29 September 1972
SUPERSEDING
MIL-C-557F
18 November 1966

MILITARY SPECIFICATION

CLOTH, WIND RESISTANT SATEEN, 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 two types of wind resistant sateen cotton cloth with a Quarpel type water repellent treatment (see 6.5).

1.2 Classification.- The cloth shall be of the following types and as specified (see 6.2):

Type I - 9-ounce
Type II - 7-ounce

2. APPLICABLE DOCUMENTS

* 2.1 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

V-T-276	-	Thread, Cotton
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

FSC 8305

MILITARY

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

PUBLICATIONS

Rules and Regulations Under the Textile Fiber Products Identification Act

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

(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.)

3. REQUIREMENTS

3.1 Standard sample.- The dyed and 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 Material.-

3.2.1 Yarn.- The yarn shall be made from cotton which has been carded, combed, drawn and spun into single or plied yarn as specified in table I.

3.3 Color.- The color shall be as specified (see 6.2 and 6.4) and shall match the standard sample.

* 3.3.1 Labile sulfur.- The use of dyes and compounds containing elementary sulfur capable of oxidation to sulfuric acid is prohibited. The dyestuff shall be chosen and applied so that the dyed cloth shall contain no more labile sulfur than shown by the standard sample when tested as specified in 4.4. When a standard sample is not available, the dyed 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 Matching.- The color of the dyed and finished cloth 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. Unless

otherwise specified, the color matching of type I shall be accomplished by using the filling effect side of the cloth as the face. For type II, the warp effect side of the cloth shall be used for color matching.

* 3.3.3 Colorfastness.- The dyed and finished cloth shall show fastness to laundering (after 3 cycles), perspiration, crocking and light equal to or better than the standard sample when tested as specified in 4.4. When no standard sample is established, the finished cloth shall show "good" fastness to laundering (after 3 cycles), perspiration, crocking and light, when tested as specified in 4.4. For Navy shade 3307, crocking shall be not less than 7.5 Munsell value when tested as specified in 4.4.

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

TABLE I.- Physical requirements

Type	Yarn ply		Weight per sq. yard (min.)	Yarns per in. (min.)		Breaking strength (min.)		Tearing strength (min.)	
	Warp	Filling	Ounces	Warp	Filling	Warp Pounds	Filling Pounds	Warp Pounds	Filling Pounds
I	2	2	9.0	112	68	150	125	-	-
II	2	1	7.0	120	88	130	105	4.5	5.5

3.4.1 Weave.- The weave for both types shall be a 5-harness sateen. The weave for type I cloth (filling face) shall be as shown on figure 1. The weave for type II cloth (warp face) shall be as shown on figure 2.

3.4.1.1 Face marking.- The filling face side of the type I cloth and the warp face side of the type II cloth shall be stamped with an ink marking to identify the face of the cloth. Each end of the cloth shall be stamped with the ink marking.

* 3.4.2 Width.- The width shall be as specified (see 6.2) and shall be the minimum width inclusive of selvages.

* 3.5 Finish.- The cloth shall be singed, desized, mercerized and dyed. The cloth shall be given a water repellent treatment (see 3.7). Type I cloth shall be finished with the filling effect side as the face. Type II cloth shall be finished with the warp effect side as the face.

* 3.5.1 pH.- The pH value of the water extract of the dyed and finished cloth shall be no lower than 6.5 nor higher than 8.5 when tested as specified in 4.4.

* 3.5.2 Nonfibrous materials.- Prior to application of the water repellent treatment, the starch and protein content including chloroform-and-water-soluble material shall not exceed 2.0 percent when tested as specified in 4.4.

* 3.6 Dimensional stability.- The dyed and finished type I cloth shall not shrink nor elongate more than 1.0 percent in either the warp or filling directions. The dyed and finished type II cloth shall not shrink nor elongate more than 2.0 percent in either the warp or filling directions. Testing shall be as specified in 4.4.

3.7 Water repellency and air permeability.- The cloth shall be given an approved Quarpel-type (see 6.5) water repellent treatment and shall conform to the water repellency and air permeability requirements of table II and 3.7.1 when tested as specified in 4.4. The use of materials other than approved water repellents and sodium acetate buffer (and acetic acid) is prohibited.

