MIL-C-7219F
19 March 1987
SUPERSEDING
MIL-C-7219E
20 July 1984

MILITARY SPECIFICATION

CLOTH, DUCK, NYLON

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

1 SCOPE

1 1 Scope This specification covers the requirements for nylon cloth woven of plied yarns, for use in the manufacture of parachute packs and other military items.

1 2 Classification The cloth covered by this specification shall be of the following types and classes, as specified (6.2).

Type I	- 9 5 oz/sq yd max
Type II	- 8 75 oz/sq yd max (not applicable for Air Force procurement)
Type III	- 7 25 oz/sq yd max
Class 1	- Untreated
Class 2	- Nondurable water repellent treated
Class 3	- Durable water repellent treated
Class 4	- Durable water repellent with IR requirements
Class 5	- Woodland camouflage printed and Quarpel water repellent treated (type III only)

1 2 1 Definitive Specification Part Number The Specification Part Number is a definitive part number which will be formulated to identify each item covered by this specification The part number will be formulated by selecting from the requirement options available in this specification as follows.

Definitive Specification Part Number M7219 - X - X

Military Specification Number —
Type Designator Roman Numeral —
Class Designation Number —

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Systems Engineering and Standardization Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, 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

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2 1.1 Specifications and standards. The following specifications and standards form a part of this specification 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-276	-	Thread, Cotton
PPP-P-1133	-	Packaging of Synthetic Fiber Fabrics

MILITARY

MIL-C-7020	-	Cloth, Parachute, Nylon

STANDARDS

FEDERAL

FED-STD-4	-	Glossary of Fabric Imperfections
FED-STD-191	-	Textile Test Methods
FED-STD-751	-	Stitches, Seams, and Stitching

2 1 2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein Unless otherwise specified, the issues shall be those in effect on the date of the solicitation

FEDERAL TRADE COMMISSION

Textile Fiber Products Identification Act

DRAWINGS

U S ARMY NATICK RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER

2-1-1516	-Woodland Pattern	-48 inches
2-1-1516B	-Woodland Pattern	-60 inches

(Copies of specifications, standards, handbooks, drawings, and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity)

2 2 Other publications The following documents form a part of this specification to the extent specified herein Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AATCC Chromatic Transference Scale
Method 119 - Color Change Due to Flat Abrasion(Frosting)· Screen Wire Method

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which 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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained

3 REQUIREMENTS

3 1 Standard sample. The cloth shall, unless otherwise indicated (see 3 4.1), 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 Materials The yarn for Types I and III cloth shall be bright high tenacity nylon filament for both warp and filling For Type II cloth, the warp yarn shall be bright high tenacity filament, and the filling yarn shall be bright or semi-dull nylon staple of such staple length and denier to conform to the requirements of this specification The nylon filament yarn used in the manufacture of cloth shall be bright, high tenacity, light, and heat resistant, polyamide prepared from hexamethylene diamine and adipic acid or its derivatives The melting point shall be 244°C (min) when tested as specified in 4 5 The yarn shall not be bleached in any manner or in any subsequent process.

3 3 Construction and physical properties The construction and physical properties shall be as specified in Table I when tested as specified in 4 5 The use of fly-shuttle or shuttleless looms is permitted

TABLE I Physical Requirements

CHARACTERISTICS	REQUIREMENTS		
	TYPE I	TYPE II 1/	TYPE III
Weave	Plain, 1 up and 1 down	Plain, 1 up and 1 down	Plain, 1 up and 1 down
Weight, ozs per sq yd, max.	9.50	8.75	7.25
Yarns per inch, min			
Warp	80	78	60
Filling	38	38	45
Yarn ply 2/			
Warp	2	2	2
Filling	3	2	2
Breaking strength, lbs, min			
Ravel strip, as received			
Warp	400	400	325
Filling	300	150	275
Tearing strength, lbs, min			
Tongue			
Warp	35	35	20
Filling	45	20	20
Air Permeability, cu ft 4/ air/minute/sq ft at 1/2 inch water pressure, max	5 0	5 0	8 0
Water resistance spray 3/ 4/ rating, min			
As received, three determination (individual values)	80,80,80	80,80,70	90,90,80
After three dry 4/ cleanings	70,70,70	70,70,70	70,70,70
Water resistance, low range, hydrostatic 3/, 4/ pressure, cm of water, min	25	30	25
Shrinkage, percent, max 4/			
Warp	2 5	2 5	2 0
Filling	2 0	2 0	2 0

1/ Not applicable for Air Force procurement.
2/ A single multifilament yarn of equivalent denier may be used
3/ Applicable to Class 2 only.
4/ Applicable to Classes 3, 4, and 5 only.

