

MIL-C-43285C  
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 SUPERSEDING  
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## MILITARY SPECIFICATION

### CLOTH, COATED (CHLOROPRENE BASE COATED, CHLOROSULPHONATED POLYETHYLENE TOP 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 the requirements for two types and five classes of coated cloth to be used in the fabrication of double wall air supported shelters (see 6.2).

Type I	- Cloth, Polyester
Type II	- Cloth, Nylon
Class 1	- Olive green face, black back
Class 2	- Pale green face, black back
Class 3	- Olive green face, pale green back
Class 4	- Pale green face, uncoated back (not applicable to type II cloth)
Class 5	- Natural or gray face, uncoated back (not applicable to type II cloth)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

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## 2. APPLICABLE DOCUMENTS

\* 2.1 Government documents.

- \* 2.1.1 Documents. The following documents form a part of this document 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

PPP-P-1136 - Packaging of Coated (Plastic; Rubber) and Laminated Fabrics

## MILITARY

MIL-C-43286 - Cloth, Plain Weave, Nylon; Cloth, Plain Weave, Polyester

## STANDARDS

## FEDERAL

FED-STD-191 - Textile Test Methods  
 FED-STD-406 - Plastics: Methods of Testing  
 FED-STD-595 - Colors

## MILITARY

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

(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.)

- \* 2.2 Other publications. The following documents form a part of this document 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

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specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1349 - Standard Temperatures and Atmospheres for  
Testing and Conditioning Rubber

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

3. REQUIREMENTS

3.1 Laboratory report approval. Unless otherwise specified at the time of submission of a bid (see 6.2), the bidder shall submit to the contracting officer a certified copy of a recent laboratory report covering material that he proposes to deliver. Unless otherwise specified by the contracting officer, the bidder shall certify that the material was manufactured in a plant where the coating will be performed if a contract is awarded. This laboratory report shall contain test data that demonstrates that the finished product that the contractor proposes to deliver has been tested and found to comply with the requirements of this document. Any of the following types of reports will be satisfactory from the standpoint of this requirement:

- a. An independent or commercial laboratory report.
- b. The prospective contractor's own laboratory report.
- c. A governmental laboratory report from a contract within not more than 6 months of date of submission of bid.

The purpose of the above requirement is to assist the Government in determining the capability of bidders to manufacture a cloth meeting all the requirements of this document. The submission of an acceptable laboratory report under this requirement shall not be construed as relieving a contractor from subsequently meeting all requirements of this document on all deliveries.

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3.2 Standard sample. A standard sample shall be used to determine conformance with shade requirements (see 6.3).

3.3 Material.

3.3.1 Base cloths.

3.3.1.1 Type I. The base cloth for type I coated cloth shall be polyester conforming to type I of MIL-C-43286.

3.3.1.2 Type II. The base cloth for type II coated cloth shall be nylon conforming to type II of MIL-C-43286.

3.3.2 Coating compound.

3.3.2.1 Black base coating. The black coating shall be chloroprene rubber compounded and plasticized only with phthalate or phosphate ester plasticizers and pigmented to a shade of black. An organic isocyanate may be added to this compound in order to achieve the adhesion of coating values specified in table I.

3.3.2.2 Pale green undercoating. The pale green base coating shall be chloroprene rubber compounded and plasticized only with phthalate or phosphate ester plasticizers and pigmented to match Pale Green 34554 of FED-STD-595.

3.3.2.3 Green undercoating. The green undercoating shall be chloroprene rubber compounded and plasticized only with the phthalate or phosphate ester plasticizers and pigmented to match Olive Green 207.

3.3.2.4 Green top coating. The green top coating shall be chlorosulphonated polyethylene compounded and plasticized only with phthalate or phosphate ester plasticizers and pigmented to match Olive Green 207.

3.3.2.5 Pale green top coating. The pale green top coating shall be chlorosulphonated polyethylene compounded and plasticized only with phthalate or phosphate ester plasticizers and pigmented to match Pale Green 34554 of FED-STD-595.

