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SUPERSEDING
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FEDERAL SPECIFICATION

CLOTH, DUCK, UNBLEACHED, PLIED-YARNS, ARMY AND NUMBERED

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers grey (unbleached) cotton duck cloth

1.2 Classification.

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

Type I - Numbered duck
Type III - Army Duck

2. APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, 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.

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

V-T-276	-	Thread, Cotton
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
FED-STD-751	-	Stitches, Seams, and Stitchings

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

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington DC, Atlanta, Chicago, Kansas City, Fort Worth, Denver, San Francisco, Los Angeles and Seattle)

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

Federal Regulations

Federal Trade Commission

Rules and Regulations Under the Textile
Fiber Products Identification Act

(Application for copies should be addressed to the Federal Trade Commission, Washington, DC 20580.)

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

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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 cloth shall be equal to or better than the standard sample with respect to all characteristics for which the sample is referenced (see 6.4).

3.3 Material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.3.1 Yarn. The yarn shall be cotton which has been carded, drawn, and spun into singles or twisted into plied yarns as specified in tables I, II, and III

3.4 Physical requirements. The cloth shall be as specified (see 6.2) and shall conform to the requirements specified in tables I, II, and III when tested as specified in 4.4.3.

3.4.1 Width. The width of the 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 or tuck-in selvages when shuttleless looms are used and exclusive of the lock-in fringed selvage when a shuttleless leno lock-in fringed selvage is used. Cut raw edges shall not be permitted. The following tolerances shall be permitted:

Width of duck in inches	Tolerance in inches
40 or less	+1/4 to -1/4
Over 40 to 51 inclusive	+3/8 to -1/4
Over 51 to 81 inclusive	+5/8 to -3/8
Over 81	+3/4 to -3/8

3.4.1.1 Shuttleless loom selvages. When the cloth is woven on shuttleless looms, the fringed selvages shall be secured by a leno lock stitch. The width of the protruding fringe shall not exceed 3/16 inch.

3.4.2 Weave. The weave shall be plain, one up and one down. The use of a fly-shuttle or a shuttleless loom is permitted.

3.5 Nonfibrous material. The cloth shall contain not more than 2.5 percent starch and protein content excluding chloroform-soluble and water-soluble material. The total sizing, finishing and other nonfibrous material content of the finished cloth shall not exceed 5.0 percent when tested as specified in 4.4.3.

TABLE I. Physical requirements for type I, numbered ducks (hard texture)

Number of duck commercial designation	Weight Oz/Yd^2		Breaking strength Warp Pounds	Breaking strength Filling Pounds	Air permeability Ft^3/Min/Ft^2
	Min	Max	Min	Min	Max
1 1/	28.7	31.6	440	370	2.0
2 1/	27.1	29.8	420	345	2.0
4 1/	23.9	26.3	375	300	2.0
6 1/	20.7	22.8	335	225	2.0
8 1/	17.6	19.4	285	190	2.0
10 2/	14.4	15.8	215	160	4.0
12 2/	11 2	13.0	195	120	4.0

1/ Plied yarns shall be used for both warp and filling.

2/ Warp yarns shall be plied; filling yards shall be singles or plied

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TABLE II. Physical requirements for type I, numbered ducks (medium texture)

Number of duck commercial designation	Weight Oz/Yd^2		Breaking strength Warp Pounds	Breaking strength Filling Pounds	Air permeability $Ft^3/Min/Ft^2$
	Min	Max	Min	Min	Max
1 1/	28.7	31.6	425	345	4.0
4 1/	23.9	26.3	350	290	5.0
6 1/	20.7	22.8	305	250	4.0

1/ Plied yarns shall be used for both warp and filling.

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TABLE III. Physical requirements for type III, army duck 1/

Weight Oz/Yd^2		Breaking strength Warp Pounds	Breaking strength Filling Pounds	Tearing strength Warp Pounds	Tearing strength Filling Pounds	Air permeability Ft^3/Min/Ft^2
Min	Max	Min	Min	Min	Min	Max
8.25	9.25	125	120	4.0	3.0	4.0
9.85	11.00	160	110	-	-	5.0
12.30	13.50	210	130	-	-	5.0
14.80	16.30	235	175	-		-
18.50	20.40	315	200	-	-	-

1/ The warp yarns shall be plied and the filling yarns shall be singles or plied.

