INCH-POUND

MIL-C-44103C
23 October 1990
SUPERSEDING
MIL-C-44103B
19 July 1988

MILITARY SPECIFICATION

CLOTH, DUCK, POLYESTER, FIRE, WATER AND WEATHER RESISTANT

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

1. SCOPE

1.1 Scope. This specification covers polyester duck cloth finished or coated to provide fire, water and weather resistance properties.

1.2 Classification. The cloth shall be furnished in the following classes and grades as specified (see 6.2).

Class 1 - Camouflage Green 483
Class 2 - Desert Tan 459
Grade A - With blackout properties (see 3.4.1)
Grade B - Without blackout properties

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issue of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

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

AMSC N/A FSC 8305

SPECIFICATION

FEDERAL

PPP-P-1135 - Packaging of Duck Fabrics (Cotton; Synthetic Fiber; Cotton-Synthetic Fiber Blends)

STANDARDS

FEDERAL

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available from the Federal Trade Commission, Pennsylvania Avenue at Sixth Street, N.W., Washington, DC 20580-0001.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 523 - Specular Gloss
D 1424 - Tear Resistance of Woven Fabrics by the Falling-Pendulum (Elmendorf) Apparatus

(Applications for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Chromatic Transference Scale
Gray Scale for Color Change

AATCC Method 119 - Color Change Due to Flat Abrasion (Frosting): Screen Wire Method
AATCC Method-169 - Weather Resistance of Textiles: Xenon Lamp Exposure

(Application for copies should be addressed to the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709-2215.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3), in accordance with 4.3.

3.2 Standard sample. The 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 6.4).

3.3 Material.

3.3.1 Base cloth. The base cloth shall consist of regular or high tenacity polyester. The cloth shall be plain woven and any fringed selvage shall be removed. The size of the yarn and construction of the cloth shall be so selected that the finished cloth meets the requirements specified in table I.

3.3.2 Finish. The cloth shall be given an approved finish or coating (see 6.5). The finish or coating shall be formulated so that when applied to the base cloth specified in 3.3.1, the finished cloth meets the requirements specified in 3.4 through 3.6.

3 4 Physical requirements. The finished cloth shall conform to the requirements specified in table I when tested as specified in 4.4.3.

TABLE I. Physical requirements

Characteristic	Requirements Minimum	Maximum
Weight, oz/sq. yd.	-	13.5
Breaking strength, pounds:		
Warp	320	-
Filling	250	-
Tearing strength, pounds:		
Warp	11	-
Filling	7	-
Gloss (face side only), percent:		
60 degree specular gloss	-	2.0
85 degree specular gloss	-	2.0
Adhesion of coating, lbs/2-inch width:		
Face side	6.0	-
Back side	6.0	-
Colorfastness to:		
Accelerated weathering	Fair 1/	-
Crocking, scale rating	1.5 1/	-
Hydrostatic resistance:		
Initial	80	-
After weathering	65 2/	-
After cold crack	65 2/	-
Flame resistance:		
After flame, seconds:		
Initial:		
Warp	-	2
Filling	-	2
After weathering:		
Warp	-	2
Filling	-	2
Consumption, percent:		
Initial		
Warp	-	50
Filling	-	50
After weathering:		
Warp	-	50
Filling	-	50
Melt-drip:		
Initial	3/	-
After weathering	3/	-

TABLE I. Physical requirements (cont'd)

Characteristic	Requirements Minimum	Maximum
Stiffness, inch-pound:		
Initial:		
Warp	-	0.020
Filling	-	0.020
At -20°F:		
Warp	-	0.040
Filling	-	0.040
After heat aging:		
Warp	-	0.040
Filling	-	0.040
Abrasion resistance, class 4/	2.5	-

1/ Or equal to or better than the standard sample.

2/ The finish shall not crack or flake.

3/ No specimen shall drop melted or flaming pieces.

4/ Refers to AATCC Method 119 Gray Scale for Color Change class.

3.4.1 Opacity, (grade A). When grade A cloth with blackout properties is specified, the finished cloth shall transmit not more than 0.030 watts per square cm per steradian of combined visible and nonvisible light and not more than 0.020 foot-lamberts of visible light when tested as specified in 4.4.3.

