

CCC-C-461C
 May 12, 1972
 SUPERSEDING
 Fed. Spec. CCC-C-461B
 January 23, 1968

FEDERAL SPECIFICATION

CLOTH, TWILL, UNIFORM COTTON

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirement for uniform cotton twill cloth.

1.2 Classification.

1.2.1 Types. The cloth shall be of the following types, as specified (see 6.2):

Type	Nominal weight oz. per sq. yd.	Yarn ply warp-filling	Yarn
I	8.2	2 x 2	Combed
II	8.2	2 x 1	Combed
III	8.0	1 x 1	Combed
IV	7.5	1 x 1	Combed
V	7.5	1 x 1	Carded
VI	8.4	1 x 1	Carded

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2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of Invitation for bids or request for proposal, form a part of this specification to the extent specified herein,

Federal Specifications:

- | | |
|------------|--|
| V-T-276 | - Thread, Cotton. |
| PPP-P-1134 | - Packaging and Packing of Cotton and Cotton-Synthetic Fiber Blend Fabrics (Excluding Duck Fabrics). |

Federal Standards:

- | | |
|-------------------|-------------------------------------|
| Fed. Std. No. 4 | - Glossary of Fabric Imperfections. |
| Fed. Std. No. 191 | - Textile Test Methods. |

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standard:

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

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Laws and Regulations:

Federal Trade Commission Publication:

**Rules and Regulations under the Textile Fiber Products
Identification Act (16 CFR 303).**

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

3. REQUIREMENTS

3.1 Standard sample. When a standard sample is established, the 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 Material.

3.2.1 Yarn. The yarn shall be made from clean cotton, and shall be ~~carded or combed, and single or plied, as specified in table 1.~~

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TABLE I.- Physical requirements

Type	Yarn	Yarn ply		Weight per sq. yd. ounces		Yarns per inch (minimum)		Breaking strength pounds (minimum)		Weave
		Warp	Filling	(min)	(max)	Warp	Filling	Warp	Filling	
I	Combed	2	2	7.9	8.6	116	56	180	120	$\frac{3}{1}$ Twill 1 to right
II	Combed	2	1	7.9	8.6	116	56	180	110	$\frac{3}{1}$ Twill 1 to right
III	Combed	1	1	7.7	8.4	112	54	160	110	$\frac{3}{1}$ Twill 1 to left
IV	Combed	1	1	7.2	7.9	100	54	160	110	$\frac{3}{1}$ Twill 1 to left
V	Carded	1	1	7.2	7.9	100	54	150	100	$\frac{3}{1}$ Twill 1 to left
VI	Carded	1	1	8.2	8.6	112	56	170	80	$\frac{3}{1}$ Twill 1 to left

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3.3 Color.

3.3.1 Dyed cloth. The color of the dyed cloth shall be as specified (see 6.2) and shall match the available standard sample. The use of dyes or substances containing elementary sulfur or compounds capable of oxidation to sulfuric acid is prohibited. The dyed and finished cloth shall contain no more labile sulfur than that shown by the standard sample when tested as specified in 4.4. When a standard sample is not 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.

3.3.2 White cloth. When white is specified, the cloth shall be bleached white to match the standard sample (see 6.3). The cloth shall be fully bleached and may be supplemented with fluorescent optical brightener with a resulting peak emission in the blue violet. The white finished cloth shall not discolor to a degree greater than that shown by the standard sample when tested as specified in 4.4. When no standard sample is available the discoloration shall be no worse than the rating of "fair" when tested as specified in 4.4.

3.3.3 Matching. When a standard sample is established, the color shall match the standard sample under natural (north sky) daylight or 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.

3.3.4 Colorfastness.

3.3.4.1 Dyed cloth. The dyed cloth shall show colorfastness to laundering (after 3 cycles), perspiration, crocking and light equal to or better than the standard sample (see 6.3). When no standard sample is established, or is not referenced for colorfastness, the dyed cloth, unless otherwise specified (see 6.2) shall show "good" colorfastness to laundering (after 3 cycles), perspiration, light and no more crocking than Munsell Value 8.5 when tested as specified in 4.4.

3.4 Physical requirements. The finished cloth shall conform to the requirements shown in table I when tested as specified in 4.4.

3.4.1 Width. The minimum width of the finished cloth, inclusive of selvages, shall be as specified (see 6.2).

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3.5 Finish. The *cloth* shall be closely singed, desized, and mercerized, When *white* is specified, the cloth shall be closely singed, desized, mercerized and bleached. The weave shall be uniform, clear and prominent.