3.3.2.6 Natural or gray coating. The coating shall be natural or gray chloroprene rubber compounded and plasticized only with phthalate or phosphate ester plasticizers.

3.3.3 Dusting material. The dusting material shall be whiting, talc, or other finely divided mineral material that does not support mildew growth.

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**3.4 Application of coating compound.**

**3.4.1 Class 1 cloth.** Class 1 cloth shall be coated in the following sequence:

- a. Coat each side of the base cloth with 2 ounces ( $\pm 0.25$  ounce) per square yard of the black base coating specified in 3.3.2.1.
- b. Coat only the face side of the cloth with 2.7 ounces ( $\pm 0.50$  ounce) per square yard of the green undercoating specified in 3.3.2.3.
- c. Top coat only the face side of the cloth with 2.25 ounces ( $\pm 0.50$  ounce) per square yard of the green top coating specified in 3.3.2.4.

**3.4.2 Class 2 cloth.** Class 2 cloth shall be coated in the following sequence:

- a. Coat each side of the base cloth with 2 ounces ( $\pm 0.25$  ounce) per square yard of the black base coating specified in 3.3.2.1.
- b. Coat only the face side of the cloth with 2.7 ounces ( $\pm 0.50$  ounce) per square yard of the pale green undercoating specified in 3.3.2.2.
- c. Top coat only the face side of the cloth with 2.25 ounces ( $-0.25, +0.50$  ounce) per square yard of the pale green top coating specified in 3.3.2.5.

**3.4.3 Class 3 cloth.** Class 3 cloth shall be coated in the following sequence:

- a. Coat each side of the base cloth with 2 ounces ( $\pm 0.25$  ounce) per square yard of the black base coating specified in 3.3.2.1.
- b. Coat only the face side of the cloth with 2.7 ounces ( $\pm 0.50$  ounce) per square yard of the green undercoating specified in 3.3.2.3.
- c. Top coat only the face side with 2.25 ounces ( $\pm 0.50$  ounce) per square yard of the green top coating specified in 3.3.2.4.
- d. Coat the back side over the black base coating with 1.25 ounces ( $\pm 0.25$  ounce) per square yard of the pale green undercoating specified in 3.3.2.2.
- e. Top coat the pale green undercoating on the back side only with 1.25 ounces ( $-0.25, +0.50$  ounce) per square yard of the pale green top coating specified in 3.3.2.5.

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3.4.4 Class 4 cloth. Class 4 cloth shall be coated in the following sequence:

- a. Coat only the face side of the base cloth with 1.25 ounces ( $\pm 0.25$  ounce) per square yard of the black base coating specified in 3.3.2.1.
- b. Top coat the face side of the cloth with 2.25 ounces ( $\pm 0.25$  ounce) per square yard of the pale green top coating specified in 3.3.2.5.
- c. The back side of the cloth shall show no evidence of coating strike-through from the face of the cloth.

3.4.5 Class 5 cloth. Coat the face side only with 1.7 ounces ( $\pm 0.5$  ounce) per square yard of the gray coating specified in 3.3.2.6.

NOTE: Tolerances may be cumulative, providing that the minimum and maximum weight requirements in table I are met.

3.5 Dusting. All types and classes of coated cloths shall be dusted after coating and before vulcanizing with the dusting compound specified in 3.3.3.

\* 3.6 Coated cloths. All types and classes of coated cloth shall be fully vulcanized and shall conform to all the requirements specified in table I.