3.5 Width. The width of the cloth shall be as specified (see 6.2) and shall be the minimum width inclusive of the selvage when fly shuttle looms or shuttleless with tuck-in selvage looms are used. For all other shuttleless looms the width measurement shall be made between the last warp yarn on each side excluding the protruding fringe(s).

3.6 Color. The color of the face side of the finished cloth shall be Camouflage Green 483 for class 1 and Desert Tan 459 for class 2. For both classes, the color of the back side of the finished cloth shall be off-white, gray, or black or any other suitable color which will allow the face side of the cloth to be easily distinguished from the back.

3.6.1 Matching. The color and appearance of the face side and the appearance of the back side of the finished cloth shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and

that have a correlated color temperature of 7500 ± 200K, with illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescant lamplight at 2300 ± 200K.

3.6.1.1 Spectral reflectance. When class 1, Camouflage Green 483 is specified, the spectral reflectance factors (in percent) for visible/near infrared wavelength range of 600 to 860 nanometers of the face side of the finished cloth shall meet the requirements specified in table II. When class 2, Desert Tan 459 is specified, the spectral reflectance factors (in percent) for the visible/near infrared wavelength range of 700 to 860 nanometers of the face side of the finished cloth shall meet the requirements specified in table III.

TABLE II. Spectral reflectance (percent) limits for the Class 1 Camouflage Green 483

Wavelengths Nanometers	Reflectance Min	Max	Wavelengths Nanometers	Reflectance Min	Max
600	5	12	740	24	42
620	5	12	760	32	50
640	5	12	780	38	56
660	5	13	800	41	60
680	6	15	820	43	63
700	9	21	840	45	65
720	15	30	860	46	66

TABLE III. Spectral reflectance (percent) limits for Class 2 Desert Tan 459

Wavelengths Nanometers	Reflectance Min	Max
700	45	65
720	45	65
740	45	65
760	45	65
780	45	65
800	45	65
820	45	65
840	45	65
860	45	65

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

3.8 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be in continuous pieces, each not less than 40 yards in length and shall be put-up in rolls in accordance with 5.1.

3.9 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 values.

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 (examinations and tests) 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 specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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

4.1.2 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Classification of inspections. 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 3.1 and 6.2), it shall be examined as specified in 4.4.2 and tested as specified in 4.4.3.

4.4 Quality conformance inspection.

4 4.1 Components and materials 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 specification 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 alternating sides (one roll face side, one roll back side). 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 4.4.2.1.1 with the following exceptions: glossary numbers 1, 2, 3, 5, 14, 26, 27, and 29 shall not be scored unless they exceed three times the thickness of the yarn. Misdraws and reed marks shall be scored if they result in a clearly noticeable separation of warp yarns. Only those slubs and knots which exceed three times the normal yarn size shall be scored. No linear yard (increments 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, except for the first article, shall be 20 rolls. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds 40.0 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 60.0 points. If one roll exceeds 60.0 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 60.0 points per 100 square yards. Point computation for lot quality and individual roll quality shall be as follows:

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

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

For defects 3 inches or less 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:

Hole, cut, or tear
Objectionable odor

Baggy, ridgy, or wavy cloth
Width less than specified or cut raw edge
Edge ravels when pulled outward
Slack or tight selvages 1/
Overall uncleanness
Poorly constructed - not firmly or tightly woven
Overall application of compound not uniform
Tackiness (Cloth shall not block so as to cause surfaces to adhere or cause difficulty in unrolling.)
Color not uniform or is mottled, blotchy, spotted, or streaky
Color not as specified

1/ To determine the presence of unacceptable selvage conditions, the following procedure shall be observed: During the visual examination, the perch shall be stopped a minimum of three times for each roll in the sample, the tension removed, and the finished cloth examined for the selvage conditions. A waviness in the selvage causing significant waviness or ripples within the body of the cloth is an indication of slack or tight selvages.

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 roll ticket shall be considered a length defect. The lot shall be rejected 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 roll tickets.

4.4.2.3 Roll identification examination. During the yard-by-yard examination, each roll in the sample shall be examined for proper identification. The lot shall be unacceptable if two or more rolls in the sample are not labeled or ticketed in accordance with the Textile Fiber Products Identification Act.

