

MIL-C-43906B

27 June 1984

SUPERSEDING

MIL-C-43906A

27 June 1980

MILITARY SPECIFICATION

CLOTH, COATED, NYLON, POLYURETHANE DOUBLE COATED

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

1. SCOPE

1.1 Scope. This document covers two types of nylon cloth coated on both sides with polyurethane (see 6.1).

1.2 Classification. The coated cloth shall be of the following types as specified (see 6.2).

Type I - Olive Green 207

Type II - Woodland Camouflage Printed

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 document to the extent specified herein.

SPECIFICATIONS

FEDERAL

- O-I-503 - Insect Repellent, Clothing and Personal Application  
PPP-P-1136 - Packaging of Coated (Plastic; Rubber) and Laminated Fabrics

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 and Development Center, Natick, MA 01760, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 8305

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## STANDARDS

## FEDERAL

FED-STD-191 - Textile Test Methods  
 FED-STD-406 - Plastics; Methods of Testing  
 FED-STD-601 - Rubber; Sampling and Testing

## MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by  
 Attributes  
 MIL-STD-1487 - Glossary of Cloth Coating Imperfections

## \* DRAWINGS

## U. S. ARMY NATICK RESEARCH AND DEVELOPMENT CENTER

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

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

- \* 2.2 Other publications. 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 document to the extent specified herein.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1424 - Tear Resistance of Woven Fabrics by Falling-Pendulum  
 (Elmendorf) Apparatus

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

(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

- \* 2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence.

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## 3. REQUIREMENTS

- \* 3.1 Standard sample. The coated cloth shall match the standard sample for shade and appearance and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 Materials.

- \* 3.2.1 Base cloth. The base cloth shall be cloth, nylon, plain weave, semi-dull or bright filament nylon, 200 to 220 denier, 40 by 40 yarns per inch (min),  $2.2 \pm 0.2$  ounces per square yard. The base cloth shall be scoured and heat set prior to coating. After heat set testing as specified in 4.2.1, the cloth shall show no appreciable distortion or puckering, and no more than 2.0 percent dimensional change in either the warp or filling direction.

3.2.1.1 Type I, undyed. The cloth shall be natural color, undyed.

3.2.1.2 Type II, printed. The base cloth shall be dyed and printed to the Woodland camouflage pattern. The base cloth shall be dyed approximating Light Green 354 shade and overprinted by using an acid dyestuff combination (see 6.7). The cloth shall be overprinted using the Woodland camouflage pattern obtained by roller or screen printing using four rollers or screens as appropriate for the Light Green 354, Dark Green 355, Dark Brown 356 and Black 357 (see 6.7) areas of the pattern.

- \* 3.2.1.2.1 Pattern execution, type II. The 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  $27.25 \pm 1.25 - 2.50$  inches in the warp direction. The various areas of the pattern shall be properly registered in relation to each other and 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 will 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 cloth shall match that of the drawing (see 6.2 and 6.3).

- \* 3.2.2 Coating compound, type I. The coating compound shall be a composition of polyurethane suitably compounded and pigmented to a dull OG 207 color. The pigment system shall be selected to produce a coated fabric with the infrared reflectance value specified in 3.4.4.1. The use of an acrylic anchor coat is permissible. No plasticizer shall be used in the coating compound (see 4.2.1).

- \* 3.2.3 Coating compound, type II. The coating compound shall be a composition of unpigmented polyurethane suitably compounded with a dulling agent to produce a clear, dull coating. The use of an acrylic anchor coat is permissible. No plasticizer shall be used in the coating compound (see 4.2.1).

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3.2.4 Dusting powder. If dusting powder is used for application to the coated cloth, it shall be whiting, talc, or finely divided mineral material which does not support mildew growth (see 4.2.1).

3.3 Coated cloth. The base cloth shall be coated on the face side with 2.0 to 2.5 ounces per square yard and on the back side with 1.0 to 1.25 ounces per square yard of the coating compound specified in 3.2.2. At the option of the contractor, the coated cloth may be dusted with the dusting powder specified in 3.2.4. The dusting powder shall not be applied prior to final curing of the coated fabric and shall be easily removed with a damp cloth. The coated cloth shall meet the requirements specified in table I when tested as specified in 4.2.3.

