INCH - POUND
GL-PD-07-12, REV. 4
9 August 2011
SUPERSEDING
GL-PD-07-12, REV. 3
29 July 2008

PURCHASE DESCRIPTION

CLOTH, FLAME RESISTANT

1. SCOPE

1.1 Scope. This purchase description covers the requirements for three types of flame resistant (FR), camouflage cloths, for use in the flame resistant clothing.

1.2 Classification. This purchase description covers the following types and classes as specified (see 6.2).

1.2.1 Types:

Type I - 65/25/10 FR Rayon/Para-Aramid/Nylon Ripstop
Type II - 43/30/27 Meta-Aramid/Nylon/Cotton Twill
Type III - FR Cloth Ripstop
NOTE: All Type III cloth shall be required to be preapproved by Army-PEO Soldier (see 6.6).

1.2.2 Classes.

Class 1 - Universal Camouflage Pattern (UCP)
Class 2 - Operation Enduring Freedom Camouflage Pattern (OCP)

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in Sections 3, 4 or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in Sections 3, 4 or 5 of this specification whether or not they are listed.

2.2 Government documents.

2.2.1 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 issues of these documents are those cited in the solicitation or contract (see 6.2).

FEDERAL STANDARDS

FED-STD-4 - Glossary of Fabric Imperfections

COMMERCIAL ITEM DESCRIPTIONS

A-A-55217 - Thread, Aramid, Spun Staple

(Copies of these documents are available online at https://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 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 or contract (see 6.2).

U.S. ARMY NATICK SOLDIER CENTER

DRAWINGS

2-1-2519 - Universal Camouflage Pattern

(For access to samples and/or pattern drawings, address the contracting activity issuing the invitation for bids or request for proposal.

CODE OF FEDERAL REGULATIONS

16 CFR Part 1500 - Federal Hazardous Substances Act Regulations
29 CFR Part 1910 - Occupational Safety and Health Standards

(Copies are available online at http://www.access.gpo.gov or from U.S. Government Printing Office 732 North Capitol Street NW, Washington, DC 20401.)

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available online at http://www.ftc.gov or from the Federal Trade Commission, 600 Pennsylvania Avenue, N.W., Washington, DC 20580-0001.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC Test Method 8 - Colorfastness to Crocking: AATCC Crockmeter Method
AATCC Test Method 15 - Colorfastness to Perspiration
AATCC Test Method 16 - Colorfastness to Light
AATCC Test Method 20 - Fiber Analysis: Qualitative
AATCC Test Method 20A - Fiber Analysis: Quantitative
AATCC Test Method 61 - Colorfastness to Laundering: Accelerated
AATCC Test Method 81 - pH of the Water-Extract from Wet Processed Textiles
AATCC Test Method 135 - Dimensional Changes of Fabrics after Home Laundering
AATCC Test Method 143 - Fabric Appearance/Smoothness
AATCC Evaluation Procedure 1 - Gray Scale for Color Change
AATCC Evaluation Procedure 8 - AATCC 9-Step Chromatic Transference Scale
AATCC Evaluation Procedure 9 - Visual Assessment of Color Difference of Textiles
AATCC Smoothness and Appearance Replicas

(Copies of are available on line at http://www.aatcc.org or from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709-2215.)

ASTM INTERNATIONAL

ASTM D 737 - Standard Test Methods for Air Permeability of Textile Fabrics
ASTM D 1424 - Standard Test Methods for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus
ASTM D 1683 - Standard Test Methods for Failure in Sewn Seams of Woven Apparel Fabrics
ASTM D 3775 - Standard Test Methods for Warp End Count and Filling Pick Count of Woven Fabric
ASTM D 3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
ASTM D 3884 - Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
ASTM D 5034 - Standard Test Methods for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
ASTM D 6413 - Standard Test Methods for Flame Resistance of Textiles (Vertical Test)
ASTM F 1930 - Standard Test Method for Evaluation of Flame Resistant Clothing for Protection Against Flash Fire Simulations Using an Instrumented Manikin

(Copies of documents are available online at http://www.astm.org or from the ASTM INTERNATIONAL, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 2112 Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire, 2007 edition

(Copies of this document are available online at http://www.nfpa.org or National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.)