4.4.3 End item testing. The cloth shall be tested for the characteristics listed in table IV. The methods of testing specified in FED-STD-191, wherever applicable and as listed in table IV 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 applicable test method. The sample unit shall be 5 continuous yards full width. The sample size shall be as shown below. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified. Unless otherwise specified herein, all physical tests shall be performed under Standard Conditions as specified in FED-STD-191. The test reports shall contain individual values utilized in expressing the final results.

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 IV. End item tests

Characteristic	Requirement paragraph	Test method
Material identification	3.3.1	1/
Weave	3.3.1	Visual 1/
Weight	3.4	5041
Breaking strength	3.4	5100
Tearing strength	3.4	ASTM D 1424
Gloss (face side only)	3.4	ASTM D 523
Adhesion of coating	3.4	5970 2/
Colorfastness to:		
Weathering	3.4	5671 3/ or 4.5.2.2
Crocking	3.4	5651
Hydrostatic resistance:		
Initial	3.4	5514 4/
After weathering	3.4	4.5.2 and 5514 4/ 5/
After cold crack	3.4	5874 6/ and 5514 4/
Flame resistance:		
Initial	3.4	5905
After weathering	3.4	4.5.2 and 5905
Stiffness:		
Initial	3.4	4.5.3
At -20°F	3.4	4.5.4
After heat aging	3.4	4.5.5
Abrasion resistance	3.4	4.5.6
Opacity, (grade A only) (see 6.9):		
Combined visible and non-visible light	3.4.1	5780 7/
Visible light	3.4.1	5781
Spectral reflectance	3.6.1.1	4.5.1

1/ A certificate of compliance shall be submitted and will be acceptable for the required statement.

2/ Three specimens shall be tested by adhering face-to-face and three specimens shall be tested by adhering back-to-back.

3/ Except that filters shall be removed and exposure time shall be 100 hours.

4/ The face side of the finished cloth shall contact the water.

5/ Except that the specimen shall be a minimum of 6 inches in any dimension.

6/ Except that the exposure temperature shall be -20° ± 5°F and the exposure time shall be a minimum of 4 hours. The face side of the specimen shall be toward the outside of the fold.

7/ Except that the photometer shall be capable of measuring light energy over the wavelength range of 360 to 930 nanometers.

4.4.4 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1135.

4.5 Methods of inspection.

4.5.1 Spectral reflectance measurements in the visible/near infrared. Spectral reflectance data for class 1 Camouflage Green 483 and class 2 Desert Tan 459 shall be obtained from 600 to 860 nanometers (nm) and 700 to 860 nm respectively, at 20 nm intervals on a spectrophotometer (see 6.6) relative to a barium sulfate standard, the preferred white reference standard. Other white reference materials may be used, provided they are calibrated to absolute white; e.g., Halon, magnesium oxide, or vitrolite tiles (see 6.7). The spectral bandwidth at 860 nm shall be less than 26 nm. Reflectance measurements shall be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates in the visible spectrum either CIE Source A or CIE Source D65. The specimen shall be measured as a single layer backed with two layers of the same fabric and shade. Readings shall be taken on a minimum of two different areas, and the data averaged. The specimen shall be viewed at an angle no greater than 10° from normal, with the specular component included. Photometric accuracy of the spectrophotometer shall be within 1 percent and wavelength accuracy within 2 nm. The standard aperture size used in the color measuring instrument shall be 1.0 to 1.25 inches in diameter. When the measured reflectance values for any color at four or more wavelengths do not meet the requirements specified in table II or III, it shall be a test failure.

4.5.2 Accelerated weathering procedure. The accelerated weathering procedure shall be as specified in either 4.5.2.1 or 4.5.2.2. The method used shall be reported.

