

CCC-C-700J
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SUPERSEDING
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FEDERAL SPECIFICATION

CLOTH, COATED, VINYL COATED (ARTIFICIAL LEATHER)

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

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers coated cloth with and without an embossed leather grain intended for use as upholstery covering, and other special uses (see 6.1).

1.2 Classification.

1.2.1 Classes and treatments. The coated cloth shall be of the following classes and treatments as required (see 6.2).

Classes:

Class 1 - 15.0 oz per sq yd
Class 2 - 18.0 oz per sq yd
Class 3 - 20.0 oz per sq yd
Class 4 - 25.0 oz per sq yd
Class 5 - 29.0 oz per sq yd
Class 6 - 40.5 oz per sq yd
Class 7 - 18.0 oz per sq yd
Class 8 - (see 6.6)
Class 9 - 25.0 oz per sq yd
Class 10 - 18.0 oz per sq yd

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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Treatments:

- a. Fire resistant
- b. Mildew resistant
- c. Oil resistant

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents of the issue in effect on the date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

Federal Specifications

- TT-S-735 - Standard Test Fluids; Hydrocarbon
- CCC-D-950 - Dyeing and Aftertreating Process for Cotton Cloths
- PPP-P-1136 - Packaging of Coated (Plastic; Rubber) and Laminated Fabrics

Federal Standards

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

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification, and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Washington, DC; Philadelphia, PA; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

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Military Standards

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

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Chromatic Transference Scale

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 1349 - Rubber - Standard Temperatures and Atmospheres for Testing and Conditioning
- 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 specifications and standards 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 specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Samples.

3.1.1 Guide samples. When applicable, the contracting officer will furnish guide samples for grain and guide samples for patterns containing more than one color (see 6.3.1). Samples, when furnished, are solely for guidance and information to the contractor. Variation from the specification may appear in the sample, in which case the specification shall govern.

3.1.2 Standard samples. Unless otherwise specified, a standard sample for color shall apply (see 6.3).

3.2 Materials. The materials specified shall conform to applicable documents and requirements specified herein. Recycled material may be used (see 6.5).

3.2.1 Base cloth. The base cloths shall conform to the requirements for applicable classes as specified in table I. All classes shall be woven cloths except classes 4 and 7, which shall be knitted cloths, and classes 9 and 10, which shall be needle-punched nonwoven cloths. The base cloth may be spliced for the purpose of coating; however, after coating, the splice area shall be cut out.

TABLE I. Base cloth requirements

Class	Commercial designation
1	Cotton sateen 1.32 or 1.2 yd/lb
2	Cotton sateen 1.12 or 1.02 yd/lb [1]
3	Cotton broken twill 1.14 or 1.06 yd/lb [1]
4	6.70 oz/sq yd (knitted) [2]
5	Chafer duck - 11.65 oz/sq yd
6	Chafer duck - 11.65 oz/sq yd
7	5.20 oz/sq yd

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TABLE I. Base cloth requirements - Continued

Class	Commercial designation
9	Needlepunch, [4] synthetic nonwoven cloth, 5.0 oz/sq yd
10	Needlepunch, [4] synthetic nonwoven cloth, 4.0 oz/sq yd

- [1] An alternate base cloth may be substituted for classes 2 and 3. The alternate cloth shall conform to the following physical requirements when tested as specified in 4.2.1:
- a. Fiber - spun polyester
 - b. Weight (ounces) per square yard - 3.25 (min)
 - c. Weave - 2/1 twill
 - d. Color - natural
- [2] An alternate base cloth conforming to the following requirements may be substituted for class 4, treatments (a) and (c):
- a. Fiber blend - 65 percent polyester and 35 percent cotton
 - b. Type of cloth - jersey knit
 - c. Weight, (ounces per square yard) - 4.0
 - d. Construction, minimum:
 - Wales per inch - 25
 - Courses per inch - 25
 - e. Bursting strength (pounds), minimum - 100
 - f. Color - natural
- [3] The needle-punched nonwoven cloth for class 9 shall conform to the following physical requirements when tested as specified in 4.2.1:
- a. Fiber blend of modacrylic and polyolefin fibers
 - b. Weight, (ounces per square yard) - 5.0 +/- 0.5
 - c. Thickness (inches), minimum - 0.070
 - d. Bursting strength (pounds), minimum - 115
 - e. Breaking strength (pounds), minimum:
 - Machine direction - 35
 - Cross machine direction - 85