TABLE I. Coated cloth requirements

Requirement	Type I		Type II	
	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>
Weight (ounces per square yard):				
Class 1	13.0	15.0	13.0	16.0
Class 2	13.0	15.0	13.0	16.0
Class 3	15.0	18.5	16.0	20.0
Class 4	7.0	8.0	-	-
Class 5	5.2	6.2	-	-

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TABLE I. Coated cloth requirements - Continued

Requirement	Type I		Type II	
	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>
<b>Breaking strength (pounds):</b>				
Warp	160	-	275	-
Filling	160	-	275	-
<b>Tearing strength (grams):</b>				
<b>Initial:</b>				
Warp	3,500	-	10,000	-
Filling	3,000	-	10,000	-
<b>After accelerated weathering <sup>1/</sup> (not applicable to class 5):</b>				
Warp	3,500	-	9,000	-
Filling	3,000	-	8,500	-
<b>After oven aging:</b>				
Warp	3,500	-	9,000	-
Filling	3,000	-	8,500	-
<b>Hydrostatic resistance (pounds per square inch):</b>				
<b>Initial:</b>				
Classes 1, 2, and 3	300	-	200	-
Class 4 only	100	-	-	-
<b>After strength of coating test:</b>				
Classes 1, 2, and 3	250	-	100	-
Class 4 only	85	-	-	-

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TABLE I. Coated cloth requirements - Continued

Requirement	Type I		Type II	
	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>
Hydrostatic resistance (pounds per square inch): - continued				
After abrasion test:				
Classes 1, 2, and 3	250	-	50	-
Class 4 only	85	-	-	-
Stiffness (centimeters), warp only:				
At 70°F	-	13	-	13
At 70°F after accelerated weathering (not applicable to class 5)	-	16	-	16
At minus 40°F	-	20	-	20
At minus 40°F after oven aging	-	20	-	20
Coating adhesion (pounds per 2-inch strip) (not applicable to class 5)				
Heavily coated side:				
Dry	16	-	16	-
Wet	12	-	12	-
Lightly coated side:				
Dry	6.0	-	6.0	-
Wet	6.0	-	6.0	-

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TABLE I. Coated cloth requirements - Continued

Requirement	Type I		Type II	
	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>
Blocking at 200°F (both sides):				
Scale rating	-	No. 2	-	No. 2
Flame resistance (not applicable to classes 4 and 5):				
After flame (seconds):				
Warp	-	3.0	-	-
Filling	-	3.0	-	-
Char length (inches):				
Warp	-	4.5	-	-
Filling	-	4.5	-	-

1/ The coated cloth shall show no evidence of becoming stiff, brittle, soft, or tacky, and there shall be no cracking or crazing when flat or when folded sharply on itself by hand, face out. In addition, there shall be no appreciable change of the color or exudation of the plasticizer in the exposed test specimen when compared with an unexposed test specimen. (Appreciable change means a change that is noticeable at first glance when comparing tested specimen with original.)

\* 3.7 Adherability. Classes 1, 2, 3, and 4 shall show no slippage when tested as specified in 4.3.5. Adherability does not apply to class 5 coated cloth.

3.8 Width. The minimum width, exclusive of selvages, shall be as specified (see 6.2). All selvages shall be trimmed from the coated cloth.

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3.9 Length and put-up. The cloth shall be put-up in rolls as specified in 5.1 in the lengths specified in table II for the applicable class. An individual roll shall contain not more than three pieces, and no piece shall be less than 6 yards in length.

TABLE II. Length and put-up

Class	Linear yards	
	Minimum	Maximum
1	60	74
2	60	74
3	45	55
4	110	125
5	120	150

3.10 Color. The colors Olive Green 207 and black shall match the standard sample (see 6.3), and the color pale green shall match the applicable color number of FED-STD-595.

\* 3.10.1 Matching. The color shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of  $7000 \pm 500\text{K}$ , with illumination of  $100 \pm 20$  foot candles. The color shall be a good match to the standard sample under incandescent lamplight at  $2300 \pm 100\text{K}$ . Specimens dusted with mineral powder shall be wiped with a wet cloth and allowed to dry before color matching.

3.11 Workmanship. The finished cloth shall be clean, evenly coated, and shall conform to the quality and grade of product established by this document, and the occurrence of defects shall not exceed the applicable acceptable quality levels (AQL).