3 4 Color The color of the finished cloth shall be as specified by the procuring activity and shall match the standard sample (see 6 2 and 6.3) The color of the finished Class 5 shall be the Woodland camouflage pattern obtained by dyeing the ground shade Light Green 354 and overprinting using three rollers or screens as appropriate for Dark Green 355, Brown 356, and Black 357, for the respective areas of the pattern The dyeing and printing of Class 5 cloth shall be accomplished using a combination of acid dyes and carbon black (see 6 7)

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 sample under incandescent lamplight at 2300 ± 200 K.

3 4 2 Colorfastness

3.4.2 1 Classes 1, 2, 3, and 4. The finished cloth shall show fastness to light, laundering and dry cleaning equal to or better than the standard sample When no standard sample is available the finished cloth shall be equal to or better than a rating of "good" when tested as specified in 4.5. The cloth shall show fastness to crocking equal to or better than the standard sample or shall have an AATCC Chromatic Transference Scale rating not lower than 3.5 when tested as specified in 4 5

3 4 2 2 Class 5. The printed and finished cloth shall show fastness to light, laundering and dry cleaning equal to or better than the standard sample When no standard sample is available the finished cloth shall be equal to or better than a rating of "good" for each of the pattern areas, except Black 357 which shall be equal to or better than a rating of "fair" when tested as specified in 4 5 The cloth shall show fastness to crocking equal to or better than the standard sample or shall have an AATCC Chromatic Transference Scale rating not lower than 3 5 for all the pattern areas, except Black 357 which shall have an AATCC Chromatic Transference Scale rating not lower than 1 5 When carbon black is used alone or in combination with other dyes for Black 357, the resistance to frosting of the printed cloth shall be equal to or better than the standard sample when tested as specified in 4 5

3 4 3 Infrared spectral reflectance

3 4 3 1 Type III, Class 4 (OG-106) only When shade Olive Green 106 is specified, the infrared reflectance values of the finished cloth (Type III, Class 4) shall meet the requirements specified in 4.5 2

3 4 3 2 Type III, Class 5 (Woodland camouflage pattern) Spectral reflectance values in the near infrared for the finished cloth (Type III, Class 5) in the Woodland pattern shall meet the requirements specified in

Table III, when tested as specified in 4 5 2

3 4 3 2 1 Pattern execution, Class 5 The pattern of the finished cloth shall match the Woodland camouflage pattern drawing (see 2 1 2 and 6 2.1) The warpwise pattern repeat of the dyed, printed, and finished cloth shall be 27 25 + 1 25, - 2 50 inches Each pattern area shall show solid coverage, skitteriness exceeding that shown by the standard sample (6 3) in any of the printed areas will not be acceptable

TABLE II Reflectance (percent) limits for shade OG-106, Type III, Class 4

Wavelength nanometers	Reflectance max	Reflectance min	Wavelength nanometers	Reflectance max	Reflectance min
600	10	3	740	79	30
620	10	3	760	84	35
640	10	3	780	85	35
660	10	3	800	86	35
680	17	3	820	86	35
700	40	10	840	86	35
720	64	20	860	86	35

TABLE III. Spectral reflectance (percent) limits for Type III, Class 5

Wavelength nanometers	Black 357 min	Black 357 max	Light Green 354 min	Light Green 354 max	Dark Green 355 min	Brown 356 max
600	-	10	8	16	3	8
620	-	10	8	16	3	8
640	-	10	8	16	3	8
660	-	10	8	18	3	8
680	-	10	8	29	3	18
700	-	10	15	49	8	39
720	-	10	26	61	20	57
740	-	10	40	70	30	70
760	-	10	50	75	32	77
780	-	10	55	77	32	79
800	-	10	55	78	32	80
820	-	10	55	78	32	80
840	-	10	55	78	32	80
860	-	10	55	78	32	80

3 5 Finish The cloth shall not be bleached in any manner or process

3 5 1 Water resistance

3 5 1.1 Class 2 The Class 2 cloth shall be given a non-durable water-repellent treatment The non-durable type water-repellents shall

consist of aluminum salts of saturated carboxylic acids (such as formate, acetate, palmitate or stearate), zirconium salts of such saturated carboxylic acids, or a combination of both, mixed with refined mineral and vegetable waxes, titanate esters, or a combination of both The product shall be applied either in the form of an aqueous emulsion or in the form of a water free solvent solution

3.5 1.2 Classes 3 and 4. The Classes 3 and 4 cloths shall be given an approved durable water-repellent treatment (See 6.8).

