MIL-C-43842B
17 December 1986
SUPERSEDING
MIL-C-43842A
17 March 1982

MILITARY SPECIFICATION

CLOTH, OXFORD, ARAMID

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

1. SCOPE

1.1 Scope. This document covers an aramid oxford cloth.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

V-T-285	-	Thread, Polyester
PPP-P-1133	-	Packaging of Synthetic Fiber Fabrics

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: US Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8305

STANDARDS

FEDERAL

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

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

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

Rules and Regulations Under the Textile Fiber Products Identification Act

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained for the Federal agency responsible for issuance thereof.)

2.2 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. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard sample. The dyed and 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 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2, and 6.7).

3.3 Materials (see 6.8).

3.3.1 Fiber. The fiber shall be an approved aramid (see 6.10), 1.5 to 2 denier per filament, cut to a staple length of 1-1/2 to 2 inches. The fiber shall not char at a temperature less than 675°F. The use of fiber other than the approved is prohibited.

3.3.2 Yarn. The yarn shall be spun into singles for both the warp and filling (see 6.4).

3.4 Color. The color of the cloth shall be Olive Green 106, Sage Green 1565, or other color as specified (see 6.2) and shall match the standard sample. The color shall be obtained by the use of melt spun solution-dyed fibers.

3.4.1 Matching. The color and appearance of the dyed and finished cloth shall match the standard sample when viewed under filtered tungsten lamps which approximate artificial daylight having a correlated color temperature of 7500 ± 200 K, with illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2300 ± 200 K.

3.4.2 Colorfastness. The dyed and finished cloth shall show fastness to light and to laundering equal to or better than the standard sample when tested as specified in 4.4.3.

3.5 Physical requirements. The physical requirements of the finished cloth shall be as specified in table I when tested as specified in 4.4.3.

*TABLE I. Physical requirements

Characteristics	Requirements
Weight per sq. yd. (ounces)	5.6 to 6.0
Yarns per inch (minimum):	
Warp	124
Filling	46
Breaking strength (lbs.) (minimum):	
Warp	300
Filling	100
Flame resistance:	
Flaming time, seconds (maximum):	
Warp	2.0
Filling	2.0
Glow time, seconds (maximum):	
Warp	25.0
Filling	25.0
Char length, inches (maximum), average:	
Warp	3.5
Filling	3.5
Air Permeability (maximum) (cu. ft./min/sq. ft.):	
Initial	15.0
After 15 launderings	20.0

3.5.1 Weave. The weave shall be oxford (two ends weaving as one in the warp and a single pick in a shed).

3.5.2 Width. The width shall be as specified (see 6.2) and shall be the minimum acceptable width inclusive of selvages. When fly shuttle looms or shuttleless looms are used, the width measurement shall be between the last warp yarn on each side excluding the protruding fringe(s).

3.5.3 Fabric break open. The flame from a meker burner shall not pass from the flame contact side to the other side of the fabric due to the fabric breaking open when tested as specified in 4.4.3.

3.6 Finishing. The cloth shall be desized, scoured, calendered on the back side, heat set (see 6.6), and given an approved durable antistatic finish.

3.6.1 Antistatic finish. The cloth shall be given an approved durable antistatic finish (see 6.5), so that the maximum surface resistivity before laundering shall be 4.5×10^{10} ohms per square and the maximum resistivity after five launderings shall be 5.0×10^{11} ohms per square when tested as specified in 4.4.3. Only those chemical treatments already approved and so listed in the invitation for bids or request for proposal shall be considered acceptable for the related procurement.

3.6.2 Nonfibrous material. Prior to the application of the finish, the cloth shall contain no more than 1.0 percent starch and protein including chloroform-soluble and water-soluble material when tested as specified in 4.4.3.

3.6.3 Curling. The finished cloth shall lie flat, without distortion, and show no evidence of curling when tested as specified in 4.4.3.

3.7 pH. The pH value of the water extract of the finished cloth shall be not less than 5.0 nor more than 8.0 when tested as specified in 4.4.3.

3.8 Dimensional stability. The cloth shall not shrink more than 4.0 percent in the direction of the warp nor more than 2.0 in the direction of the filling, after 15 launderings when tested as specified in 4.4.3.