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## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

\* 4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Certificate of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

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

4.2.1 Component inspection. In addition to the quality assurance provisions of applicable subsidiary documents, the coating composition, coating distribution, and dusting powder composition shall be accepted on the basis of a contractor's certificate of compliance with requirements specified for such characteristics.

4.2.2 End item examination.

4.2.2.1 Yard-by-yard examination. The required yardage of each roll shall be inspected on one side only. However, the sample shall be so alternated that, on one out of every three pieces in the sample, the required yardage is examined on the more lightly coated side or uncoated side, as applicable. Visual defects shall be classified as listed in table IV. The same yardage shall be given a through-lighting inspection, for pinholes, and for areas of missing film. The through-lighting equipment shall be as specified in MIL-STD-1487. The defects found shall be counted regardless of their

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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 defects shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The lot size shall be expressed in units of yards. The sample unit shall be 1 linear yard. The inspection level shall be III and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total defects. An approximately equal number of yards shall be examined in each roll of the sample. The number of rolls from which the sample is to be selected shall be as specified in table III.

TABLE III. Sample size

Lot size (yards)	Sample size (rolls)	Acceptance number
1,200 or less <sup>1/</sup>	3	0
1,201 up to and including 3,200	5	0
3,201 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

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

TABLE IV. Yard-by-yard examination

Defect	Classification	
	<u>Major</u>	<u>Minor</u>
Any hole, cut, or tear, including edges	X	
Any pinholes clearly visible by through lighting	X	
Abrasion resulting in a thin or weak place or exposure of cloth structure		X
Any size of blister, tunnels, or delamination of coating	X	

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TABLE IV. Yard-by-yard examination - Continued

Defect	Classification	
	<u>Major</u>	<u>Minor</u>
Clearly visible lump or heavier coated area exceeding 1/2 inch in combined length and width dimensions or area not uniformly coated		X
Crease or wrinkle resulting in doubling that cannot be corrected by manual pressure, or adhesion of surfaces against each other, or any diagonal distortions of surface	X	
Coating missing or noticeably thinner than normal	X	
Coating noticeably heavier than normal		X
Window due to absence or poor blending of pigmentation only		X
Fabric edges rolled, folded, or doubled		X
Spot, stain, or streak		
-one inch or more in combined directions, clearly visible <u>1/</u>	X	
-less than 1 inch but greater than 1/2 inch in combined direction, clearly visible <u>1/</u>		X
Width (overall) less than specified		X
Off shade (see 3.10.1), mottled or shaded color		X
Any tackiness	X	
Fabric edges tight causing puckering or waviness		X
Strike-through to back of the cloth (class 4 only)		X
Any selvage not trimmed		X
Fabric baggy, wavy, or puckered, will not stay flat upon manual pressure <u>2/</u>	X	
Bowed filling more than two inches (measured from straight line cord to maximum point of arc) <u>3/</u>	X	
Bias filling over three inches from horizontal at the greatest point of bias <u>3/</u>	X	
Objectionable odor <u>4/</u>		X

1/ Clearly visible at normal inspection distance of 3 feet.

2/ At the beginning of the examination, the cloth shall be laid out on a table at least 3 feet long by the full width of the cloth. One long side of the table shall be straight, and one edge of the cloth shall be lined up with the straight side of the table. The cloth shall then be visually examined for the indicated defects.

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- 3/ At the beginning of the examination, a cut shall be made 2 inches from the end of the roll, and the cloth ripped across the roll to determine if the filling is bowed or bias.
- 4/ Aromatic odors usually associated with specific types of coating compounds or solvents shall not be regarded as objectionable.

4.2.2.2 Length examination. The lot size shall be expressed in rolls. The sample unit shall be one roll.

4.2.2.2.1 Individual rolls. The number of rolls to be examined and the acceptance number shall be in accordance with table III. The following shall be considered defects:

- a. Any roll (gross length) less than minimum or more than maximum specified.
- b. Any roll containing more than 3 pieces.
- c. Any piece in roll less than 6 yards.