3 5 1.3 Class 5 The Class 5 cloth shall be given a Quarpel water repellent treatment which shall consist of an approved fluorocarbon and a fluorocarbon extender (see 6.8)

3 5 2 Resistance to organic liquid (Class 5 only). The Class 5 finished cloth shall show no wetting by n-dodecane when tested as specified in 4 5

3.6 Dimensions

3 6 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 and exclusive of the lock-in selvage when shuttleless looms are used. Cut, raw edges shall not be permitted

3 6 2 Length and put up. Unless otherwise specified (see 6.2) the cloth shall be in one continuous piece of not less than 40 yards and shall be put up in rolls in accordance with PPP-P-1133 Pieces shall be sewn together with a butted FSa-1 type seam of FED-STD-751 using ticket 10, 3 ply unbleached cotton thread conforming to type III A of V-T-276, and having a minimum of 6 stitches per inch. The stitching shall be placed 1/2 to 5/8 inch from the cut or raw edge of the cloth The number of pieces in the roll shall be indicated by stencil marking on the last 6 inches on the roll on the outer surface. The rolls shall be ticketed as specified in PPP-P-1133 (see 6 2).

3 7 pH The pH value of the water extract of the finished cloth shall be no less than 5 0 nor more than 8 5 when tested as specified in 4 5

3 8 Face identification (Classes 1, 2, 3, and 4) 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 9 Fiber identification Each roll of nylon cloth shall be labeled, ticketed, or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act

3 10 Part Number Specification Part Number for items described in this specification will be formulated as shown in paragraph 1 2 1

3 11 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

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 the specification 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 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 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. Where certificates of compliance are submitted in accordance with 4.5, they shall contain verifiable actual test and inspection data The Government reserves the right to inspect and test the cloth to verify the validity of the certification

4 2 Classification of inspections The inspections specified herein are classified as quality conformance inspections

4.3 Quality conformance inspection The quality conformance inspection shall consist of the inspections described in 4.3 2 through 4 3 6 4 and the end item tests of 4.5

4 3 1 Inspection conditions Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4 3 2 through 4 3 6 4 and the end item tests of 4 5.

4.3.2 Component and material inspection. In accordance with 4 1 above, components and materials shall be tested in accordance with all the requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents.

4 3 3 Examination of the end item Examination of the end item shall be in accordance with the provisions of 4 3 4 through 4 3 6 4

4 3 4 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 listed in 4 3 4 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 4 points The sample size shall be 20 rolls selected from 20 containers. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds 35 0 points The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 53 0 points. If one roll exceeds 53 0 points per 100 square yards, a second sample of 20 rolls shall be examined only for individual roll quality examination The lot shall be unacceptable if one or more rolls in the second sample exceeds 53 0 points per 100 square yards Point computation for lot quality and individual roll quality shall be as follows

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

4.3 5 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.

Edges curled, folded, rolled, beaded or slack throughout the roll
Overall uncleanness
Objectionable odor
Mottled, cloudy, streaky or poor penetration of dye.
Width less than specified

4.3.6 Examination for length

4.3 6 1 Individual rolls During the yard-by-yard examination each roll in the sample shall be examined for put up and length Each defect shall be counted not more than once in each roll examined The lot shall be unacceptable if two or more of the following defects are present·

Defects

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
Any roll weight heavier than specified.

Pieces not sewn together with a butted FSa-1 type seam
Stitches less than the minimum specified
Stitching not 1/2 to 5/8 inch from the cut or raw edge of the cloth
Number of pieces in roll not stenciled on last 6 inches of rolls on outer surface

For Class 5 only.

Objectionable odor
Baggy, ridgy or wavy cloth
Width less than specified
Edge ravels when pulled outward
Slack or tight selvages 1/
Overall uncleanness
Pattern design not equal to the standard sample
Incorrect color in any part of the pattern
Pattern repeat less than 24 75 inches or more than 28 50 inches
Skitteriness (mottled, uneven color) of pattern exceeds that shown by the standard sample
Excessive feathering or spew (fuzziness at color boundaries) of pattern as compared to the standard sample
Excessive grinning (off register, gap where ground shade shows through) of pattern as compared to the standard sample
Excessive haloing or trapping (overlapping of colors) of pattern as compared to the standard sample
Overall application of water repellent not uniform
Tackiness (sticky to touch)
Design not printed on face side of cloth

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. Suspect rolls should be removed from the perch and unrolled on the floor or a table and further examined for the condition A waviness in the selvage or significant ripples diagonally across the width of the fabric is an indication of slack or tight selvages

