

CCC-C-428G  
March 9, 1987  
SUPERSEDING  
CCC-C-428F  
October 28, 1981

## FEDERAL SPECIFICATION

### CLOTH, DUCK, COTTON; FIRE, WATER, WEATHER, AND MILDEW RESISTANT

This specification is 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 fire, water, weather, and mildew resistant cotton duck.

#### 1.2 Classification.

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

Type I	- Cloth finished in Olive Drab 7
Type II	- Cloth finished in deck gray
Class 1	- Regular finish
Class 2	- Dry finish

#### 2. APPLICABLE DOCUMENTS

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. 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

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Federal Specifications:

- |            |                                                                                       |
|------------|---------------------------------------------------------------------------------------|
| CCC-C-419  | - Cloth, Duck, Cotton, Unbleached, Plied-Yarns Army and Numbered                      |
| CCC-C-443  | - Cloth, Duck, Cotton (Single and Plied Filling Yarns, Flat)                          |
| PPP-P-1135 | - Packaging of Duck Fabrics (Cotton; Synthetic Fiber; Cotton-synthetic Fiber Blends). |

Federal Standards:

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

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification and other Federal specifications, standards, and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Standards:

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

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting activity.)

## Federal Regulations:

### 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 from 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. 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 Materials.

3.2.1 Base cloth. The base cloth shall be as specified by the contracting agency and shall conform to CCC-C-419 or CCC-C-443 (see 6.2), except that the nonfibrous material for CCC-C-443 shall be as specified in 3.2.1.1.

3.2.1.1 Nonfibrous material content. The cloth, prior to finishing, shall contain not more than 2.5 percent starch and protein content excluding chloroform-soluble and water-soluble material and not more than 5.0 percent starch and protein content including chloroform-soluble and water-soluble material when tested as specified in 4.2.3.

3.2.2 Greige-cloth weight. Unless otherwise specified, where reference is made to greige-cloth weight, the minimum acceptable greige-cloth weight as given in the applicable greige-cloth specification shall be used.

3.3 Finish. The cloth shall be treated with approved fire, water, weather, and mildew resistant treatments (see 6.7).

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3.4 Finished cloth.

3.4.1 Construction. The number of yarns per inch of the finished cloth shall conform to the requirements of the specification covering the greige cloth specified except that a minus tolerance in the filling yarn will be allowed as listed in table I.

TABLE I. Finished filling yarn per inch tolerance

Designation	Minus tolerance
Flat ducks (requiring desizing)	Up to 10 percent
Army duck	Up to 5 percent
No. 8 and lighter duck	Up to 5 percent
Heavier than No. 8 duck	Up to 3 percent

3.4.1.1 Shuttleless loom. When a cloth is woven on shuttleless looms, the fringed selvages shall be removed from the cloth (not past point of lock-in or into body of cloth).

3.4.2 Finished width. The nominal width of the finished cloth shall be as specified (see 6.2). The minimum acceptable width shall be inclusive of the woven selvage when fly-shuttle looms are used and exclusive of the lock-in selvage when shuttleless looms are used. Raw edges shall not be permitted. The tolerances listed in table II shall apply.

TABLE II. Finished width tolerances

Type of duck	Width (inches)	Tolerance (inches)
Numbered	40 or less	-1/2, +1/4
	Over 40 to 51 inclusive	-1/2, +3/8
	Over 51 to 81 inclusive	-3/4, +1/2
	Over 81	-7/8, +5/8

TABLE II. Finished width tolerances - Continued

Type of duck	Width (inches)	Tolerance (inches)
Army	40 or less	-1/4, +1/2
	Over 40 to 51 inclusive	-1/4, +5/8
	Over 51 to 81 inclusive	-3/8, +3/4
	Over 81	-1/2, +7/8

3.4.3 Breaking strength. The breaking strength of the finished cloth in both warp and filling directions shall be not less than that of the corresponding specification requirements for the greige cloth.

3.4.4 Weight. The weight of the finished cloth shall be the actual weight of the greige cloth plus an allowance due to the treatment based on actual greige-cloth weight, as specified in table III.