OTHER PUBLICATIONS

Repeat Insult Patch Test - Modified Draize Procedure -
Principles and Methods of Toxicology, (fourth edition) A. Wallace Hayes (editor),
pp 1057 - 1060, 2001.

(Copies are available online at http://www.taylorandfrancis.co.uk/ or from Taylor and Francis, 325 Chestnut Street, Philadelphia PA 19106.)

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

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 in accordance with 4.2.

3.2 Standard sample. The finished cloths shall match the standard sample for shade and appearance, and shall, unless otherwise indicated, 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 Fiber content. Type I cloth shall be made of warp and filling yarns using a fiber blend of flame resistant rayon, para-aramid, and nylon in a blend ratio of 65/25/10 percent by weight. Type II cloth shall be made of warp and filling yarns using meta-aramid, nylon and cotton in a blend ratio of 43/30/27 percent by weight. Type III cloth shall be made of warp and filling yarns which result in a flame resistant cloth that meets the requirements of Table III. Testing shall be as specified in 4.6. The fibers for all Types shall be made of virgin material and the use of recycled or recovered materials is prohibited.

3.4 Weave. The weave for Type I and Type III shall be plain weave with reinforcement ribs in both the warp and filling directions. The ribs for Type I should be formed by weaving every twentieth and twenty-first warp end as one and every fifteenth and sixteenth filling pick in the

same shed. The weave for Type II shall be 3 x 1 left hand twill. Testing shall be as specified in 4.6.

3.5 Finish. The cloths shall be given a wrinkle free finish to match the "hand" crispness, fabric appearance and smoothness of the guide sample provided.

3.6 Color and Colorfastness.

3.6.1 Color (Class 1 and 2).

3.6.1.1 Class 1, Universal Camouflage Pattern. The cloths shall be dyed to a ground shade either matching or approximating Desert Sand 500 and then overprinting with the camouflage pattern. When the ground shade is dyed to match Desert Sand 500, the remaining colors shall be obtained by overprinting for the Urban Gray 501 and Foliage Green 502 areas of the pattern. When the ground shade is dyed to approximate Desert Sand 500, all three colors of the camouflage pattern shall be obtained by subsequent overprinting of all three colors of the pattern. Resin bonded pigments are not permitted.

3.6.1.2 Class 2, Operation Enduring Freedom Camouflage Pattern. The cloth shall be dyed to a ground shade either matching or approximating Cream 524 and then overprinting with the camouflage pattern by roller or screen printing. When the ground shade is dyed to match Cream 524, the remaining colors shall be obtained by subsequent printing using six rollers or screens, as appropriate for the Tan 525, Pale Green 526, Olive 527, Dark Green 528, Brown 529 and Dark Brown 530 areas of the pattern. When the ground shade is dyed to approximate Cream 524 all seven colors of the camouflage pattern shall be obtained by subsequent printing using seven rollers or screens to match all seven colors (see 6.4). Resin bonded pigments are not permitted.

3.6.2 Visual shade matching. The color and appearance of the cloths shall match the standard sample when tested as specified in 4.6.

3.6.3 Colorfastness. The finished cloths for Class 1 and 2 shall conform to the colorfastness requirements listed below in Table I, and Table IA when tested as specified in 4.6.