TABLE I. Physical requirements of coated cloth

Characteristic	Requirement	
	Minimum	Maximum
Weight, oz./sq. yd.	5.5	6.2
Breaking strength, pounds:		
Warp	120	-
Filling	85	-
Tearing strength, grams:		
Warp	1850	-
Filling	1650	-
Hydrostatic resistance, psi:		
Initial	250	-
After accelerated weathering	200 <u>1/</u>	-
After abrasion	200	-
After strength of coating	200	-
After high humidity	200 <u>1/</u>	-
Colorfastness after accelerated weathering	No appreciable change <u>2/</u>	-
Colorfastness after high humidity	No appreciable change <u>2/</u>	-
Stiffness, warp only mm:		
At 70°F	-	90
At 0°F	-	120
Adhesion of coating, lbs./2-inch width	15.0	-

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TABLE I. Physical requirements of coated cloth (cont'd)

Characteristic	Requirement	
	Minimum	Maximum
Blocking, scale rating		(2)
Resistance to leakage	No leakage <u>3/</u>	
Resistance to insect repellent	<u>4/</u>	

1/ The coating shall not become stiff and brittle nor soft and tacky and there shall be no evidence of cracking or crazing under visual examination.

2/ "Appreciable change in color" means a change that is immediately noticeable in comparing the test specimen with the original sample for comparison. If closer inspection or a change of angle of light is required to make apparent a slight change of color, the change is not considered appreciable.

3/ Leakage is defined as the appearance of water at three or more different places within the 4-1/2 inch diameter test area.

4/ The coated cloth shall show no lifting of the coating, no tackiness, no solution, no pickoff of the coating, no adherence of the coating to itself greater than scale rating (3) (slight blocking).

### 3.4 Color of coated cloth.

3.4.1 Type I. The color of the finished type I coated cloth shall be dull Olive Green 207.

3.4.2 Type II. The color of the finished type II coated cloth shall be Light Green 354, Dark Green 355, Dark Brown 356, and Black 357 with each area matching the specific colors of the Woodland camouflage pattern in accordance with the standard sample (see 6.3).

3.4.3 Matching. The color and shade of the dyed or printed coated cloth shall match the standard sample under artificial daylight having a color temperature of  $7000 \pm 500$  K and shall be a good approximation of the standard sample under incandescent lamplight at  $2850 \pm 100$  K.

### 3.4.4 Infrared reflectance.

3.4.4.1 Type I. The coated cloth shall have an infrared reflectance value of  $21 \pm 2$  percent measured at 1 micron when tested as specified in 4.2.3.

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3.4.4.2 Type II. The infrared reflectance of the colors in the 4-color camouflage printed finished cloth shall conform to the requirements specified in table II when tested as specified in 4.2.3 (see 6.7).

TABLE II. Infrared requirements, type II

Wavelength nanometers	Reflectance Values (percent)					
	<u>Black 357</u>		<u>Light Green 354</u>		<u>Dark Green 355 and Dark Brown 356</u>	
	min.	max.	min.	max.	min.	max.
600	-	10	-	20	-	13
620	-	10	-	20	-	13
640	-	10	-	20	-	13
660	-	10	-	20	-	13
680	-	10	20	-	10	-
700	-	10	33	-	25	-
720	-	10	45	-	40	-
740	-	10	50	-	50	-
760	-	10	50	-	50	-
780	-	10	50	-	50	-
800	-	10	50	-	50	-
820	-	10	50	-	50	-
840	-	10	50	-	50	-
860	-	10	50	-	50	-

3.5 Width. The minimum overall width, after selvage trimming, shall be as specified (see 6.2). Selvages shall be trimmed to give a straight, uniform edge.

3.6 Length and put-up. The coated cloth shall be put-up in rolls as specified in 5.1. The minimum length of any one roll shall be 50 yards. The maximum number of pieces per roll shall be three and no single piece shall be less than 25 yards. The ends of the pieces shall be overlapped, not joined by a seam.

\* 3.6.1 Face side identification. The face side of the cloth shall be identified by applying a stamping on that side of the cloth with the word "Face" on each end of each individual piece.

3.7 Odor. The coated cloth shall be free from any objectionable odor. Characteristic odor of coating is not considered objectionable.

3.8 Workmanship. The finished coated cloth shall conform to the quality of product established by this document. The occurrence of defects shall not exceed the applicable acceptable quality levels.