4.5.2.1 Accelerated weathering procedure (carbon arc). The apparatus and procedure shall be in accordance with Method 5804 of FED-STD-191 except that the filters shall be removed and the weathering procedure shall be as follows. Two swatches, each 13 by 22 inches, shall be cut from the sample unit. One swatch shall be cut with the long dimension in the direction of the warp; the other with the long dimension in the direction of the filling. The face side of the cloth shall be exposed to the light source. The swatches shall be exposed one above the other, in the quadrant of the accelereated weathering apparatus for 100 hours. The swatches shall be changed from the top to bottom racks and visa versa each time the carbons are changed (approximately 17 to 20 hours) during a 100-hour exposure period. At the conclusion of the 100-hour exposure period, the swatches shall be removed from the apparatus and allowed to dry and condition at Standard Conditions. Then five specimens for the fire resistance test shall be cut from each exposed swatch such that the direction being tested shall have been exposed to accelerated weathering in the vertical position. In conducting fire resistance tests on these specimens, three specimens shall be subjected to the flame at the end which was at the top of the exposed material, and two shall be subjected to the flame at the end which was at the bottom of the specimen. The lower edges of the fire resistance test specimens shall be trimmed, if necessary, so that a freshly cut end is exposed to the test flame.

4.5.2.2 Accelerated weathering procedure (xenon lamp exposure). The test procedure shall be in accordance with AATCC Method 169 except that the following deviations shall apply:

a. The test apparatus shall be either test chamber type 1A or 1B. Type 1B shall be equipped with a three-tiered inclined specimen rack. The apparatus shall be equipped with an automatic light monitor and shall be capable of automatically controlling irradiance, temperature, and humidity. The apparatus shall be maintained in accordance with the manufacturer's recommendations.

b. The weathering test cycle shall be 40 minutes of light, 20 minutes of light with water spray on the fabric face, 60 minutes of light, 60 minutes of darkness. The test cycle shall be repeated until the total energy exposure is equal to 100 kilojoules per square meter.

c. The irradiance level shall be 0.55 $\pm$ 0.01 watt/square meter/nanometer ($W/m^2/nm$) bandpass at 340 nanometers.

d. The glass filter combination shall be a quartz inner filter and a borosilicate type "S" outer filter.

e. The relative humidity shall be 50 $\pm$ 5 percent during the light cycle and not lower than 95 percent during the dark cycle.

f The control set points shall be as follows:

	Dark cycle	Light cycle
Black panel	38°C	77°C
Conditioning water	40°C	53°C
Wet bulb depression 1/	0°C	10°C

1/ As a guide only; adjust to achieve required relative humidity (see e. above).

g. The test specimens shall fit the specimen rack of the apparatus with no wrinkles or gaps. The test specimen shall be mounted on the outside of the rack with the use of appropriate stainless steel spring clips (see 6.8). After the required exposure period, the specimens shall be removed from the apparatus and allowed to dry and condition at Standard Conditions. Then test specimens for each required test shall be cut and tested appropriately.

NOTE: Monitoring of dry bulb temperature, wet bulb depression, irradiance, and black panel temperature is recommended through the use of chart recorders.

4.5.3 Initial stiffness test. The stiffness test shall be in accordance with Method 5202 of FED-STD-191 except that eight specimens, four with the long dimension in the warp direction and four in the filling direction, shall be cut from the sample unit and pressed between two glass plates having dimensions of approximately 8 inches by 8 inches by 1/8 inch. A 20-pound weight shall be placed on the top plate for 4 hours at Standard Conditions prior to determining the stiffness. The load scale reading shall be taken only at a 20-degree angular deflection for each specimen.

4.5.4 Stiffness at low temperature test. Stiffness test specimens shall be cut and conditioned as specified in 4.5.3. The weight shall then be removed. The plate/specimen assembly and the test instrument shall then be subjected to a temperature of minus 20° ± 5°F for not less than 1 hour and then tested at that temperature as specified in Method 5202 of FED-STD-191. The load scale reading shall be taken only at a 20-degree angular deflection for each specimen.

4.5.5 Stiffness after heat aging test. A sample of the material to be tested shall be cut to measure 8 inches by 8 inches. The sample shall be hung vertically in a well ventilated oven at a temperature of 200° ± 5°F for 120 hours. The sample shall not be laid flat in the oven. The sample shall be removed from the oven and placed between glass plates with the dimensions stipulated in 4.5.3. A 20-pound weight shall be placed on the top plate for 4 hours at Standard Conditions. The sample shall then be removed from the glass plates and specimens shall be cut as specified in 4.5.3. Stiffness shall then

be determined as specified in Method 5202 of FED-STD-191. The load scale reading shall be taken only at a 20-degree angular deflection for each specimen.