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[4] The nonwoven cloth for class 10 shall be a fiber batting needle-punched to one side of a flexible foam; the foam side shall be the face of the finished cloth. The fiber batting shall be composed of flame retardant polyester fiber; the flexible foam shall be an open cell polyurethane foam (0.7 oz/yd[square] nominal weight, 0.030 inch nominal thickness). The finished cloth shall conform to the following physical requirements when tested as specified in 4.2.1:

- a. Weight (ounces) per square yard - 4.0 +/- 0.5
- b. Thickness (inches), minimum - 0.070
- c. Bursting strength (pounds), minimum - 35
- d. Breaking strength pounds, minimum:
 - Machine direction - 10
 - Cross machine direction - 15

3.2.2 Mildew inhibitor. When treatment b is specified, either the base cloth or the coating compound shall be treated with mildew inhibitor. The mildew inhibitor used must be approved (see 6.4).

3.2.2.1 Treatment of base cloth (applicable to cotton cloth only). The base cloth shall be treated in accordance with CCC-D-950.

3.2.2.2 Treatment of the coating. The treatment for the coating shall be limited to solubilized copper-8-quinolinolate. The disposition of the mildew inhibitor shall be 0.18 to 0.27 percent as copper base on the nonvolatile content of the coating, when tested as specified in 4.2.3.

3.2.3 Coating compound.

3.2.3.1 Treatment b not specified. When treatment (b) is not specified, the coating compound shall be formulated from vinyl chloride polymer or vinyl chloride acetate copolymer. Materials containing mercurial compounds or water soluble ingredients shall not be used.

3.2.3.2 Treatment b specified. When treatment (b) is specified, the coating compound shall conform to the requirements of 3.2.3.1 when inhibitor (d) of CCC-D-950 is used. In addition, only phosphate or phthalate ester plasticizers shall be used.

3.2.4 Coated cloth. The coated cloth shall consist of a base cloth, as specified in 3.2.1, coated on the face side with the coating compound specified in 3.2.3. The reverse side of the fire-resistant coated cloth may be flash coated with the same coating compound used on the face side. The weight of the flash coating shall not exceed 0.5 ounce per square yard and

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shall be exclusive of the minimum coating weight on the face side required in table II. The coated cloth shall meet the requirements for the applicable classes as specified in table II when tested as specified in 4.2.3.

TABLE II. Coated cloth requirements

Characteristic	Class								
	1	2	3	4	5	6	7	9	10
Weight (oz/sq yd), minimum	15.0	18.0	20.0	25.0	29.0	40.5	18.0	25.0	18.0
Coating weight (oz/sq yd), min.	7.0	8.0	10.5	18.5	17.5	29.5	12.8	18.5	13.5
Breaking strength (pounds), min: [1]									
Warp, wales or machine	125	140	120	110	140	140	80	140	90
Filling, courses or cross machine	100	130	120	100	140	140	70	140	90
Tearing strength (grams), min: [1]									
Warp, wales or machine	2200	2200	2200	4500	4400	4700	3700	6000	6000
Filling, courses or cross machine	2400	2400	2400	2500	4400	4700	3700	6000	6000
Abrasion resistance	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Adhesion of coating (lb/2 in. width), min.	8.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	8.0

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TABLE II. Coated cloth requirements - Continued

Characteristic	Class								
	1	2	3	4	5	6	7	9	10
Accelerated weathering (200 hours)	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
Blocking scale rating, max.	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3
Colorfastness to crocking, min.	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Elongation (percent), min:									
Wales	-	-	-	5	-	-	5	-	-
Courses	-	-	-	25	-	-	25	-	-
Machine	-	-	-	-	-	-	-	25.0	25.0
Cross machine	-	-	-	-	-	-	-	25.0	25.0
Hydrostatic resistance (lb/sq in.), min.	70	100	100	100	100	100	100	150	100
Cold resistance at -20 deg. +/- 2 deg. F.	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]
Plasticizer loss (percent) max:									
Activated carbon extraction	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

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- [1] Except for classes 9 and 10, the breaking strength and tearing strength of the fire-resistant treated material shall be not less than 80 percent of the applicable minimum values shown.
- [2] No visual loose fibers of the base cloth shall be exposed in the center 1 inch of abraded portion. Visible loose fibers shall be regarded as fibers from the cotton yarns or polyester used to weave the base cloth and not as entire yarns or yarn plies or as fibers from the nonwoven base cloth.
- [3] There shall be no "appreciable" fading of the color, discoloration, exudation, development of tackiness, or stiffness. "Appreciable" means a change that is noticeable on first glance in comparing the tested specimen with the original.
- [4] The coating shall not crack through to the base cloth.