TABLE II.- Water repellency and air permeability requirements

Type	Hydrostatic pressure (cm.)		Dynamic absorption		Air permeability cu ft/ min/sq ft
	Min. average	Min. 1/	Max. (percent) average	Max. (percent) 2/	Max. average
Initial					
I	35	30	25	30	
II	30	25	25	30	
After 3 launderings					
I	30	25			5.5
II	20	15			8.0
After 15 launderings					
I			25	30	
II			45	50	

1/ No single determination shall fall below the specified minimum.

2/ No single determination shall exceed the specified maximum.

3.7.1 Resistance to organic liquid.- The finished cloth shall show no wetting by n-tetradecane either initially or after 15 launderings when tested as specified in 4.4.1.

3.7.2 Spray rating.- The measurements of the three individual determinations on the sample unit for spray rating shall be equal to or better than the following: 90, 90, 80.

3.8 Seam efficiency.- The cloth 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 pieces, each not less than 40 yards in length and shall be put up in rolls as specified in PPP-P-1134.

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

3.11 Workmanship.- The finished cloth shall conform to the quality and grade of product established by this specification. The demerit points per 100 square yards 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 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 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 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 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 4.2.4.

* 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 I 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 except that only those slubs and knots which exceed the maximum acceptable limits shown for each in figure 1 of FED-STD-4 shall be scored. No linear yard from any one roll within the sample shall be penalized more than 4 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 for individual roll quality examination. 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:

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

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

For defects 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
Width less than specified
Not finished on the side specified
Poor dye penetration, mottled, streaky or cloudy

4.2.2.2 Examination for length.-

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 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 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.

4.2.2.3 Examination for shade.- During the yard-by-yard examination, each roll in the sample shall be examined for shade. Any roll 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.

4.2.4 Examination for face marking, identification of preshrinkage process and compliance with Textile Fiber Products Identification Act.- During the yard-by-yard examination, each roll in the sample shall be examined for the defects listed below. The lot shall be unacceptable if two or more of the following defects are present:

Ink stamping identifying face of fabric missing from either or both ends
Preshrinkage process identified by name or trademark on cloth or ticket
Fiber content not identified in accordance with 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 that the packaging, packing and marking complies with the section 5 requirements

4.4 Testing of the end item.- The methods of testing specified in FED-STD-19 wherever applicable, and as listed in table IV shall be followed. The physical and chemical values specified in section 3, except as specified herein, apply

to the results of the determinations made on the sample unit for test purposes, as specified in the applicable test method. For hydrostatic resistance and dynamic absorption, the requirements for individual determination (see table II) shall also apply. For air permeability the requirement shall apply only to the lot average (average of all sample units within the lot). The sample unit shall be 1/4-yard full width of the dyed cloth (prior to application of the water repellent treatment) for determinations of non-fibrous material content, and 5 continuous yards full width of the finished cloth for all physical and other chemical tests. 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 or if the lot average of the air permeability tests does not meet the specified requirements. The sample size (number of sample units) shall be in accordance with table III. Individual values utilized in obtaining averages shall be reported.

TABLE III.- Test sample sizes

Lot size	Sample size
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

TABLE IV.- Tests

Characteristics	Requirement paragraph	Test method
Material identification	3.2.1	1200 1/
Yarn ply	3.2.1	Visual 2/
Weave	3.4.1	Visual 2/
Weight	3.4	5041
Yarns per inch:		
Warp	3.4	5050
Filling	3.4	5050

TABLE IV.- Tests (cont'd)

Characteristics	Requirement paragraph	Test method
Breaking strength		
Warp	3.4	5100
Filling	3.4	5100
Tearing strength		
Warp	3.4	5132
Filling	3.4	5132
Presence of labile sulfur	3.3.1	2020
Colorfastness to:		
Laundering (after 3 cycles)	3.3.2	5610 6/ 7/
Perspiration	3.3.2	5680
Crocking	3.3.2	5651
Light	3.3.2	5660
Nonfibrous material content		
Before treatment	3.5.1	2611
Singeing	3.5	1/
Mercerization	3.5	Microscopic examination 1/ 2/
pH	3.5.1	2811
Dimensional stability		
Warp	3.6	5550
Filling	3.6	5550
Water repellency:		
Spray rating	3.7.2	5526
Water repellents	3.7	3/
Resistance to organic liquid:		
Initial	3.7.1	4.4.1
After 15 launderings (Cotton method)	3.7.1	4.4.1 4/

TABLE IV.- Tests (cont'd)

Characteristics	Requirement paragraph	Test method
Hydrostatic pressure:		
Initial	3.7	5514
After 3 launderings	3.7	5514, 5556
Dynamic absorption:		
Initial	3.7	5500
After 15 launderings	3.7	5556, 5500
Air permeability:		
After 3 launderings	3.7	5450, 5556
Seam efficiency	3.8	5110 5/

1/ 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 reported as "pass" or "fail".