3.9 Seam efficiency. The finished cloth shall have a seam efficiency of not less than 80 percent when tested as specified in 4.4.3.

3.10 Length and put-up. Unless otherwise specified (see 6.2), the finished cloth shall be furnished in continuous lengths each not less than 40 yards. Each length shall be put-up in full width rolls as specified in 5.1.

3.11 Face identification. 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 roll.

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

* 3.13 Workmanship. The finished cloth shall conform to the quality 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 set forth in this document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Certificate of compliance. When 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:

a. First article inspection (see 4.3).
b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for appearance, color, and finish defects and shall be tested for the characteristics specified in table II. The presence of any defect or failure of any test shall be cause of rejection of the first article.

4.4 Quality conformance inspection.

4.4.1 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.

4.4.2 End item examination.

4.4.2.1 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 4.4.2.1.1 except as follows:

a. Only coarse yarns that exceed twice the normal yarn diameter shall be scored.

b. Mixed filling (shade bar) shall be scored only when resulting from wrong ply, variation of twist in the yarn, or off shade yarn.

c. Only knots and slubs which exceed limits shown on Sears Fabric Defect Scales (see 6.9) F or 2 as applicable for slubs and D for knots shall be scored.

No linear yard (increment 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 50 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 75 points. If one roll exceeds 75 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 75 points per 100 square yards. Point computation for lot quality and individual roll quality shall be as follows:

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

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

For defects 3 inches or less	- 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
Uneven weaving

4.4.2.2 Length examination. 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 with respect to length or if the total of the actual lengths of rolls in the sample is less than the total of the lengths marked on the tickets.

4.4.2.3 Shade and appearance examination. During the yard-by-yard examination, the cloth of each roll in the sample shall be examined for shade and appearance. Two or more rolls in the sample off shade or shaded side to side, side to center, or end to end, or any roll that does not have the same appearance as the standard sample shall be cause for rejection of the entire lot represented by the sample.

4.4.2.4 Roll identification examination. 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 rolls in the sample contain one or more of the following defects:

Face identification missing from either or both ends
Face identification on wrong side
Not labeled or ticketed in accordance with the Rules and Regulations Under the Textile Fiber Products Indentification Act

4.4.3 End item testing. The cloth shall be tested for the applicable characteristics indicated 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 the 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, 1/4 yard full width of the cloth prior to the application of the finish for determination of nonfibrous materials, and 1/2 yard of the finished cloth carefully wrapped on a tube for the air permeability test. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified. The sample size shall be in accordance with the following:

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

TABLE II. End item tests

Characteristic	Requirement paragraph	Test method
Aramid		
Identification	3.3.1	1/
No charring	3.3.1	1/
Staple		
Denier	3.3.1	1/
Length	3.3.1	Visual 1/
Yarn	3.3.2	Visual 1/
Colorfastness to:		
Light	3.4.2	5660 2/
Laundering	3.4.2	5610
Weight	3.5	5041
Yarns per inch	3.5	5050
Breaking strength	3.5	5100
Flame resistance	3.5	5903
Air permeability:		
Initial	3.5	5450
After 15 launderings	3.5	5450 3/
Weave	3.5.1	Visual 4/
Fabric break open	3.5.3	4.5.1 4/
Desized	3.6	1/
Scoured	3.6	1/
Antistatic finish:		
Resistivity before laundering	3.6.1	5930 5/
Resistivity after five launderings	3.6.1	5556, 5930 5/ 6/

TABLE II. End item tests (cont'd)

Characteristic	Requirement paragraph	Test method
Nonfibrous material	3.6.2	2611
Curling	3.6.3	4.5.2
pH	3.7	2811
Dimensional stability after 15 launderings	3.8	5556 6/
Seam efficiency	3.9	5110 7/

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

2/ Except that the specimen shall be compared with the standard sample after 6 standard fading hours and evaluated.

3/ The sample used for the dimensional stability determination may be used for testing air permeability after 15 launderings.

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

5/ When the apparatus incorporates concentric ring electrodes, three specimens shall be tested. When the apparatus incorporates parallel plate electrodes, six specimens shall be tested, three each in the warp and filling directions. Both surfaces of each specimen shall be tested. The average results for each specimen shall be recorded and the average of the results from all specimens shall be reported.