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

3.6 pH. The pH value of the water extract of dyed and finished cloth shall be not lower than 5.5 or higher than 8.5 when tested as specified in 4.4.

3.7 Shrinkage. The cloth shall be preshrunk so that the residual shrinkage shall be not more than 1.0 percent in either the warp or filling direction of the cloth when tested as specified in 4.4. The preshrinking process used shall not be identified on the cloth, the ticket, or on the package.

3.8 Seam efficiency. The finished cloth for all types shall have a seam efficiency of not less than 80 percent when tested as specified in 4.4.

3.9 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous lengths each not less than 40 yards. The cloth shall be put up in flat folds as specified in PPP-F-1134.

3.10 Fiber identification. Each piece of cloth shall be labeled, ticketed, or invoiced for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act (see 2.1).

3.11 Face marking. The face side of the cloth shall be identified by applying a stamping on that side of the cloth with the word "Face" at each end of the piece.

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.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 that supplies and services conform to prescribed requirements.

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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 Inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

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

4.2.2 Examination of the end item. Examination of the end item shall be in accordance with 4.2.2.1 through 4.2.5.

4.2.2.1 Yard-by-yard examination. Each piece in the sample shall be examined on the face side only. When the total yardage in the piece does not exceed 100 yards, the entire yardage in the piece shall be examined. When the total yardage in the piece exceeds 100 yards, only 100 yards shall be examined. All defects as defined in section 1 of Fed. Std. No. 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 except that only those slubs and knots which exceed the limits shown in figure 1 of Fed. Std. No. 4 shall be scored. No linear yard shall be penalized more than 4 points. The sample size shall be 20 pieces selected from 20 containers. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds the following point values:

25.0 points for dyed cloth.
30.0 points for white cloth.

The lot shall be unacceptable if the points per 100 square yards of two or more individual pieces exceed the following value:

38.0 points for dyed cloth.
45.0 points for white cloth.

If one piece exceeds the point level, a second sample of 20 pieces shall be selected for individual piece quality examination only. The lot shall be unacceptable if one or more pieces in the second sample exceeds the point level. Point computation for lot quality and individual piece quality shall be as follows:

$\frac{\text{Total points scored in sample size} \times 3600}{\text{Contracted width of cloth (inch—)} \times \text{total yards inspected}}$	= Points per 100 square yards.
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4.2.2.1.1 Demerit points. Demerit points shall be assigned as follows:

For defects 3 inches or less 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:

Baggy, ridgy, or wavy cloth.
Overall uncleanness.
Width less than specified.
Poor dye penetration, mottled, streaky or cloudy.

4.2.3 Examination for length.

4.2.3.1 Individual pieces. During the yard-by-yard examination, each piece in the sample shall be examined for length. Any length found to be less than the minimum specified or more than two 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 pieces in the sample are defective in respect to length.

4.2.3.2 Total yardage in sample. The lot shall be unacceptable if the total of the actual lengths of pieces in the sample is less than the total of the lengths marked on the tickets.

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

4.2.5 Examination for face markings, identification of preshrinkage process and compliance with the Rules and Regulations Under the Textile Fiber Products Identification Act. During the yard-by-yard examination,

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each piece in the sample shall be examined for defects listed below. The lot shall be unacceptable if two or more of the following defects are present in the sample:

Face stamping missing from either or both ends.
 Face stamping on wrong side.
 Preshrinkage process identified by name or trademark on cloth or ticket.
 Not labeled, ticketed or invoiced in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

4.3 Examination of preparation for delivery requirements. An examination shall be made in accordance with the provisions of PPP-P-1134 to determine whether packaging, packing, and marking complies with section 5 requirements.

4.4 Testing of the end item. The methods of testing specified in Fed. Std. No. 191, wherever applicable, and as listed in table II shall be followed. The physical and chemical values specified in section 3 apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test method. The sample unit shall be 5 continuous yards, full width of the finished cloth. The sample size (number of sample units), shall be as shown in the list below. 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 requirements specified. All test reports shall contain the individual value utilized in expressing the final results.