3.2.5 Treated coated cloth. The coated cloth with treatment a, b, c, or any combination thereof shall conform to the requirements specified in table III in addition to those specified in table II.

TABLE III. Requirements for treated coated cloth

Treatment	Characteristic	Requirement
a. Fire resistance	Flame resistance:	
	After flame (seconds), max.	2.0
	Char length (inches), max.	3.0
	Breaking strength after accelerated aging	[1]
b. Mildew resistance	Mildew inhibitor content	(see 3.2.2)
c. Oil resistance	Oil resistance	[2]

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- [1] The breaking strength of the treated coated cloth after accelerated aging shall be not less than 75 percent of initial breaking strength of the treated coated cloth.
 - [2] There shall be no indication that the oil has permeated the coated cloth.
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3.3 Color and grain. Color and grain shall be as specified (see 6.2).

3.3.1 Color. The color shall match the applicable color number of FED-STD-595 or other color standard or shall match the approved standard sample for the color specified where such a standard is applicable (see 6.3).

3.3.1.1 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 +/- 500K, with illumination of 100 +/- 20 foot candles. The color shall be a good match to the standard sample under incandescent lamplight at 2300 +/- 100K.

3.3.2 Grain. The grain shall match the approved grain standard where such a standard is applicable (see 6.3.1 and 6.3.2).

3.4 Width. All selvages of the coated cloth shall be trimmed. After trimming, the width of the finished coated cloth shall be a minimum of 54 inches.

3.5 Length and put-up. When the coated cloth is purchased directly by the Government, it shall be put up on rolls as specified in 5.1. The length of rolls shall be as specified in table IV. An individual roll shall contain not more than three pieces, and no piece shall less than six yards in length. Splicing of the coated cloth is prohibited.

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TABLE IV. Length of rolls

Class	Linear yards	
	Minimum	Maximum
1	70	90
2	50	73
3	50	67
4	40	53
5	35	46
6	25	32
7	50	73
9	35	55
10	40	60

3.6 Marking. For identification purposes, the manufacturer's name or trademark and the month and year of manufacture shall be permanently and legibly marked on the back of the coated cloth with a nontransferable marking material. The marking shall be positioned 8 inches in from both selvages and shall be repeated at intervals of not more than 24 inches. The size of the letters and numerals shall be 1/2 inch for classes 1 through 7 and 1 inch for classes 9 and 10.

3.7 Workmanship. The finished cloth shall be clean, evenly coated, and shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels.

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

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

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

4.2 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 specifications and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document. In addition to the quality assurance provisions of applicable subsidiary specifications and standards, testing shall be performed on components and materials listed in table V for the characteristics shown. The lot size shall be expressed in units of yards. The sample unit for testing shall be 1 yard, and the sample size shall be 5 for lots of 22,000 units and under and 8 for all lots of 22,001 units and over. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

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TABLE V. Component test methods

Component	Requirement paragraph	Test method
Base cloth:		
Material	3.2.1	Visual [1]
Weave or type of material as applicable	3.2.1	Visual [1]
Weight	3.2.1	5041 [2]
Thickness (classes 9 and 10)	3.2.1	5030 [2, 3]
Bursting strength (classes 9 and 10)	3.2.1	5120 [2]
Breaking strength (classes 9 and 10)	3.2.1	5100 [2]
Base knitted cloth (alternate for class 4):		
Material (fiber blend)	3.2.1	[1]
Weight	3.2.1	5041 [2]
Yarns per inch	3.2.1	5070 [2]
Bursting strength	3.2.1	5120 [2]
Color	3.2.1	Visual [4]
Mildew inhibitor content	3.2.2	CCC-D-950
Coating compound	3.2.3	[5]

[1] Unless otherwise specified, a certificate of compliance shall be furnished and will be acceptable for the stated requirements.

[2] Specified in FED-STD-191.

[3] The total pressure applied by pressure foot shall be 0.60 +/- 0.03 lb/sq in.