4 3 6 2 Total yardage in sample The lot shall be unacceptable if the total of the actual lengths of rolls in the sample is less than the total of the lengths marked on the tickets

4 3 6 3 Examination for shade and appearance During the yard-by-yard examination, each roll in the sample shall be examined for shade and appearance. Any roll in the sample off shade, shaded side to side, side to center, or end to end, or if any roll does not have the same appearance as the standard sample it shall be cause for rejection of the entire lot represented by the sample

4 3 6 4 Examination for compliance with Textile Fiber Products Identification Act and Face Marking During the yard-by-yard examination, each roll in the sample shall be examined for conformance to the Textile Fiber Products Identification Act or face stamping missing from either or both ends or face marking on wrong side Each roll not labeled in accordance with this

act shall be a defect. The lot shall be unacceptable if two or more of these defects occur.

4.4 Examination of preparation for delivery requirements. An examination shall be made in accordance with the provisions of PPP-P-1133, to determine that packaging, packing and marking comply with the section 5 requirements of this specification

4 5 Testing of the end item The method of testing specified in FED-STD-191, wherever applicable, as listed in Table IV shall be followed. The physical and chemical values specified in section 3, except where otherwise specified, apply to the results made on a sample unit for test purposes as specified in the applicable test method The sample unit shall be 4 continuous yards, full width, of the finished cloth. All test reports shall contain the individual values utilized in expressing the final result. The lot size shall be expressed in units of 1 yard The lot shall be unacceptable if one or more units fail to meet any requirement specified. The sample (number of sample units) shall be as follows:

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

4 5 1 Shrinkage and air permeability (Classes 3, 4, and 5 only) After conditioning for not less than 4 hours, an 18-inch square shall be marked on a 20-inch square specimen of the cloth by means of a template, using indelible ink A metal tub of adequate size to accommodate the specimen prepared as described below shall be filled to within 3 inches of the top with water, which shall then be heated to a boil The specimen shall be placed in the boiling water in a "skein" form prepared by stapling two opposite sides of the specimen together to form a loop or "skein " This shall then be placed over a glass rod 1/4 inch in diameter and 21 inches long weighing approximately 100 grams, or a sufficient weight to hold specimen in place in bath, shall be placed inside the loop at the bottom The loop shall then be suspended in the boiling water bath by attaching it to another glass rod 24 inches long 1/4 inch in diameter by means of twine and wire The 24 inch glass rod shall rest on the top of the tub allowing the specimen to hang freely in the bath The specimen shall be subjected to the action of the boiling water bath for a period of 15 minutes, after which it shall be removed from the tub and allowed to drain for a few minutes, the staples shall be removed from the sample, which shall then be placed flat on a horizontal screen to dry After the specimen is thoroughly dry, it shall be exposed for at least 4 hours to a standard atmosphere of 65 percent relative humidity and at a temperature of 70°F (21°C) The 18-inch square shall then be measured in three places in the warp direction and three places in the filling direction The amount of shrinkage shall then be recorded Air permeability readings shall be taken

4 5 2 Spectral reflectance test for Type III, Class 4 (OG 106) and Type III, Class 5 (Woodland pattern) Spectral reflectance data shall be obtained from 600 to 860 nanometers(nm), at 20 nm intervals on a spectrophotometer (see 6 5), 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 6) The spectral bandwidth shall be less than 26 nm at 860 nm. Reflectance measurements may 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 source that simulates either CIE source A or D65 For Type III, Class 4, shade OG 106, the specimen shall be measured as a single layer backed with two layers of the same fabric and color For the Type III, Class 5, Woodland pattern, the Black 357 areas of the pattern shall be measured as a single layer backed with two layers of the same fabric and color. Each of the remaining three colors in the Woodland pattern shall be measured as a single layer backed with four layers of the same fabric and color Measurements 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 degrees 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 aperature size used in the color measurement device shall be 1 0 to 1 25 inches in diameter. When the measured spectral reflectance values for any color at four or more wavelengths do not meet the limits specified in Tables II or III, it shall be a test failure

4 5 3 Resistance to organic liquid test Place a small specimen of the cloth on a smooth horizontal surface, face up Using a pipette or eye dropper, gently deposit one drop of n-dodecane on the surface of the specimen After 1 minute, examine the specimen under light at an angle Absence of light reflectance at the fabric drop interface shall be taken at various locations across the sample being tested Evidence of wetting on any specimen shall be considered a test failure.