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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 the document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

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 documents. In addition, testing shall be performed for the characteristics specified in table III. All test reports shall contain the individual values used in expressing the final results. The sample unit for the base cloth shall be 1 yard full width. The lot size shall be expressed in units of 1 yard and the sample size shall be as specified below. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

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

TABLE III. Component tests

<u>Characteristic</u>	<u>Requirement reference</u>	<u>FED-STD-191 test method</u>
Base Cloth:		
Material identification	3.2.1	1530
Weave	3.2.1	Visual
Yarns per inch	3.2.1	5050
Weight, oz./sq. yd.	3.2.1	5041
Color	3.2.1.1 and 3.2.1.2	Visual

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TABLE III. Component tests (cont'd)

Characteristic	Requirement reference	FED-STD-191 test method
Base Cloth: (cont'd)		
Denier	3.2.1	<u>1/</u>
Luster and type	3.2.1	<u>1/</u>
Scouring	3.2.1	<u>1/</u>
Heat set	3.2.1	<u>2/</u>
Coating Compound:		
Composition	3.2.2 and 3.2.3	<u>3/</u>
Plasticizer	3.2.2 and 3.2.3	<u>3/</u>
Dusting powder (when used)	3.2.4	<u>4/</u>

1/ A certificate of compliance shall be furnished with each shipment or lot attesting to compliance with the denier, luster, type, and scouring requirements.

2/ The test specimen shall be a square of cloth at least 12 inches by 12 inches, with sides cut parallel to the warp and filling directions. The test specimen shall be measured in the warp and filling directions and placed flat in an oven, without tension, and exposed to a temperature of  $280^{\circ} \pm 2^{\circ}\text{F}$  for a period of 2 hours. At the end of this period, the specimen shall be removed from the oven and conditioned under standard atmospheric conditions as defined in Section 4 of FED-STD-191 for a minimum of 4 hours. After conditioning, the specimen shall be measured and shall be visually compared with the original unheated cloth for the presence of distortion or puckering. Dimensional change shall be calculated as follows:

$$\text{Dimensional change, percent} = \frac{A - B}{B} \times 100$$

Where: A = Initial measurement

B = Measurement after heating and conditioning.

3/ A certificate compliance shall be furnished with each shipment or lot stating that the coating compound is polyurethane and that no plasticizer has been used.

4/ A certificate of compliance shall be furnished with each shipment or lot stating that the dusting powder (when coated cloth is dusted), does not support mildew growth.



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4.2.2 End item examination.

- \* 4.2.2.1 Yard-by-yard examination. The coated cloth shall be examined for the defects listed below. The required yardage of each roll in the sample shall be examined on both sides. The same yardage shall be given a through-light inspection for pinholes and thinly coated areas. The through-light inspection shall be performed in accordance with MIL-STD-1487. The defects found shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the cloth, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The sample unit shall be 1 linear yard. The inspection level shall be II and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0. The number of rolls from which the sample yardage is to be selected shall be in accordance with table IV. The sample yardage shall be apportioned equally among the selected rolls.

Examine	Defect
Coating	Any cut, hole, tear, scratch, or abrasion mark. Any pinhole. Any uncoated area. Any thinly coated area (applies to face side only). Any pit, blister, tunnel, or delamination of coating. Any lump or heavily coated area. Any crease or wrinkle resulting in doubling or adhesion of surfaces that cannot be corrected by manual pressure. Any spot, stain, or streak more than 1 inch in combined directions. <u>1/</u> Any embedded foreign matter. Any scorch or burn. Any piece not coated on both sides. Any objectionable odor. <u>2/</u> Not clean. Curled, folded, scalloped or rolled edges.
Width	Trimmed width less than minimum specified. Selvages not trimmed. Edges not straight and uniform.

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Examine	Defect
Type II (applies to face side only)	Any skitteriness of pattern exceeding that shown by standard sample. Pattern design not equal to standard sample. Excessive feathering or spew of pattern. Pattern repeat not equal to the standard pattern. Warpwise pattern repeat less than 24.75 inches or more than 28.50 inches.

- 1/ Clearly visible at normal inspection distance (approximately 3 feet).
- 2/ Odors of chemicals commonly used in coating compounds shall not be regarded as objectionable.

TABLE IV. Sample size and acceptance criteria

Lot size (yards)	Sample size (rolls)	Maximum number <u>2/</u>
Up to 1200 inclusive <u>1/</u>	3	0
1201 up to and including 3200	5	0
3201 up to and including 10,000	8	0
10,001 up to and including 35,000	13	0
35,001 up to and including 150,000	20	1
150,001 and over	32	2

1/ If lot contains fewer than three rolls, each roll in the lot shall be examined.

2/ Applicable to length examination defects only (see 4.2.2.2).

- \* 4.2.2.2 Length examination. Each roll of cloth used in the yard by yard examination shall be examined for the defects listed below. If the total number of defects in the sample rolls exceeds the maximum number specified in table IV or if the total of the actual lengths of the sample rolls is less than the total of the lengths marked on the roll tickets, the lot shall be rejected.

Any roll containing more than three pieces.

Any piece in roll less than 25 yards in length.

Any roll with a total length of less than 50 yards.

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Any roll with a total length more than 2 yards less than that marked on ticket.