TABLE III. Finished cloth weight increase

Weight of greige cloth (ounces per sq yd)	Allowable maximum increase in weight (percent)
12 and over	50
Under 12	65

3.4.5 Color. Unless otherwise specified (see 6.2), the color shall be as specified for the applicable type and shall match the standard sample when furnished by the contracting activity (see 6.3). The color shall be obtained with carbon black or lamp black, inorganic or phthalocyanine pigments, or such other coloring materials.

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3.4.5.1 Colorfastness. When a standard sample is established, the colored and finished cloth shall show fastness to accelerated weathering equal to or better than the standard sample when tested as specified in 4.2.3. When a standard sample is not available or is not referenced as a standard for colorfastness, the colored and finished cloth shall show "fair" colorfastness to accelerated weathering when tested as specified in 4.2.3.

3.4.5.2 Matching. The color 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  $7500 \pm 200$  K, with illumination of  $100 \pm 20$  foot candles, and shall be a good match to the standard sample under incandescent lamplight at  $2300 \pm 200$  K.

### 3.4.6 Crocking.

3.4.6.1 Class 1. Cloths with a regular finish shall show no more crocking on dry white cotton cloth than Munsell value of 5.0 when tested as specified in 4.2.3.

3.4.6.2 Class 2. Cloths with a dry finish for upholstery purposes shall show no more crocking on dry white cotton cloth than Munsell value of 7.0 when tested as specified in 4.2.3.

3.4.7 Flexibility. The finished cloth shall show a bending moment of not more than that specified in table IV when tested as specified in 4.2.3.

TABLE IV. Flexibility

CCC-C-419 cloth designations <u>1/</u>	Initial bending moment (inch-lb), maximum	Bending moment after heating at 200°-205°F (inch-lb), maximum	Bending moment at 0° ± 5°F (inch-lb), maximum
Numbered duck:			
2	0.16	0.400	0.400
4	0.12	0.300	0.300
6	0.08	0.225	0.225
8	0.05	0.125	0.125
10	0.03	0.075	0.075
12	0.02	0.050	0.050

TABLE IV. Flexibility - Continued

CCC-C-419 cloth designations <sup>1/</sup>	Initial bending moment (inch-lb), maximum	Bending moment after heating at 200°-205°F (inch-lb), maximum	Bending moment at 0° ± 5°F (inch-lb), maximum
Army duck:			
8.25	0.013	0.032	0.032
9.85	0.013	0.032	0.032
12.29	0.013	0.032	0.032

<sup>1/</sup> For all other cloths, the flexibility requirements shall be as specified (see 6.2).

3.4.8 Water resistance. The finished cloth shall have a maximum leakage of 50 mL at the height indicated in table V when tested by the water permeability test specified in 4.2.3. The cloth shall conform to the same maximum leakage requirements after the accelerated weathering test specified in 4.2.3. The requirements for resistance to water permeability shall be applicable to all ducks of CCC-C-419 only.

TABLE V. Height for test of water resistance

Untreated weight (oz/sq yd)	Hydrostatic height (inches)	Time of exposure (minutes)
Over 20	20	10
14 through 20	14	10
Under 14	10	10

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3.4.9 Flame resistance. The average time of flaming of the finished cloth shall not exceed 4 seconds when tested as specified in 4.2.3. The average length of char shall not exceed the requirements of table VI. The cloth shall conform to the same fire-resistance requirements after accelerated weathering and also after water leaching, when tested as specified in 4.2.3.

TABLE VI. Average length of char

Untreated weight (oz/sq yd)	Maximum average length of char (inches) of eight specimens
Under 10	4.5
10 through 20	3.5
Over 20	2.0

#### 3.4.10 Mildew resistance.

3.4.10.1 Mildew resistance treatment. The cloth shall be treated with a fungicide. Unless otherwise specified (see 6.2), the fungicide shall be either solubilized copper 8-quinolinolate applied from a solvent base or copper naphthenate combined with copper 8-quinolinolate. If copper 8-quinolinolate is used, the finished cloth shall have a copper content of not less than 0.18 percent and not greater than 0.27 percent. If copper naphthenate combined with copper 8-quinolinolate is used, the finished cloth shall have a total copper content of not less than 0.35 percent and not greater than 1.48 percent and shall have a percent of copper from copper 8-quinolinolate of not less than 0.05 percent and not greater than 0.18 percent. Testing shall be as specified in 4.2.3.

3.4.11 Breaking strength after accelerated weathering. The requirements for breaking strength after accelerated weathering shall be applicable for civil agency procurements only.