4.2.2.2.2 Total yardage in sample. The lot shall be unacceptable if the total of the gross lengths of the rolls in the sample is less than the total of the gross lengths marked on the tickets.

4.2.2.3 End item testing. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table V shall be followed. The physical and chemical values specified in section 3 apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test method. The lot size shall be expressed in units of yards. The sample unit shall be 5 continuous yards, full width, of the finished cloth. The lot will be unacceptable if one or more units fail to meet any requirement specified. The sample size shall be as follows:

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

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TABLE V. Test methods

Characteristic	<u>Specification reference</u>		Number of determinations per unit	<u>Results reported as</u>	
	Requirement	Test method		Pass or fail	Numerically to nearest
Weight	Table I	5041	5		0.1 ounce
Breaking strength	Table I	5102	5 each direction		1.0 pound
Tearing strength:					
Initial	Table I	4.3.1.1	5 each direction		(see 4.3.1.1)
After accelerated weathering	Table I	4.3.1.2	5 each direction		(see 4.3.1.1)
After oven aging	Table I	4.3.1.3	5 each direction		(see 4.3.1.1)
Hydrostatic resistance:					
Initial	Table I	4.3.2.1	5		1.0 psi
After strength of coating test	Table I	4.3.2.2	5		1.0 psi
After abrasion test	Table I	4.3.2.3	5		1.0 psi
Stiffness:					
At 70°	Table I	4.3.3.1	5 warp only		1.0 mm
At 70° after accelerated weathering	Table I	4.3.3.2	5 warp only		1.0 mm

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TABLE V. Test methods - Continued

Characteristic	<u>Specification reference</u>		Number of determin- ations per unit	<u>Results reported as</u>	
	Requirement	Test method		Pass or fail	Numerically to nearest
Stiffness: (continued)					
At minus 40°F	Table I	4.3.3.3	5 warp only		1.0 mm
After oven aging	Table I	4.3.3.4	5 warp only		1.0 mm
Adhesion of coating (dry and wet) <u>1/</u>	Table I	4.3.4	5 dry, 5 wet		0.1 pound
Blocking	Table I	5872 <u>2/</u>	3	X	
Flame resistance:					
After flame	Table I	5903	5 each direction		1/5 second
Char length	Table I	5903	5 each direction		0.1 inch
Adherability					
At 70°F	3.7	4.3.5	1	X	
At 200°F	3.7	4.3.5	1	X	

1/ Except that the length of the test specimens shall be 8 inches.

2/ Except that the test temperatures shall be 200°F.

4.2.3 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1136.

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\* 4.3. Methods of inspection. Results of physical tests obtained under testing conditions defined in FED-STD-191, FED-STD-406, or ASTM D 1349 will be acceptable except in case of dispute. In dispute cases, tests shall be conducted with both specimen and test apparatus under standard conditions as defined in FED-STD-191.

4.3.1 Tearing strength.

4.3.1.1 Initial. The initial tearing strength test shall be conducted as specified in Method 5132 of FED-STD-191. For type I cloths, results shall be reported to the nearest 100 grams. For type II cloths, results shall be reported to the nearest 200 grams.

4.3.1.2 After accelerated weathering. Specimens shall be subjected to an accelerated weathering test specified in Method 5804 of FED-STD-191 for a period of 200 hours without filters but with framework supports remaining. When testing class 1 or class 3 cloths, the olive green side of the cloth shall be exposed. When testing class 2 cloths, the pale green side shall be exposed. After exposure, the specimens shall be allowed to air dry and then brought to equilibrium under standard conditions prior to testing for tearing strength as specified in 4.3.1.1.

NOTE: Attention is called to manufacturers who own weathering apparatus that operates at one cycle in two hours and with the water spray on continually. This equipment may continue to be used. However, the one cycle per minute shall be the standard procedure in the event of dispute, and the laboratory reports shall state the procedure used.