Any piece joined by a seam.

Any piece not marked with the word "Face" on both ends of the piece.

- \* 4.2.2.3 Shade and appearance examination. During the yard-by-yard examination, each roll in the sample shall be examined on the face side for shade and appearance. If any roll in the sample is off shade or 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, the lot represented by the sample shall be rejected.
- \* 4.2.3 End item testing. The coated cloth shall be tested for the characteristics listed in table V. The methods of testing specified in FED-STD-191 wherever applicable and as listed in table V shall be followed. The sample unit for testing shall be 3 continuous yards, full width, of the coated cloth. The lot shall be unacceptable if any sample unit fails to meet any requirement specified. All test reports shall contain the individual values used in expressing the final results. The sample size shall be in accordance with the following:

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

4.2.3.1 Standard test conditions. Results of physical tests obtained under testing conditions defined in FED-STD-191, FED-STD-406, or FED-STD-601 will be acceptable except in the case of dispute. In dispute cases, tests shall be conducted with both the specimen and test apparatus under standard conditions as defined in FED-STD-191.

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TABLE V. End item tests

Characteristic	Requirement paragraph	Test method
Distribution of coating	3.3	<u>1/</u>
Weight	3.3	5041
Breaking strength	3.3	5102
Tearing strength	3.3	ASTM D 1424
Hydrostatic resistance:		
Initial	3.3	5512 <u>2/</u>
After accelerated weathering	3.3	5804 <u>3/</u> and 5512 <u>2/</u>
After abrasion	3.3	5302 <u>4/</u> and 5512 <u>2/</u>
After strength of coating	3.3	5972 <u>5/</u> and 5512 <u>2/</u>
After high humidity	3.3	4.3.1 and 5512 <u>2/</u>
Colorfastness after accelerated weathering	3.3	5804 <u>3/</u>
Colorfastness after high humidity	3.3	4.3.1
Stiffness, warp only:		
At 70° + 2°F	3.3	5204
At 0° + 2°F	3.3	5204 <u>6/</u>
Adhesion of coating	3.3	5970
Blocking	3.3	5872 <u>7/</u>
Resistance to leakage	3.3	4.3.2
Resistance to insect repellent	3.3	4.3.3
Infrared reflectance:		
Type I	3.4.4.1	4.3.4.1
Type II	3.4.4.2	4.3.4.2

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

2/ The water pressure shall be applied only to the heavier coated side (face) of the coated cloth.

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- 3/ The heavier coated side of the coated cloth shall be exposed to the light source. The exposure period in the weatherometer shall be 100 hours. At the end of the exposure period, the specimens shall be visually examined to determine if the coating has become stiff and brittle or soft and tacky, or if there is evidence of cracking or crazing.
- 4/ A solid rubber diaphragm  $0.030 \pm 0.010$  inch thick with a nonmetallic contact shall be used. The specimen shall be abraded on the heavier coated side of the coated cloth. The heavier coated side of the specimen shall be abraded 1000 double strokes and then tested for hydrostatic resistance with the abraded portion of the test specimen centered in the hydrostatic test area.
- 5/ Except that the specimens shall be stretched at 20 pounds.
- 6/ The test specimens shall be subjected to a temperature of  $0^{\circ} \pm 2^{\circ}\text{F}$  for a minimum of 4 hours and the test shall be performed in a still atmosphere at that temperature.
- 7/ Except that only one specimen shall be tested.
- \* 4.2.4 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1136.

4.3 Methods of inspection.

4.3.1 Resistance to high humidity. Three 4 by 4-inch specimens shall be laid flat, heavier coated side up, on a supporting plate and the assembly placed in a desiccator containing water in the lower portion. The water level shall be approximately 1 inch below the specimens. The lid of the desiccator shall be put in place and the desiccator placed in a circulating air oven having a temperature of  $125^{\circ} \pm 2^{\circ}\text{F}$  for a period of 7 days. At the end of the aging period, each specimen shall be removed from the desiccator, visually examined for colorfastness and then tested immediately in accordance with Method 5512 of FED-STD-191 with the water pressure being applied to the heavily coated side.

4.3.2 Resistance to leakage. The test for resistance to leakage shall be conducted as specified in Method 5516 of FED-STD-191 except that the lightly coated side of the cloth shall contact the water. The hydrostatic head shall be 50 centimeters, and shall be held for 10 minutes. The report shall only include "measurement of the appearance of water drops". The appearance of water drops on any specimen shall be considered a test failure.