3.4.11.1 Army and numbered duck. The breaking strength of the finished cloth after exposure to 100 hours accelerated weathering as specified in 4.2.3 shall conform to the requirements of table VII.



TABLE VII. Breaking strength

Untreated greige weight (ounces per square yard)	Minimum retention of finished cloth breaking strength (percent)
Under 15	60.0
15 and over	75.0

3.4.11.2 Flat ducks. The finished cloth breaking strength for flat ducks from CCC-C-443, after accelerated weathering, shall be not less than 80 percent of the initial finished cloth breaking strength or not less than that specified in the base cloth specification after exposure to 100 hours accelerated weathering, when tested as specified in 4.2.3.

3.5 Fiber identification. Each roll shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act (see 2.1).

3.6 Length and put-up. The cloth shall be put-up on rolls as specified in 5.1. The minimum length of pieces shall be in accordance with the applicable greige cloth specification.

3.7 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.

3.8 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.

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#### 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 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.

4.1.3 Formula approval. Material submitted to the Government when no formula approval has been obtained shall not be accepted.

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.2.1 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.

4.2.2 End item examination.

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, that are clearly noticeable at normal inspection distance (3 feet) shall be scored and assigned demerit

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points as listed in 4.2.2.1.1 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 the warp yarns. Each knot and slub shall be scored as a defect only when it exceeds three times the normal yarn diameter. 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 shall be 20 rolls. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceed 40 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceed 60 points. If one roll exceeds 60 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 exceed 60 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  
 Color not uniform, off shade (not within established tolerance), or shaded end to end, side to side, or side to center  
 Poor dye penetration, mottled, streaky, or cloudy  
 Overall application of compound not uniform  
 Objectionable odor  
 Overall uncleanness  
 Clearly visible crystallization of mildew inhibitors  
 Poorly constructed - not firmly or tightly woven  
 Bias or bowed filling  
 Tackiness (sticky to the touch)  
 Width not within specified tolerance

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4.2.2.2 Examination for length. During the yard-by-yard examination, each roll in the sample shall be examined for put-up and length in accordance with the provisions of the untreated cloth specification.

4.2.2.3 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 of the following defects are present in the sample:

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

4.2.3 End item testing. The cloth shall be tested for the characteristics listed in table IX. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table IX shall be followed. The physical and chemical values specified in section 3 (except where otherwise indicated) apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test methods. The sample unit for testing shall be 1/4 yard of the desized untreated cloth and 5 continuous yards of the finished cloth, all full width of the material. The sample size (number of sample units) shall be in accordance with table VIII except for the mildew resistance testing. The sample unit for testing mildew resistance shall be 1/4 yard of the finished cloth, and the sample size shall be 5 for all lots less than 22,001 units in size and 8 for all lots 22,001 and over units in size. The lot size shall be expressed in units of yards. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified or if the lot average determination for allowable increase in weight due to treatment exceeds requirements. Unless otherwise specified, all physical tests shall be performed under standard conditions as defined in FED-STD-191. The number of determinations per individual sample units and the reporting of results shall be as required by the referenced test method. All test reports shall contain the individual values utilized in expressing the final results.

TABLE VIII. Sample size

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 IX. End item tests

Characteristic	Requirement paragraph	Test method
Nonfibrous material content	3.2.1.1	2611
Yarns per inch	3.4.1	5050 <u>1/</u>
Breaking strength, initial	3.4.3	5100
Finished cloth weight increase	3.4.4	5041 <u>2/</u>
Dye identification	3.4.5	<u>3/</u>
Colorfastness to accelerated weathering	3.4.5.1	5671 <u>4/</u>
Fastness to crocking	3.4.6	5651
Flexibility:		
Initial	3.4.7	4.3.1
After heat aging	3.4.7	4.3.1 and 4.3.1.1

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TABLE IX. End item tests - Continued