TABLE I. Colorfastness requirements, Class 1, all Types

Universal Camouflage Pattern (UCP)				
Colors Evaluation	Laundering (10 cycles) 1/ (min.)	Light (40 hrs or170 kJ) 1/ (min.)	Perspiration (acid & alkaline) 1/ (min.)	Crocking Wet/Dry 2/ (min.)
All colors	3	3	3	3

1/ Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change
2/ Rated using the AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale

TABLE I.A. Colorfastness requirements, Class 2, all Types

Operation Enduring Freedom Camouflage Pattern (OCP)				
Colors Evaluation	Laundering (10 cycles) 1/ 2/ (min.)	Light (40 hrs or 170 KJ) 1/ 2/ (min.)	Perspiration (acid & alkaline) 2/ 3/ (min.)	Crocking Wet/Dry 2/ 3/ (min.)
All colors	3		3-4	3.5
Dk. Green 528, Brown 529, Dark Brown530		3-4		
Cream 524, Tan 525, Pale Green 526, Olive 527		3		

1/ Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change
2/ All color evaluations shall be performed on the solid color area and not the tonal area.
3/ Rated using the AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale

3.7 Pattern execution, Classes 1 and 2

3.7.1 Class 1, Universal Camouflage Pattern (UCP). The Universal Camouflage pattern shall reproduce the standard sample in respect to design, colors and registration of the respective areas. The pattern repeat of the dyed, printed, and finished cloth shall be 36.00 inches (+1.25 inches, -2.50 inches) in the warp direction. The various areas of the pattern shall be properly registered in relation to each other and shall present definite sharp demarcations with a minimum of feathering or spew. Each pattern area shall show solid coverage; skitteriness exceeding that shown by the standard sample in any of the printed areas shall not be acceptable. When the standard sample is not referenced for pattern execution or design, a pattern drawing shall be provided, and the pattern on the finished cloths shall match that of Drawing 2-1-2519.

3.7.2 Class 2, Operation Enduring Freedom Camouflage Pattern(OCP). The pattern on the printed finished cloth(s) shall reproduce the standard sample in respect to design, colors and registration of the respective areas. The pattern repeat of the OCP pattern shall be 25.255 (+1.25, -2.50). The various areas of the pattern shall be properly registered in relation to each other and shall present definite sharp demarcations with a minimum of feathering or spew. Each pattern area shall show solid coverage; skitteriness exceeding that shown on the standard sample in any of the printed areas will not be acceptable. When the standard sample is not referenced for pattern execution, a pattern drawing provided by the Government at the time of award shall be used (see 6.2 and 6.4).

3.8 Spectral reflectance requirements, Class 1 and 2.

3.8.1 Class 1, Universal Camouflage Pattern. The spectral reflectance of the colors in the Universal Camouflage cloths shall conform to the requirements specified in Table II when tested as specified in 4.7.2.

TABLE II. Spectral reflectance requirements: for Class 1, All Types (percent).

Wavelength, Nanometers (nm)	Desert Sand 500		Urban Gray 501		Foliage Green 502	
	Min	Max	Min	Max	Min	Max
600	28	40	12	26	8	18
620	30	42	14	26	8	18
640	34	48	14	28	8	20
660	38	56	14	30	10	26
680	44	60	18	34	10	26
700	46	66	24	38	12	28
720	48	68	26	42	16	30
740	48	72	30	46	16	30
760	50	74	32	48	18	32
780	54	76	34	48	18	34
800	54	76	34	50	20	36
820	54	76	36	54	22	38
840	56	78	38	54	24	40
860	56	78	40	56	26	42

3.8.2 Class 2, Operation Enduring Freedom Camouflage Pattern. The spectral reflectance of the colors in the Operation Enduring Freedom Camouflage cloths shall conform to the requirements specified in Table II.A. when tested as specified in 4.7.2.

TABLE II.A Spectral reflectance requirements (percent) for Class 2, all Types.

Wavelength, Nanometers (nm)	Cream 524 & Tan 525		Pale Green 526, Olive 527 and Brown 529		Dark Green 528 and Dark Brown 530	
	Min.	Max.	Min.	Max.	Min.	Max.
600	22	44	12	30	3	11
620	24	45	12	30	3	12
640	24	45	12	32	4	13
660	25	45	12	32	4	14
680	28	45	14	34	4	17
700	28	48	14	36	6	23
720	30	52	16	39	6	23
740	32	55	18	41	10	25
760	36	56	20	43	14	30
780	38	57	22	45	18	35
800	40	57	24	45	21	40

TABLE II.A Spectral reflectance requirements (percent) for Class 2, all Types. - Continued

Wavelength, Nanometers (nm)	Cream 524 & Tan 525		Pale Green 526, Olive 527 and Brown 529		Dark Green 528 and Dark Brown 530	
	Min.	Max.	Min.	Max.	Min.	Max.
820	44	58	26	46	24	42
840	46	59	28	47	26	43
860	48	60	30	48	28	45

3.9 Physical requirements. The finished cloths shall conform to the requirements, listed below, in Table III, when tested as specified in 4.6.