4.3.1.3 After oven aging. Specimens shall be exposed in a circulating air oven at  $180 \pm 2^{\circ}\text{F}$  for 100 hours, withdrawn from the oven, and brought to equilibrium under standard conditions prior to testing for tearing resistance as specified in 4.3.1.1.

4.3.2 Hydrostatic resistance.

4.3.2.1 Initial. The initial hydrostatic resistance test shall be conducted as specified in Method 5512 of FED-STD-191. The water pressure shall be applied to the more heavily coated side of the cloth.

4.3.2.2 After strength of coating. Test specimens shall first be subjected to the strength of coating test in Method 5972 of FED-STD-191. These same specimens shall then be tested for hydrostatic resistance as specified in 4.3.2.1.

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4.3.2.3 After abrasion. Test specimens shall be abraded as specified in Method 5302 of FED-STD-191 except that the abradant shall be the coated cloth. The olive green side of classes 1 and 3 and the pale green side of class 2 cloth shall abrade the face of the specimen for 1000 multidirectional cycles (i.e., the test specimen and the abradant shall be face to face). After abrading, the specimens shall be tested for hydrostatic resistance as specified in 4.3.2.1.

4.3.3 Stiffness.

4.3.3.1 At 70°F. Stiffness test shall be conducted as specified in Method 5204 of FED-STD-191.

4.3.3.2 At 70°F after accelerated weathering. Test specimens shall be exposed to accelerated weathering test specified in 4.3.1.2 and tested for stiffness as specified in Method 5204 of FED-STD-191.

\* 4.3.3.3 At minus 40°F. Stiffness test shall be conducted as specified in Method 5204 of FED-STD-191. Test shall be performed at minus  $40 \pm 5^\circ\text{F}$  after specimens and equipment have been conditioned at this temperature for a minimum of 4 hours before testing. This test shall be conducted in still air.

4.3.3.4 After oven aging. Test specimens shall be exposed in a circulating air oven at  $180 \pm 2^\circ\text{F}$  for 100 hours, withdrawn from the oven, and brought to equilibrium under standard conditions prior to testing. The conditioned specimens shall then be tested for stiffness at minus  $40^\circ\text{F}$  as specified in 4.3.3.3.

\* 4.3.4 Adhesion of coating (dry and wet). The adhesion of coating shall be determined by Method 5970 of FED-STD-191 with the exception that 5.1 of Method 5970 (but not 5.1.1 and 5.1.2) shall be deleted and the following shall be substituted:

"5.1 Preparation of specimen. Unless otherwise specified in the material specification, the coated side of a 1-side coated cloth or the more heavily coated side of cloth that has been coated on both sides shall be the side of the cloth to be tested. The surface shall be cleaned by wiping with a piece of cloth dipped in a mild soap solution, then rinsed with distilled water, and air dried.

a. Adhesive a. The specimens shall first be prepared with adhesive (a) without abrading the surface. If valid values as stated in 6.1 are not obtained, adhesion of the specific coated fabric shall then be determined by lightly abrading each surface to be adhered using 80-grit carborundum cloth, then washing the surface with a toluol-wetted, clean

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cloth. The cleaned surfaces shall be allowed to dry for 10 to 15 minutes at room temperature. One coat of adhesive (a) shall be applied to the test sides of the two strips of the specimen. The strips shall be placed one on top of the other with the adhesive coated side together.

Adhesive b. If a proper bond is not obtained with adhesive (a), adhesive (b) shall be used without abrading the surface. If valid values stated in 6.1 are not obtained, adhesion of the specific coated fabric shall then be determined by lightly abrading each surface to be adhered with 80-grit carborundum cloth, then washing the surface with a toluol-wetted, clean cloth. The cleaned surfaces shall be allowed to dry for 10 to 15 minutes at room temperature. Three coats of the solvent adhesive shall be applied to the test sides of the two strips of the specimen, with a 15-minute drying time at room temperature after the first and second coat of adhesive and a 5-minute drying time at room temperature after the third coat of adhesive. The strips shall then be placed one on top of the other with the adhesive coated sides together.

