roll exceeds the value, the lot shall be rejected. Point computation for the lot quality and individual piece or roll quality shall be as follows:

$$\frac{\text{Total points scored in sample} \times 3600}{\text{Contracted width of cloth (inches)} \times \text{Total yards inspected}} = \text{Points per 100 square yards (83.6m}^2\text{)}$$

#### 4.3.2.1.1 Demerit points Demerit points shall be assigned as follows:

For defects up to and including 3 inches (76.2mm) in any dimension	- one point
For defects exceeding 3 inches (76.2mm), but not exceeding 6 inches (152.4mm) in any dimension	- two points
For defects exceeding 6 inches (152.4mm), but not exceeding 9 inches (228.6mm) in any dimension	- three points
For defects exceeding 9 inches (228.6mm) in any dimension	- four points

The following defects, when present, shall be scored 4 points for each yard in which they occur:

Baggy, ridgy or wavy cloth  
Width less than specified  
Poor dye penetration, mottled, streaky, or cloudy  
Excessive neppiness

#### 4.3.2.2 Examination for length

4.3.2.2.1 Individual pieces or rolls During the yard-by-yard examination, each piece or roll in the sample shall be examined for length. Any length found to be less than the minimum specified or more than 2 yards (1.82m) 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 pieces or rolls in the sample are defective with respect to length.

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4.3.2.2.2 Total yardage in sample The lot shall be unacceptable if the total of the actual lengths of pieces or rolls in the sample is less than the total of the lengths marked on the tickets. The pieces or rolls examined shall be those selected for the examination of individual pieces or rolls.

4.3.2.3 Examination for shade During the yard-by-yard examination each piece or roll shall be examined for shade. Any piece or roll in the sample off shade (compared to the standard sample), shaded side to side, side to center or end to end shall be cause for rejection of the entire lot represented by the sample.

4.3.2.4 Examination for face identification, identification of preshrinking process and non-conformance with the Textile Fiber Products Identification Act During the yard-by-yard examination, each piece in the sample shall be examined for these defects. The lot shall be unacceptable if two or more pieces or rolls in the sample have face identification missing from either or both ends, two or more pieces or rolls in the sample contain identification of the preshrinking process by name or trademark on the cloth or ticket, or are not labeled or ticketed in accordance with the Textile Fiber Products Identification Act.

4.3.3 Examination of preparation for delivery requirements An examination shall be made in accordance with the provisions of PPP-P-1134 to determine that packaging, packing and marking comply with the Section 5 requirements of this specification.

4.4 Testing of the end item 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 indicated, apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test methods. All test reports shall contain the individual values utilized in expressing the final result. The sample unit shall be 3 1/2 yards (3.19m), full width of the finished cloth. The lot size shall be expressed in units of one yard (.91m). The sample size shall be as follows and the lot shall be unacceptable if one or more sample units fail to meet any requirements specified.

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

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Table II - Test Methods

Characteristic	Requirement paragraph	Test Method
Yarn ply		
Warp	3.3.1	Visual <u>1/</u>
Filling	3.3.1	Visual <u>1/</u>
Material Identification	3.3.1	1200 <u>2/</u>
Sulfur content	3.4.1	2020
Colorfastness to.		
Light	3.4.3	5660 <u>3/</u>
Crocking	3.4.3	5651
Perspiration	3.4.3	5680
Laundering	3.4.3	5610 <u>4/</u>
Salt water and soap	3.4.3	5632
Weight	3.5	5041
Yarns per inch		
Warp	3.5	5050
Filling	3.5	5050
Breaking strength		
Warp	3.5	5100
Filling	3.5	5100
Tearing strength		
Warp	3.5	5134
Filling	3.5	5134
Weave	3.5.1	Visual <u>1/</u>
Nonfibrous materials	3.7	2611
Dimensional stability	3.8	5550
pH	3.9	2811

1/ One determination per sample unit and the result reported as "pass" or "fail".

2/ A certificate of compliance is required and will be acceptable for the stated requirement.

3/ To be tested for 20 hours.

4/ Only the stain on the cotton fiber of the transfer cloth shall be evaluated.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging Packaging shall be level A or C, as specified (see 6.2).

5.1.1 Levels A and C The cloth, put up as specified (see 3.11), shall be packaged in accordance with the applicable requirements of PPP-P-1134.

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

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5.2.1 Levels A, B, and C The cloth shall be packed in accordance with the applicable requirements of PPP-P-1134.

5.3 Marking In addition to any special marking required by the contract or order, shipments shall be marked in accordance with the applicable requirements of PPP-P-1134.

## 6. NOTES

6.1 Intended use The cloth covered by this specification is intended for use in fabricating radioactive contaminants protective garments.

6.2 Ordering data Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. When first article is required (see 3.2).
- c. Width required (see 3.5.2).
- d. Length required if other than specified (see 3.11).
- e. Levels of packaging and packing required (see 5.1 and 5.2).

6.3 Standard sample For access to the standard sample (see 3.1), address the procuring activity issuing the invitation for bids.

6.4 Sears Fabric Defect Scales are available from Sears, Roebuck and Company, Department 733Q "Sears Defect Replica Kit", Sears Tower, Chicago, Illinois 60684.

\* 6.5 Changes from previous issue The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

### Custodians:

Army - GL  
Navy - SA  
Air Force - 11

### Preparing activity:

Navy - SA

Project No. 8305-0226

### Review activities:

Navy - MS  
Air Force - 11, 99

### User activities:

Navy - OS, YD, CG



<b>SPECIFICATION ANALYSIS SHEET</b>		Form Approved Budget Bureau No 22-R255
<b>INSTRUCTIONS</b> This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.		
<b>SPECIFICATION</b> <div style="border: 1px solid black; padding: 2px; margin-top: 5px;">MIL-C-29118A CLOTH, TWILL, COTTON</div>		
<b>ORGANIZATION</b> <div style="border: 1px solid black; height: 20px; margin-top: 5px;"></div>		
<b>CITY AND STATE</b> <div style="border: 1px solid black; height: 20px; margin-top: 5px;"></div>	<b>CONTRACT NUMBER</b> <div style="border: 1px solid black; height: 20px; margin-top: 5px;"></div>	
<b>MATERIAL PROCURED UNDER A</b> <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
<b>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?</b> <b>A. GIVE PARAGRAPH NUMBER AND WORDING.</b> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div>		
<b>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</b> <div style="border: 1px solid black; height: 150px; margin-top: 5px;"></div>		
<b>2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID</b> <div style="border: 1px solid black; height: 60px; margin-top: 5px;"></div>		
<b>3. IS THE SPECIFICATION RESTRICTIVE?</b> <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?) <div style="border: 1px solid black; height: 80px; margin-top: 5px;"></div>		
<b>4. REMARKS</b> (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity) <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div>		
<b>SUBMITTED BY</b> (Printed or typed name and activity - Optional) <div style="border: 1px solid black; height: 20px; margin-top: 5px;"></div>		<b>DATE</b> <div style="border: 1px solid black; height: 20px; margin-top: 5px;"></div>

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