4.5.6 Abrasion resistance test. Three test specimens shall be abraded on the face side as specified in Method 5302 of FED-STD-191. The abradant shall be the face side of the finished cloth. Each specimen shall be abraded for 1,000 multidirectional cycles. After abrading, the specimens shall be evaluated for color change in accordance with AATCC Method 119, using the Gray Scale for Color Change The class rating shall be averaged and then rounded to the nearest 0.5.

5 PACKAGING

5.1 Put-up and preservation. Put-up and preservation 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-1135.

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-1135.

5.3 Marking. In addition to any special marking required in the contract or purchase order, shipments shall be marked in accordance with the requirements of PPP-P-1135.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Polyester duck, finished for fire, water, and weather resistance, is intended for use in manufacture of tents and tentage related items.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Class and grade of cloth required (see 1.2).
c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
d When first article is required (see 3.1, 4.3, and 6.3).
e. Width of cloth required (see 3.5).
f. Length required, if other than specified (see 3.8).
g. Levels of preservation and packing (see 5.1 and 5.2).

6.3 First article. When a first article 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.

6.4 Sample. For access to standard sample, address the contracting activity issuing the invitation for bids.

6.5 Formula approval. Approval of formulations is the responsibility of the U.S Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 and is based on extensive tests including those for toxicity which are not set forth in this specification. Because of the time required to evaluate and approve new treatments (approximately 6 months), only those chemical treatments already approved will be considered acceptable for the related procurement. Information pertaining to approval of new treatments should be obtained from the U.S. Army Natick Research, Development, and Engineering Center. The list of approved treatments may be obtained from the contracting activity.

6.6 Spectrophotometers. Suitable spectrophotometers for measuring spectral reflectance in the visible/near infrared are the Diano Hardy, Diano Match Scan, Hunter D54P-IR, and Macbeth 1500 with IR option.

6.7 White standard. Barium sulfate of suitable quality for use as a white reference standard is available from the Eastman Kodak Company. The same source has available magnesium reagent (ribbon) and Halon. Suitable tiles can be obtained from the National Bureau of Standards or the instrument manufactaurers.

6.8 Clips. Style 2235-4E stainless steel spring clips have been found appropriate for securing the fabric to the rack and are available from the John F. Maguire Company, Inc., 121 Bacon Street, Pawtucket, RI 02860.

6.9 Opacity testing. When equipment for opacity testing is not available to the contractor, a 1/4 yard full width sample should be cut from each sample unit and forwarded to U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 (ATTN: STRNC-IUC), for opacity testing.

6.10 Subject term (key word) listing.

Blackout
Coated
Tents
Tent flys
Uncoated

6.11 Changes from previous issues. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - GL
Navy - NU
Air Force - 99

Preparing activity:

Army - GL

(Project 8305-0314)

Review activities:

Army - MD
Navy - MC
Air Force 82
DLA - CT

User activity:

Navy - YD

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:	1 DOCUMENT NUMBER	2 DOCUMENT DATE (YYMMDD)
	MIL-C-44103C	1990 October 23

3 DOCUMENT TITLE
CLOTH, DUCK, POLYESTER, FIRE, WATER AND WEATHER RESISTANT

4 NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible Attach extra sheets as needed)*

5 REASON FOR RECOMMENDATION

6 SUBMITTER

a NAME (Last, First, Middle Initial)	b ORGANIZATION	
c ADDRESS (Include Zip Code)	d TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7 DATE SUBMITTED (YYMMDD)

8 PREPARING ACTIVITY

a NAME	b TELEPHONE (Include Area Code) (1) Commercial	(2) AUTOVON
U S Army Natick RD&E Center	508-651-4352	256-4352
c ADDRESS (Include Zip Code) Commander, U S Army Natick RD&E Center ATTN STRNC-IRT Natick, MA 01760-5014	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041 3466 Telephone (703) 756-2340 AUTOVON 289-2340	