Characteristic	Requirement paragraph	Test method
Flexibility: - continued		
At low temperature	3.4.7	4.3.1 and 4.3.1.2
Water resistance:		
Initial	3.4.8	5516 <u>5/</u>
After accelerated weathering	3.4.8	5516 <u>5/</u> 4.3.2 <u>4/</u>
Flame resistance:		
Initial:		
Char length:	3.4.9	5903 <u>6/</u>
Flaming time:	3.4.9	5903 <u>6/</u>
After accelerated weathering:		
Char length:	3.4.9	5903 <u>6/</u> 4.3.2 <u>4/</u>
Flaming time:	3.4.9	5903 <u>6/</u> 4.3.2 <u>4/</u>
After water leaching:		
Char length:	3.4.9	5903 <u>6/</u> 5832 <u>7/</u>
Flaming time:	3.4.9	5903 <u>6/</u> 5832 <u>7/</u>

TABLE IX. End item tests - Continued

Characteristic	Requirement paragraph	Test method
Mildew resistance:		
Total copper analysis	3.4.10.1	2050 or 2051 <u>8/</u>
Fungicide identification and concentration	3.4.10.1	2060 <u>9/</u>
Breaking strength after accelerated weathering	3.4.11.1 and 3.4.11.2	5100 and 4.3.2 <u>10/ 11/</u>

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

2/ All test results on the weight of the basic untreated cloth and finished cloth shall be averaged separately to determine the respective lot average weights. These values shall then be utilized in calculating the percent increase in the finished cloth weight. Results shall be calculated to the nearest 0.1 percent.

3/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.

4/ The time of exposure shall be 100 standard hours.

5/ Finished cloth failing to comply with 3.4.8 shall be retested by immersing specimens in water at a temperature of 75° to 85°F to a depth of 2 inches for 2 hours and tested while still wet. If water resistance requirements are met at this time, the cloth shall be considered as having passed this requirement.

6/ Four specimens from each of the warp and filling directions shall be tested from each sample unit.

7/ Except that the leaching period shall be 24 hours.

8/ Contractors shall indicate on their test reports which fungicides were used.

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- 9/ The contractor shall certify that the required amount of copper as metal from copper 8-quinolinolate has been used in the treatment of the duck. The certificate shall be accompanied by actual test, inspection, or other verifiable quality data.
- 10/ The time of exposure for Army and numbered duck shall be 100 hours and for flat duck shall be 100 hours.
- 11/ All test results shall be averaged and this value shall be utilized in calculating the percent change from the initial treated cloth value. Results shall be calculated to the nearest 0.1 percent.
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4.2.4 Packaging inspection. The packaging inspection shall be made in accordance with the quality assurance provisions of PPP-P-1135.

4.3 Methods of inspection.

4.3.1 Flexibility tests. The tests shall be conducted in accordance with Method 5202 of FED-STD-191 with the following modifications:

- a. Load scale reading - The load scale reading shall be taken at a 20-degree angular deflection of the specimen.
- b. Specimens - Eight specimens, each 1 inch by 2 inches, shall be cut as follows: four with the long dimension in the warp direction and four in the filling direction, and shall be pressed between two 6 by 6-inch glass plates weighted with a 20-pound weight for 4 hours at standard conditions prior to testing.

4.3.1.1 After heat aging. Cut flexibility test specimens from the conditioned specimens as specified in 4.3.1. However, prior to putting them under glass plates and a 20-pound weight, subject the specimens to a temperature between 200° and to 205°F for 120 hours in a well-ventilated oven, and allow them to cool at standard conditions for 16 hours. Place the heat aged and conditioned samples on glass plates under weight for 4 hours prior to testing:

4.3.1.2 At low temperature. Prepare flexibility test specimens as specified in 4.3.1. After the required pressing for 4 hours, remove the weight and upper glass plate. Subject the lower plate holding the conditioned and pressed specimens to a temperature of 0° ± 5°F for not less than 1 hour and then test at that temperature.



#### 4.3.2 Accelerated weathering procedure.

4.3.2.1 Apparatus and procedure. The apparatus shall be in accordance with Method 5804 of FED-STD-191 except as modified below (see 6.4).

4.3.2.2 Filters. The filters shall be removed when testing all types of Army and numbered ducks listed in CCC-C-419 and flat ducks of CCC-C-443.