TABLE IV Test methods

TEST	REQUIREMENT PARAGRAPH	FED-STD-191 TEST METHOD NO.
Material identification	3 2	1530 1/
Melting point	3 2	1534 1/
Water repellent identification	3 5 1 1 or 3 5 1 2 (as applicable)	1/ 5/
Absence of bleaching	3 2	1/
Weave	3 3	Visual 6/
Weight of cloth	3 3	5041
Yarns per inch	3 3	5050
Breaking strength	3 3	5104
Tearing strength	3 3	5134

TABLE IV Test Methods (continued)

TEST	REQUIREMENT PARAGRAPH	FED-STD-191 TEST METHOD NO
Air permeability	3 3	4.5.1/5450
Shrinkage	3 3	4.5 1
Water resistance (spray) As received All Classes as applicable except Class 1	3.3	5526
After dry cleaning All Classes as applicable except Class 1	3 3	5508/5526
Water resistance (hydrostatic) All Classes as applicable except Class 1	3 3	5514
Fastness to laundering 2/	3 4 2	5614
Fastness to dry cleaning 2/	3 4.2	5620
Fastness to crocking	3 4.2	5651
Fastness to light 3/	3 4.2	5660
Resistance to frosting Class 5, Black 357 only 7/	3.4.2 2	AATCC Test Method 119 8/
Infrared reflectance (OG-106) Type III, Class 4 and (Woodland pattern), Type III, Class 5 only	3 4 3	4 5 2
pH	3 7	2811

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

2/ A 2- by 2-inch square of white nylon cloth conforming to MIL-C-7020 shall be used to show staining Staining of the white cloth shall be cause for rejection

3/ Time of exposure shall be 20 standard fading hours

4/ Time of exposure shall be 24 hours at a temperature of 140 ± 1 8°F (60 ± 1°C) A six (6) pound weight shall be used

5/ The contractor shall specify on his test report the water repellent treatment used

6/ One determination shall be made per sample unit.

7/ When carbon black alone or in combination with dyes is used for Black 357.

8/ Except that the number of abrasion cycles shall be 300.

5 PACKAGING

5 1 Preservation Preservation shall be level A or C as specified (see 6 2)

5 1 1 Levels A and C The cloth shall be preserved in accordance with the applicable requirements of PPP-P-1133

5 2 Packing. Packing shall be level A, B or C as specified (see 6.2).

5 2 1 Levels A, B and C The cloth shall be packed in accordance with the applicable requirements of PPP-P-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 covered by this specification is intended for use in the manufacture of parachute packs and other equipage

6 2 Ordering data Purchasers should exercise any desired options offered herein, and procurement documents should specify the following

6 2 1 Procurement requirements

(a) Title, number and date of this specification
(b) Type and class required (see 1 2)
(c) Color required (see 3 4)
(d) Quantity and width of cloth required (see 3 6)
(e) Selection of applicable levels of put-up, packaging and packing (see 5 1 and 5 2)
(f) Woodland camouflage pattern drawing if required (see 3 4 3.2)

6 3 Standard sample For access to standard sample, address the procuring office issuing the invitation for bids (see 3 1)

6 4 Water-repellent treatments Only those chemical treatments listed for Classes 2, 3, 4, and 5 shall be used

6 5 Spectrophotometers Suitable spectrophotometers that meet the needs of 4 5 2 are the Diano Hardy, Diano Match-Scan, Macbeth 1500 with IR option, and Hunter D54P-IR spectrophotometers

6 6 Source of Material Barium Sulfate of suitable quality for use as a white standard is available from Eastman Kodak Co . Halon and magnesium reagent (ribbon) are available from the Eastman Kodak Co Suitable white tiles are available from the National Bureau of Standards or the instrument makers.

6 7 Dye formulation for Class 5. The following dyes have been found acceptable for dyeing the ground shade to approximate Light Green 354

Acid Blue	258
Acid Orange	4R
Acid Red	219

The printing of Dark Green 355 and Brown 356 shades may be accomplished by varying the amount of the following dyes

Acid Orange	156
Acid Red	266
Acid Blue	258

The Black 357 shade may be satisfactorily printed with carbon black alone or in combination with the above listed dyes

6 8 Quarpel water repellency Approval of such compounds and combinations 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 Because of the time necessary to conduct full evaluation (approximately 6 months), 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

6 9 Subject term (key word) listing.

cloth
duck
durable
IR treated
nondurable
nylon
parachute packs
Quarpel water repellent
water repellent
Woodland camouflage printed

6 10 Changes from previous issue 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 - AS
Air Force - 99

Review activities:
Army - AR, MI, MD
Air Force -11, 82
DLA - CT

User activity:
Air Force -45

Preparing activity:
Navy - AS
(Project No 8305-0115)

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.

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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