<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 II. Test methods

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Cotton identification	3.2.1 and 3.4	1200 <u>1/</u>
Combed cotton (types I, II, III and IV)	3.2.1 and 3.4	<u>1/</u>
Carded cotton (types V and VI)	3.2.1 and 3.4	<u>1/</u>

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TABLE II. Test methods (cont'd)

Characteristic	Requirement paragraph	Test method
Yarn ply	3.2.1 and 3.4	Visual 2/
Labile sulfur	3.3	2020
Discoloration (bleached)	3.3.2	5660 <u>2/</u> <u>3/</u>
Colorfastness to:		
Laundring (after 3 cycles)	3.3.4.1	5610 <u>6/</u> <u>7/</u>
Perspiration	3.3.4.1	5680
Light.	3.3.4.1	5660 <u>4/</u>
Crocking	3.3.4.1	5651
Weight	3.4	5041
Yarns per inch:		
Warp	3.4	5050
Filling	3.4	5050
Breaking strength:		
Warp	3.4	5100
Filling	3.4	5100
Weave	3.4	Visual 2/
Singed:	3.5	<u>1/</u>
Identification of mercerization	3.5	Microscopic examination for swelling of cotton fiber <u>1/</u> <u>2/</u>
Nonfibrous material content	3.5.1	2611

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TABLE II.- Test methods (cont'd)

Characteristic	Requirement paragraph	Test method
Shrinkage in laundering:		
Warp	3.7	5550
Filling	3.7	5550
Seam efficiency	3.8	5110 <u>5/</u>
pH	3.6	2811

- 1/ Unless otherwise specified, a certificate of compliance is required and will be acceptable for the requirements specified.
- 2/ One determination shall be made from each sample unit and the result reported as "pass" or "fail".
- 3/ Method 5660 shall be used, except that exposure of specimen and standard sample shall be for 20 standard fading hours. Any specimen showing discoloration less than or equal to that of the standard sample shall be rated "pass". Any specimen showing discoloration greater than that of the standard sample shall be rated "fail". When no standard sample is available, the discoloration of the specimen shall be considered satisfactory if it is not worse than the rating of "fair" indicated in method 5660.
- 4/ When no standard sample is available, the time of exposure shall be 40 standard fading hours.
- 5/ The thread shall conform to type IA1 of V-T-276. The needle size shall be 0.049 ± 0.001 inch, and the (needle) thread shall be ticket No. 24, 3 ply, and the bottom (looper) thread shall be ticket No. 60, 3 ply.
- 6/ The specimens must be dried after each of the 3 laundering cycles.
- 7/ On the color transfer cloth evaluation, only the stain on the cotton fiber of the color transfer cloth shall be evaluated.

5. PREPARATION FOR DELIVERY

5.1 Put-up and packaging. Put-up and packaging shall be level A, or C as specified (see 6.2).

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5.1.1 Levels A and C. The cloth shall be put up and 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).

5.2.1 Levels A, B, and C. Cloth of one type only 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 clothing and equipage items.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type required (see 1.2).
- (c) Color required (see 3.3).
- (d) Colorfastness requirements, if other than specified (see 3.3.4.1).
- (e) Width required (see 3.4.1).
- (f) Minimum length, if other than specified (see 3.9).
- (g) Selection of applicable levels of put-up packaging and packing (see 5.1 and 5.2).

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

6.4 Dyestuff formulation. A suggested mandatory dyestuff formulation for the following shade standards:

Khaki No. 1

Vat Green 8, CI 71050
 Vat Black 27, CI 69005
 Vat Brown GL (No color index)

Army Green 159

Vat Black 25, CI 69525
 Vat Green 3, CI 69500
 Vat Blue 20, CI 59800

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6.5 Level B. Level B packaging and packing should be used by ordering agencies only when shipment is known to be made to a holding supply depot or warehouse from which partial shipments will be made to ultimate consumers.

Custodians:

Army - GL
Navy - SA
Air Force - 82

Preparing activity:

Amy - GL

Civil Agency Coordinating Activities:**Review activity:**

Army - MD

GSA-FSS

USDA-AFS

User activity:

Navy - MC

★U. S. GOVERNMENT PRINTING OFFICE : 1972 O - 482-197 (3428)

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 15 cents each.

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: 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.

SPECIFICATION

Cloth, Twill, Uniform Cotton

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ORGANIZATION

CITY AND STATE

CONTACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES☐ NO (If "yes", in what way?)

REMARKS (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)

SUBMITTED BY (Printed or typed name and activity - Optional)

DATE

DD FORM 1426
1 JAN 66

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

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