TABLE III. Physical requirements

Characteristic	Requirement		
	Type I	Type II	Type III
Weight, oz./sq.yd.			
Minimum	5.5	5.5	5.5
Maximum	8.5	8.5	7.5
Yarns per inch, (minimum)			
Warp	70	70	60
Filling	60	50	50
Breaking strength, pounds (minimum)			
Warp	100	100	110
Filling	80	80	100
Tearing strength, pounds (minimum)			
Dry Warp	4.0	4.0	12.0
Filling	4.0	4.0	10.0
Wet Warp	NA	NA	8.0
Filling	NA	NA	6.0
Dimensional Stability, percent (After laundering 5 cycles)(Maximum) Warp and Filling:			
Individual Sample	4.0	5.5	4.0
Lot Average	3.5	5.0	3.5
Air permeability, cu.ft./min./sq.ft. (minimum)	10.0	10.0	25.0
Flame Resistance:			
Initial -			
After Flame, seconds maximum)	2.0	2.0	2.0
After Glow, seconds (maximum)	25.0	25.0	15.0
Char Length, inches (maximum)	4.5	4.5	4.5

TABLE III. Physical requirements – Continued

Characteristic	Requirement		
	Type I	Type II	Type III
Flame Resistance:			
After laundering -			
After Flame, seconds maximum)	2.0	2.0	2.0
After Glow, seconds (maximum)	25.0	25.0	15.0
Char Length, inches (maximum)	4.5	4.5	4.5
Thermal Shrinkage Resistance, percent (maximum):			
Initial	10	10	10
After laundering (25 cycles)	10	10	10
Thermal Protective Performance (TPP)			
Spaced	NA	NA	10.0
Contact			7.0
Flash Fire (Predicted Burn), percent			
With Head	37	37	35
Without Head	30	30	28
Fabric Appearance/Smoothness, rating (minimum)			
Initial	5	5	5
After laundering (15 cycles)	4	4	3
Seam Efficiency, percent (minimum)	80	80	80

3.10 pH. The pH of the water extract of the finished cloths shall be no less than 5.0 nor more than 8.5, when tested as specified in 4.6.

3.11 Toxicity. The finished cloths shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 4.7.3. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.12 Width. For Government procurements only, the width of the finished cloths shall be as specified (see 6.2) and shall be the minimum acceptable width inclusive of the selvage.

3.13 Length and put-up. For Government procurements only, unless otherwise specified (see 6.2), the cloths shall be furnished in continuous lengths, each not less than 40 yards. Each length shall be put-up full width on a roll as specified in 5.1.

3.14 Fiber identification. Each roll of finished cloths shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

3.15 Workmanship. The finished cloths 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 applicable established maximum point values.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).
b. Conformance inspection (see 4.3).

4.2 First article inspection. A first article, submitted in accordance with 3.1, shall be inspected, examined for appearance, color and finished defects and tested for the characteristics as specified in Table IV.

4.3 Conformance inspection. Conformance inspection shall include the examination of 4.5 and the tests of 4.6 through 4.7.3, as applicable. Sampling for inspection shall be performed in accordance with ANSI/ASQ Z1.4 and with acceptance quality limits as specified in the contract and/or order, except where otherwise indicated (see 6.2).

4.4 Inspection Conditions. Unless otherwise specified, all inspections shall be performed in accordance with all the requirements of referenced documents, unless otherwise excluded, amended, modified or qualified in this specification or applicable procurement documents (see 6.2).