4.3.3 Resistance to insect repellent. The insect repellent for use in this test shall conform to type I of O-I-503. Three drops of the repellent shall be placed in the center of a 4 by 8-inch sample of coated cloth with the repellent contacting the heavily coated side. The sample shall be folded to form a 4 by 4-inch square with the heavily coated sides contacting each other.

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The folded sample shall then be placed between two 6 by 6-inch glass plates and a 4-pound weight placed on the assembly and left at standard conditions for 16 hours. The sample shall then be removed from between the glass plates, rated for blocking as required in Method 5872 of FED-STD-191 and immediately examined for conformance with the requirements in table I.

#### 4.3.4 Infrared reflectance tests.

4.3.4.1 Type I. The infrared reflectance shall be determined on the heavier coated side by recording the spectral reflectance relative to MgO or BaSO<sub>4</sub> at 1 micron using a spectrophotometer sensitive in this range (see 6.5) or using a photometer (see 6.6). The photometer shall be calibrated with vitreous enamel gray standards of varying reflectance, certified by the National Bureau of Standards. Readings shall be made on two layers of the specified color while backed with cloth, cotton, sateen, OG-107, and values shall be reported to the nearest percent unit. The infrared reflectance value shall be the average of three individual readings.

4.3.4.2 Type II. Infrared reflectance data shall be determined on the heavier coated side and shall be obtained from 600 to 860 nm relative to a barium sulfate standard white reference. The spectral band width at 860 nm shall be less than 25 nm. Reflectance measurements may be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode operation is used, the spectrophotometer (see 6.5) shall operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates in the visible spectrum either CIE source A or CIE source D65. Specimens shall be measured as a single layer backed with a gray surface with a reflectance of  $20 \pm 5$  percent between 600 and 760 nm and  $32 \pm 7$  percent between 780 and 860 nm. The specimen shall be viewed at an angle no greater than 10 degrees from normal. Photometric accuracy of the spectrophotometer shall be within 1 percent; and the wavelength accuracy shall be within 2 nm.

### 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 coated cloth shall be put-up and preserved in accordance with the applicable requirements of PPP-P-1136.

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 coated cloth shall be packed in accordance with the applicable requirements of PPP-P-1136.

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5.3 Marking. In addition to any special marking required by the contract or purchase order, shipments shall be marked in accordance with the applicable requirements of PPP-P-1136.

6. NOTES

6.1 Intended use. The coated cloth is intended for use in the fabrication of the Parka and Trousers, Wet Weather.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this document.
- b. Type required (see 1.2).
- c. Woodland camouflage pattern drawing if required (see 3.2.1.2.1).
- d. Width required (see 3.5).
- e. Selection of applicable levels of put-up, preservation and packing (see 5.1 and 5.2).

6.3 Standard sample and pattern drawing. For access to the standard shade sample (see 3.1) and the Woodland camouflage pattern drawing, if applicable (see 3.2.1.2.1) address the contracting activity issuing the invitation for bids.

6.4 Coating compound suggestion. The incorporation of an isocyanate (PAPI or MDI) in the top coating using a thermo-plastic polyurethane, or the use of a thermo-setting or cross linked polyurethane has been found necessary to meet the requirements of this document. The coating limitations are intended to guarantee a waterproof cloth with adequate resistance to mildew and bacterial degradation (see 3.2.2).

\* 6.5 Spectrophotometer. The basic instrument for measuring the infrared reflectance is the General Electric Diano Hardy spectrophotometer, but other instruments such as the Beckman DU or DK, Diano Hardy Match-Scan, Cary 14, Hunter D54P-5, or ACS Spectro Sensor spectrophotometers can be used (see 4.3.4.1 and 4.3.4.2).

\* 6.6 Photometer. A photometer capable of performing the necessary measurements is available from:

Hunter Associates Laboratory, Inc.  
11495 Sunset Hills Road  
Reston, VA 22090

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An alternate instrument is the D-40 colorimeter fitted with an S-1 surface phototube and a Corning 2540 filter of appropriate thickness. This instrument is also available from Hunter Labs.

6.7 Suggested dyestuff formulation for type II coated cloth. The dyed ground shade Light Green 354, and the printing of Dark Green 355, Dark Brown 356 and Black 357 may be accomplished by varying the amounts of the following dyestuffs:

Acid Blue 258	Acid Orange 156
Acid Orange 4R	Acid Red 266
Acid Yellow 219	Acid Blue 258

Shade Black 357 may also be satisfactorily printed with the use of carbon black alone or in combination with the above dyes.

6.8 Changes from previous issue. The margins of this document are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

## Custodians:

Army - GL  
Navy - NU  
Air Force - 99

## Preparing activity:

Army - GL  
Project No. 8305-0942

## Review activities:

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



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