4.3.2.3 Procedure. Cut two samples, each 9 1/2 by 28 inches, constituting the material required to complete all weathering tests, from the sample unit. Cut one sample with the long dimension in the direction of the warp, the other with the long dimension in the direction of the filling. When the width of the sample unit does not permit a full 28-inch specimen to be taken in the filling direction, cut two 9 1/2 by 14-inch samples. Expose the specimens one above the other in the quadrant of the accelerated weathering apparatus. Change the specimens from the top to bottom racks approximately every 25 hours during the exposure period (see 3.4.11). At the conclusion of the exposure period, remove the samples from the apparatus and allow to dry; then cut the breaking strength and fire resistance specimens from the exposed material. All specimens shall be conditioned at standard conditions prior to testing. Cut the four fire resistance specimens from the exposed sample 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, subject two specimens to the test flame at the end which was at the top of the exposed material, and subject two to the test flame at the end which was at the bottom of the specimen. Trim the lower edges of the fire resistance test specimens, if necessary, so that a freshly cut end is exposed to the test flame.

### 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 on rolls 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, or 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 by the contract or purchase order, shipments shall be marked in accordance with PPP-P-1135.

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## 6. NOTES

6.1 Intended use.6.1.1 Types I and II.

6.1.1.1 Class 1. Cloth treated for fire, water, weather, and mildew resistance for class 1 is intended for use in the manufacture of canvas covers, tents, tarpaulins, and other duck items providing protection under conditions of prolonged outdoor use.

6.1.1.2 Class 2. Cloth treated for fire, water, weather, and mildew resistance for class 2 is intended for use as upholstery material in motorized vehicles and uses where a higher degree of resistance to crocking is required by the condition of the end use.

6.2 Ordering data. Contracting officers 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 and class required (see 1.2.1).
- c. Base cloth required (see 3.2.1).
- d. Width of cloth required (see 3.4.2).
- e. Color required if other than specified (see 3.4.5).
- f. Flexibility requirements for duck other than numbered or Army duck specified in 3.4.7.
- g. Mildew inhibitor if other than specified (see 3.4.10.1).
- h. Submission of certification as to the formula approval, when required (see 4.1.4).
- i. 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 procuring activity issuing the invitation for bids.

6.4 Accelerated aging. When the accelerated aging apparatus specified in 4.3.2 is not available, other tests and requirements may be submitted provided data is submitted showing correlation with the accelerated weathering test of table IX.

6.5 Colors. Dark Green FWWMR Duck may be finished under the requirements for type I. Dark Blue FWWMR Duck may be finished under the requirements for type II.

6.6 Approval of flame resistant. As a part of the approval testing of flame retardant finishes or fiber for tentage use, the finished cloth shall have a maximum of 4 seconds afterflame and shall not melt or drop flaming pieces when tested in accordance with Method 5903 of FED-STD-191. The finished material shall retain flame resistance characteristic after 1 year of exposure to natural weathering.

6.7 Formula approval. Approval of formulation is the responsibility of the U.S. Army Natick Research, Development, and Engineering Center, Natick, MA, and is based on extensive tests, including those for toxicity, which are not set forth in this specification. Because of the time necessary to conduct full evaluation (approximately 6 months), only those chemical treatments which have been previously submitted to and evaluated by Natick Research, Development, and Engineering Center will be considered for approval and use in the current 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.

6.8 Subject term (key word) listing.

Canvas  
Cloth, duck  
Protection, outdoor  
Tarpaulins  
Tents  
Upholstery

MILITARY INTERESTS:

Custodians

Army - GL  
Navy - NU  
Air Force - 99

Review Activities

Army - MD, EA, AR  
Navy - SH, MC  
Air Force - 82  
DLA - CT

User Activities

Army - AT  
Air Force - 45  
DLA - DM

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS  
JUS - FPI

PREPARING ACTIVITY:

Army - GL

Project No. 8305-0119

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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DEPARTMENT OF THE ARMY

US Army Natick Research and Development Center  
Natick, Massachusetts 01760



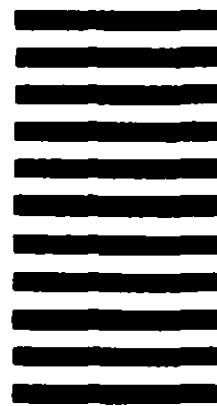
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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

CCC-C-428G

2. DOCUMENT TITLE

Cloth, Duck, Cotton; Fire, Water, Weather, and Mildew Resistant

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

 VENDOR USER MANUFACTURER OTHER (Specify): \_\_\_\_\_

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

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)

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PREVIOUS EDITION IS OBSOLETE.

NATICK OP, 1 Apr 84