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3.6 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous lengths, each not less than 40 yards and shall be put-up on full width rolls as specified in 5.1. The maximum length of the rolls when converted to pounds shall not exceed the maximum weight specified in PPP-P-1135. For duck No. 10 and lighter in weight, pieces shall be sewn together with a butted FSa-1 type seam of FED-STD-751 using ticket No. 10, 3-ply, unbleached cotton thread conforming to type IIIA of V-T-276, and having a minimum of 6 stitches per inch. The stitching shall be placed 1/2 to 5/8 inches from the cut or raw edge of the cloth. For cloth heavier in weight than No. 10, the pieces shall be lapped and not sewn together. The number of pieces in the roll shall be indicated by stencil marking on the last 6 inches of the roll on the outer surface.

3.7 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.

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

3.9 Workmanship. The cloth shall conform to the quality of product established by this specification. The demerit points per 100 square yards when calculated as specified in section 4 shall not exceed the established maximum point value.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the 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.

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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 for the defects specified in 4.4.2.1 and 4.4.2 2 and tested for the characteristics specified in 4.4.3.

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 specification or applicable purchase document

4.4.2 End item visual 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 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. Each knot or 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 in accordance with the following:

Lot size (yards)	Sample size (rolls)
3200 or less	8
3201 up to and including 10,000	13
10,001 and over	20

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The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds 40 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 60 points. If one roll exceeds 60 points per 100 square yards, a second sample as previously stated 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:

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

4.4.2.1.1 Small sized lot yard-by-yard examination. For lot sizes less than 3200 yards, when specified, see 6.2, the sample unit shall be in yards, randomly selected from the rolls in the lot and the sample yardage shall be examined on the face side only. The lot shall be unacceptable if the maximum points per sample are exceeded or if the sample yardage from any individual roll contains greater than 40 points per 100 square yards (using formula cited in 4.4.2.1). The sampling plan shall be as follows:

Lot size (yards)	Sample size (yards)	Maximum points per sample
0-1200	300	120
1201-3199	500	200

4 4.2.1.2 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 not within specified tolerance
Objectionable odor
Excessive nappiness
Holes, cuts, or tears
Overall uncleanliness

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Width not within specified tolerance. Fringed selvages of shuttleless loom cloth not secured by a leno lock-stitch or fringe protruding in excess of 3/16 inch

Slack or tight selvages. (NOTE: To determine the presence of unacceptable selvage conditions the following procedure shall be used: 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 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 the defects listed below. Each defect listed shall be counted not more than once in each roll examined. The lot shall be unacceptable if two or more of the listed defects are present in the sample 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 ticket.

Any length found to be more than 2 yards less than the length marked on the roll ticket.

Any piece less than 40 yards in length.

For No. 10 duck and lighter in weight:

a. Pieces not sewn together with a butted FSa-1 type seam.

b. Stitches less than the minimum specified.

c. Stitching not 1/2 to 5/8 inch from the cut or raw edge of the cloth.

For duck heavier in weight than No. 10, pieces sewn instead of lapped.

Number of pieces in roll not stenciled on last 6 inches of rolls on outer surface.

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 specified 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 the applicable test method. The sample unit shall be 1-1/2 yards full width. All test reports shall contain the individual values utilized in expressing the final results. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified. The sample size shall be in accordance with the following:

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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
Yarn ply	3.4	Visual 1/
Weight	3.4	5041
Breaking strength	3.4	5100
Tearing strength (8.25 oz)	3.4	5132
Air permeability	3.4	5450
Weave	3.4.2	Visual 1/
Starch and protein content excluding chloroform-soluble and water-soluble material	3.5	2611 2/
Total sizing, finishing, and other nonfibrous materials	3.5	2611 2/

1/ One determination shall be made from each sample unit and the results reported as "pass" or "fail".

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

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

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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, 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 by 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. The cloths are primarily used in fabrication of tentage and equipage items.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Type and weight of cloth required. If the cloth is type I, specify number and texture (see 1.2.1 and 3.4).
c. When first article is required (see 3.1, 4.3, and 6.3).
d. Width required (see 3.4.1).
e. Length, if other than specified (see 3.6).
f. When small size lot examination criteria is applicable (see 4.4.2.1.1).
g. Levels of put-up, 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 also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Sample. For access to samples, address the contracting activity issuing the invitation for bids or request for proposal.

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6.5 Subject term (key word) listing.

Equipage
Tentage
Textile fabrics

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MILITARY INTERESTS:

Custodians:

Army - GL
Navy - NU
Air Force - 99

Review activities:

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

User activities:

Army - AR, AT, ME, MI

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:

Army - GL

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