3/ The supplier shall report the water repellents used, and certify that no other material (except the specified buffer and acetic acid) has been added.

4/ Specimens shall be subjected to 15 complete cycles (wash and dry) prior to determinations or resistance to organic liquid after laundering.

5/ The needle shall measure 0.049 ± 0.001 inch across the blade at the eye. The thread shall be 24 3-ply for the needle and 50 3-ply for the looper conforming to type IA1 of V-T-276.

6/ The specimens must be dried after each of the 3 laundering cycles.

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

* 4.4.1 Test for resistance to organic liquid.- Place a small specimen of the cloth on a smooth horizontal surface, face up. Using a pipette or eye dropper, gently deposit one drop of n-tetradecane on the surface of the specimen. After one minute examine the specimen under light at an angle.

Absence of light reflectance at the fabric-drop interface shall be taken as evidence of wetting. Three specimens (or areas) taken at various locations across the sample shall be tested. Evidence of wetting on one or more specimens shall be considered cause for rejection of the lot represented by the sample.

* 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).

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.- 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 requirements of PPP-P-1134.

6. NOTES

6.1 Intended use.- The cloth covered by this specification is intended for use in clothing where a high degree of wind resistance and water resistance is of prime importance.

6.2 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type of cloth required (see 1.2).
(c) Color of cloth required (see 3.3).
(d) Width of cloth required (see 3.4.2).
(e) When length of piece is other than specified (see 3.9).
(f) Selection of applicable levels of put-up, packaging and packing (see 5.1 and 5.2).

6.2.1 In the preparation of contracts or orders, it should be noted that various options, choices or alternatives, as indicated in PPP-P-1134, may be exercised in the preparation for delivery of cloth.

6.3 For access to standard sample address the procuring office issuing the invitation for bids.

6.4 Dyestuff formulation, Olive Green 107.- A suggested but not mandatory dyestuff formulation for Olive Green 107 is as follows:

Vat Black 25, CI 69525
Vat Green 3, CI 69500/1
or
Vat Green 8, CI 71050

Shaded with either or both of the following:

Vat Brown 3, CI 69015/6
Vat Yellow of suitable fastness

The redness of shade should result from the predominant use of the main colors and not from the shading colors.

6.5 Quarpel water repellent.- The "Quarpel type" water repellent treatment consists of the coapplication of an emulsified fluorocarbon and a buffered quaternary ammonium salt type of repellent. Approval of such components and combinations is the responsibility of the U. S. Army Natick Laboratories, Natick, Mass. and is based on more extensive tests, including those for toxicity, which are not set forth in this specification. Because of the time necessary to conduct full evaluation, only those chemical treatments already approved and so listed in the invitation for bids or request for proposal shall be considered.

6.6 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 suppliers 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 - 82

Preparing activity:

Army - GL

Project No. 8305-0880

Review activities:

Army - MD
Navy - MS

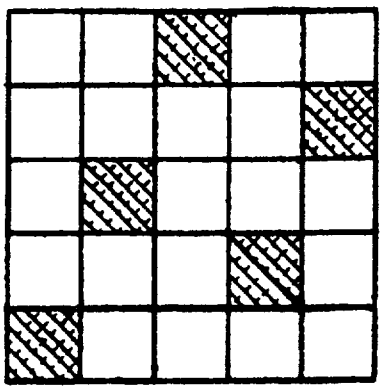

FIGURE 1

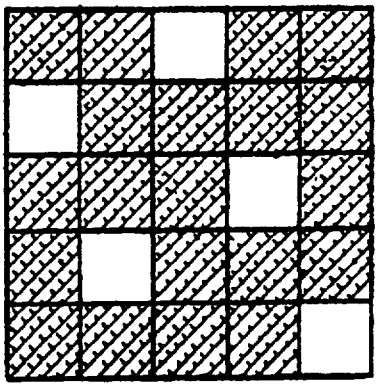

FIGURE 2. *Weave construction*

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, Wind Resistant Sateen, Cotton MIL-C-557G

ORGANIZATION

CITY AND STATE

CONTRACT 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?)*

4. 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 1 JAN 66 1426 REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED

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