4.5 Examination. Each roll in the sample shall be examined yard-by-yard on the printed 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 points as listed in 4.5.1 except that only those slubs and knots which exceed the limits shown on the Sears Fabric Defect Scale (See 6.5), "D" or "3-1/2" as applicable for slubs and "C" for knots, shall be scored and coarse yarn shall only be scored as a defect when the coarse yarn is twice the diameter of the normal yarn used in the fabric. No linear yard (increments of 1 yard on the measuring device of the inspection machine) from any one roll shall be penalized more than four points. The sample size shall be 20 rolls selected from 20 containers. The lot shall be unacceptable if the points per 100 square yards examined exceeds 30.0 points. The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceeds 45.0 points. If one roll in the sample exceeds 45.0 per 100 square yards, a second sample of 20 rolls shall be examined for individual roll quality only. The lot shall be unacceptable if one or more rolls in the second sample exceeds 45.0 points per 100 square yards. Point computation for lot quality and individual roll quality shall be as follows:

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

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

For defects up to 3 inches 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:

Objectionable odor
Baggy, ridgy, or wavy cloth
Overall uncleanness
Uneven weaving throughout
Pattern design not equal to the standard sample
Incorrect color in any part of the pattern
Pattern repeat not equal to the standard sample
Pattern repeat less than 33.50 inches or more than 37.25 inches for Class 1.
Pattern repeat less than 22.755 inches or more than 26.505 inches for Class 2.
Skitteriness (mottled, uneven color) of pattern exceeds that shown by he 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 standard sample

4.6 End item testing. The cloths shall be tested for the characteristics listed in Table IV. The methods of testing as specified wherever applicable and as listed in Table IV shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The sample unit shall be 5 continuous yards full width of the finished cloth for all physical and chemical tests. The lot shall be unacceptable if one or more sample units or the lot average for dimensional stability fail to meet any requirement specified. The sample size shall be in accordance with the following:

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

TABLE IV. End item tests

Characteristic	Requirement Reference	Test Method
Fiber Identification	3.3	AATCC-20
Fiber Content	3.3	AATCC-20A
Weave	3.4	Visual
Visual shade matching	3.6	4.7.1
Colorfastness to:		
Laundering (after 10 cycles)	Tables I & I.A.	AATCC 135 3,V, Aiii 1/ 2/
Light (after 40 hrs or 170 kJ)	Tables I & I.A.	AATCC-16, Options 1 or 3 2/
Perspiration (acid & alkaline)	Tables I & I.A.	AATCC-15 2/
Crocking	Tables I & I.A.	AATCC-8 2/
Spectral reflectance	3.8 Tables II & II.A	4.7.2
Weight	Table III	ASTM D-3776 (Method C)
Yarns per Inch	Table III	ASTM D-3775
Breaking Strength	Table III	ASTM D-5034 (G-E or G-T)
Tearing Strength	Table III	ASTM D-1424
Dimensional Stability (After 5 cycles)	Table III	AATCC-135, 3, V, Aiii
Air Permeability	Table III	ASTM D-737
Flame Resistance		
Initial	Table III	ASTM D-6413
After laundering (25 cycles)	Table III	AATCC-135, 3, V, Aiii and ASTM D 6413
Thermal Shrinkage Resistance:		
Initial	Table III	NFPA 2112 (section 8.4)
After laundering (25 cycles)	Table III	AATCC-135, 3, V, Aiii and NFPA 2112 (section 8.4)
TPP	Table III	NFPA 2112 (section 8.2)
Flash Fire (Predicted Burn)	Table III	ASTM F 1930
Fabric Appearance/Smoothness:		
Initial	Table III	AATCC-143 3/
After laundering (15 cycles)	Table III	AATCC-135, 3, V, Aiii and AATCC 143 3/
Seam efficiency	Table III	ASTM D-1683 4/
pH	3.10	AATCC-81
Toxicity	3.11	4.7.3

1/ Only the stain on the nylon and cotton fibers of the color transfer cloth shall be evaluated.
2/ When testing for colorfastness properties, each color shall be evaluated, whenever possible, separately and reported as such. In cases where the print pattern does not allow for the evaluation of each color separately, the test results should indicated which colors were evaluated together.
3/ Rated using the AATCC Smoothness and Appearance Replicas
4/ The needle shall measure 0.040 (± 0.001) inch across the blade at the eye. Reference ASTM D 1683, except use seam type LSc-2 with Flame Resistant threads A-A-55217, Thread, Aramid, Spun Staple Type I, Tex 50-60, 3-ply for needles and Tex 35-40, 3-ply for loopers.