To facilitate the initial separation of the specimen, use either method outlined in 5.1.1 or 5.1.2."

Initial dry adhesion shall be stopped after a 3-inch separation. The specimen shall be immersed in distilled water at room temperature for 24 hours, dried, and the wet adhesion shall be determined on the remainder of the specimen.

Adherability of coated cloth.

Preparation of lap seam. Two rectangular swatches of coated cloth, each 8 inches by 10 inches, shall be cut with the longer dimension parallel to the longer dimension of the coated cloth. The two swatches shall be joined by cementing to form a lap seam with the chlorosulphonated polyethylene side of one swatch shall be adhered to the chloroprene side of the other swatch. (NOTE: When testing class 4 cloth, the coated side of one swatch shall be adhered to the uncoated side of the other swatch.) The seam shall be made by overlapping the 8-inch swatches 4 inches. The areas to be cemented shall be thoroughly abraded using 80-grit carborundum cloth, then washed with a toluol-wetted, clean cotton cloth. The cleaned surfaces shall be allowed to dry for 10 to 15 minutes at room temperature. Two coats of two-part neoprene cement Bostik 1039/Boscodur (see 6.5) shall be applied to each of the prepared surfaces. The first coat on each surface shall be allowed to dry for 15 minutes. Five minutes after the application of the second coat, the two swatches shall be assembled and shall be rolled down the seam with a steel roller. The sample seam shall be allowed to cure at room temperature for 24 hours prior to testing.

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4.3.5.2 Test specimens. One-inch wide strips shall be cut from the sample lap seam prepared as specified in 4.3.5.1. The strips shall be cut with their long dimension perpendicular to the seam.

4.3.5.3 Apparatus. Apparatus shall consist of grip clamps for anchoring and for load-application of a type that shall preclude failure of the specimens at or in the grips and that shall hold the specimens uniformly across the 1-inch dimension.

\* 4.3.5.4 Procedure. Anchor one end of the specimen in a clamp and apply a load of 40 pounds at the other end for 4 hours at 65 percent ( $\pm 2$  percent) relative humidity and at a temperature of  $70 \pm 2^\circ\text{F}$ . The anchoring and load-application clamps shall be applied to the specimen not closer than 2 inches from the lap seam, and the load shall be applied uniformly and without twist. Make gage marks at the lap seam to assist in determining slippage. Repeat this procedure using new specimens with the exposure temperature raised to  $200 \pm 3^\circ\text{F}$ .

## 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.

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

## 6. NOTES

6.1 Intended use. The coated cloth is intended for use in the manufacture of air supported shelter tents.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Type and class of fabric required (see 1.1).
- c. When laboratory report approval is not required (see 3.1).

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- d. Width of cloth required (see 3.8).
- e. Selection of the applicable levels of put-up, preservation, and packing (see 5.1 and 5.2.)

6.3 Standard sample. For access to samples, address the contracting activity issuing the invitation for bids.

6.4 Top coat. As a starting point in the development of a suitable Hypalon top coat to meet the performance requirements specified herein, Dupont base formulation #2301F-233 is available from Elastomer Chemical Department, E. I. DuPont de Nemours Company, Wilmington, Delaware 19898.

6.5 Neoprene cement. Bostik 1039/Boscodur 5 (16 to 1 ratio by volume) may be obtained from USM Corporation, Chemicals Division, Middleton, MA 01949.

\* 6.6 Subject term (key word) listing.

Chloroprene base coated  
Chlorosulphonated polyethylene coated  
Cloth  
Coated cloth  
Tentage

6.7 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, as written, irrespective of the marginal notations and relationship to the last previous issue.

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Custodians:

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Air Force - 99

Preparing activity:

Army - GL  
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