6/ Cotton laundering procedures.

7/ The needle shall measure 0.049 inch (plus or minus 0.001) across the blade at the eye. The thread for the needle shall be size E, type I, class 1, subclass A or B and the thread for the looper shall be size B, type I, class 1, subclass A or B of V-T-285.

4.4.4 Packaging inspection. The inspection shall be made in accordance with the quality assurance provisions of PPP-P-1133.

4.5 Methods of inspection.

4.5.1 Fabric break open test. One specimen of cloth, 7 by 7 inches, shall be cut. The specimen shall be rigidly held in a horizontal position between two metal plates with a 6-inch diameter fabric exposure. The specimen shall be positioned 2 inches above the top of a meker burner. The center of one side of the specimen shall be exposed for 30 seconds at a 90 degree angle to a flame from the burner. Natural gas at a flow rate of 2 liters per minute shall be used.

4.5.2 Curling. Two specimens of cloth, 1-1/2 inches wide by 6 inches long shall be cut, one having the long dimension parallel to the warp and the other with the long dimension parallel to the filling. Both specimens shall be placed on a flat surface for at least 5 minutes and then visually examined for evidence of curling.

5. PACKAGING

5.1 Put-up and packaging. Put-up and packaging 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 packed 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 PPP-P-1133.

6. NOTES

6.1 Intended use. The cloth is intended for use in body armor vests, aircraft seat cushion covers, armored vehicle crewmen's cold weather coveralls, and aircrewman flying jackets.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this document.
b. When a first article is required (see 3.2, 4.3, and 6.7).
c. Color of cloth required (see 3.4).
d. Width of cloth required (see 3.5.2).
e. Length required if other than specified (see 3.10).
f. Selection of applicable levels of put-up, preservation, and packing (see 5.1 and 5.2).

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

6.4 Yarn. Cloth woven with 22/1 yarn has been found to meet the requirements of this document.

6.5 Antistatic finish. The antistatic requirements of this document have been met by the pad dry application of Aston 123, Onyx Chemical Co., 190 Warren St., Jersey City, NJ 07301 and Stanax (not Stanax 1166), Standard Chemical Products, Inc., Hoboken, NJ 07030. Other products considered for this use must have the prior approval of the contracting officer.

6.6 Heat set. A heat setting procedure that has given satisfactory results is as follows:

Autoclave with steam at 30 pounds per square inch (p.s.i.) minimum for at least 40 minutes. The steam shall be drawn through the cloth by the application of a vacuum for a period of 5 minutes in order to adequately saturate the cloth with steam. The steam pressure shall be held at 30 p.s.i. minimum for approximately 20 minutes after which the steam is cut off and a vacuum placed on the material for 5 minutes. The steam shall then be reapplied for the remaining time of the autoclaving period followed by a vacuum for 5 minutes to remove all moisture from the cloth. Care must be taken to avoid the presence of creases in the cloth and any roll deformation since autoclaving will permanently set the cloth.

6.7 First article. When a first article sample is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should include specific instructions in all acquisition instruments regarding arrangements for selection, inspection, and approval of the first article.

6.8 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document (see 3.3).

6.9 Sears defect scales. Sears Fabric Defect Scales are available from Sears, Roebuck and Company, Department 817 (ATTN: BSC 23-29), Sears Tower, Chicago, IL 60684.

6.10 Fiber identification. The requirements of the fabric can be met with "Type 456 or 457" aramid fiber manufactured by E.I. DuPont de Nemours Co., Wilmington, DE. Approval of other fibers is the responsibility of the U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, and is based on more extensive tests, including those for toxicity, which are not set forth in this document.

6.11 Subject term (key word) listing.

Body armor
Cloth oxford
Coveralls, cold weather
Jackets, aircrewmen, flying

6.12 Changes from previous issue. Due to the extensiveness of the changes, asterisks are not used in this revision to identify changes with respect to the previous issue.

Custodians:

Army - GL
Navy - NU
Air Force - 99

Review activities:

Army - MD
Air Force - 82
DLA - CT

User activities:

Navy - AS, MC

Preparing activity:

Army - GL

Project No. 8305-0090

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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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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-C-43842B	Cloth, Oxford, Aramid

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

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)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

NATICK OP-1, Feb 86