4.7 Methods of inspection.

4.7.1 Visual shade matching. The color and appearance of the cloths shall match the standard sample when viewed using the AATCC Evaluation Procedure 9, Option A or C, with sources simulating artificial daylight D75 illuminant with a color temperature of 7500 (± 200)°K illumination of 100 (± 20) foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2856 (± 200)°K.

4.7.2 Spectral reflectance test. Spectral reflectance data shall be obtained from 600 to 860 nanometers (nm) at 20 nm intervals on a spectrophotometer relative to the barium sulfate standard, the preferred white standard. Other white reference materials may be used provided they are calibrated to absolute white, e.g. magnesium oxide or vitrolite tiles. The spectral band width shall be less than 26 nm at 860 nm. Reflectance measurements shall be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode of operation is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates either CIE Source A or CIE Source D65. Measurements shall be taken on a minimum of two (2) different areas and the data averaged. The measured areas should be at least 6 inches away from the selvage. The specimen shall be measured as a single layer backed with four layers of the same fabric and shade. The specimen shall be viewed at an angle no greater than 10° from normal, with the specular component included. Measurements shall be taken on a minimum of two different areas. Specimens shall be oriented in different directions during testing. When possible, the specimens tested shall not contain the same warp or filling yarns when presented to the sample port. Photometric accuracy of the spectrophotometer shall be within 1 percent and wavelength accuracy within 2 nm. The diameter for standard aperture size used in the color measurement device shall be 0.3725 inches. Any color having spectral reflectance values falling outside the limits at four or more of the wavelengths specified shall be considered a test failure.

4.7.3 Toxicity test. When required (see 6.2), an acute dermal irritation study and a skin sensitization study shall be conducted on laboratory animals. When the results of these studies indicate the cloth is not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure (See 2.3). If the toxicity requirement (see 3.11) can be demonstrated with historical use data, toxicity testing may not be required (see 6.2).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Department or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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 cloth is intended for use in flame resistant, camouflage clothing.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this Purchase Description.
b. Type and Class required
c. The specific issue of individual documents referenced (see 2.2).
d. When first article is required (see 3.1, 4.2, 6.3).
e. Camouflage pattern drawing, if required (see 3.7).
f. Width of cloth required (see 3.12).
g. Length required if other than specified (see 3.13).
h. Conformance inspection acceptance quality limits (see 4.3)
i. Inspection conditions (see 4.4)
j. When Toxicity testing is required (see 4.7.3)
k. Packaging (see 5.1).

6.3 First article. When a first article inspection is required (see 3.1), it will be inspected and approved under the appropriate provisions of FAR 52.209-4. 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 acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Standard sample. For access to samples and pattern drawings, address the contracting activity issuing the invitation for bids or request for proposal.

6.5 Fabric defect scales. Fabric Defect Replica Kits are available from Sears Roebuck and Company, 3333 Beverly Road, Dept 871HG, FC568B, Hoffman Estates, Il 60179. For information call (847) 286-8952.

6.6 Approved Type III FR cloth. PEO Soldier (PM-SCIE) has qualified/approved the following cloth as meeting the requirements for the Type III FR Ripstop:

Improved Defender™ M fabric with XDPF finish

6.7 Superseding documents. GL-PD-07-12. Rev. 4 should be used in preference to GL-PD 07-12, Rev.3, Cloth, Flame Resistant and GL-PD-08-77, Cloth, Flame Resistant, Twill.

Custodian:
Army – GL

Preparing activity:
Army – GL