[4] Required for class 2 spun polyester alternate and class 4 alternate base cloth only.

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- [5] A certificate of compliance shall be furnished with each shipment or lot citing conformance to the applicable requirements for the coating compound.

4.2.2 End item examination.

4.2.2.1 Yard-by-yard examination. The required yardage of each roll shall be inspected on the coated side for the defects listed herein. All defects shall be counted regardless of their proximity to one another, except where two or more defects represent a single local condition of the cloth, in which case only one 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 lot size shall be expressed in units of yards. The sample unit shall be one linear yard. The inspection level shall be II and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5. An approximate equal number of yards shall be examined from each roll selected. The number of rolls over which the sample yardage shall be distributed shall be in accordance with table VI. For definition of coated cloth imperfections, see MIL-STD-1487.

TABLE VI. Sample size

Lot size (yards)	Sample size in rolls	Acceptable number of defects
Up to 1200 [1]	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

[1] If a lot contains fewer than 3 rolls, each roll shall be examined.

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Defects

Any uncoated area.
 Any thinly coated area evidenced by light area or window.
 Any separation of coating from base cloth.
 Any evidence of a splice or any impression in coating resulting from splicing.
 Cracked or checked coating.
 Any blister, tunnel, foreign matter, or lump.
 Nonuniform coating.
 Any wrinkle or crease on coated surface.
 Any cut, hole, tear, or coated surface scratch or abrasion.
 Curled, folded, doubled, or rolled edge.
 Dirt, spot, or stain.
 Any transfer of marking to the face of the cloth.
 Width less than minimum specified.
 Color not as specified.
 Color off shade, not uniform, mottled, blotchy, or spotted.
 Grain not as specified (see 3.3.2).
 Grain indistinct or not uniform.
 Tackiness (coating adheres to opposite surfaces upon unrolling).
 Dimensional distortion and waviness (cloth does not lie uniformly flat along its entire width when no tension is applied).
 Objectionable odor.

NOTE: Aromatic odors usually associated with specified types of coating compounds shall not be regarded as objectionable.

4.2.2.2 Examination for length and identification marking. Each roll in the sample shall be examined for the defects listed in table VII. The lot size shall be expressed in units of rolls. The sample unit for this examination shall be one roll. The sample size and acceptance number shall be as shown in table VI.

TABLE VII. Length and identification examination

Examine	Defect
Rolls for total length	Length of roll more or less than specified (see table IV) Length of roll less than length indicated on roll ticket

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TABLE VII. Length and identification examination - Continued

Examine	Defect
Roll for number and length of pieces	More than 3 pieces in roll Any piece less than 6 yards in length
Rolls for total length	Actual total length of rolls in sample is less than the total yards marked on piece ticket
Roll for identification marking	Marking information inaccurate Marking illegible or incomplete Marking not positioned as specified or does not appear at specified intervals Size of letters and numerals varies from size specified by more than +/- 1/4 inch

4.2.3 End item testing. The methods of testing specified in FED-STD-191, whenever applicable, and as listed in table VIII shall be followed. The requirements for all tests are referenced in tables II and III. Except for abrasion resistance and blocking, the physical values specified apply to the average of determinations made on a sample unit for test purposes as specified in the applicable test methods. For the characteristics "abrasion resistance" and "blocking," the requirement shall apply to each determination separately. The sample unit for test purposes shall be 3 yards full width of finished cloth. The lot size shall be expressed in units of yards. The sample size (number of sample units) shall be as shown below. The lot shall be unacceptable if one or more units fail to meet any requirement specified. For those characteristics where test results are reported as pass or fail, there shall be no evidence of failure of any test specimen to meet the requirements as specified.

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

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TABLE VIII. Test Methods

Characteristics	Requirement paragraph	Test method
Total weight	3.2.4	4.3.1
Coating weight	3.2.4	4.3.1
Breaking strength:		
Classes 1 through 7:		
Warp or wales	3.2.4	5100
Filling or courses	3.2.4	5100
Classes 9 through 10:		
Machine direction	3.2.4	5100
Cross machine direction	3.2.4	5100
Tearing strength:		
Classes 1 through 7:		
Warp or wales	3.2.4	ASTM D 1424
Filling or courses	3.2.4	ASTM D 1424
Classes 9 and 10:		
Machine direction	3.2.4	ASTM D 1424
Cross machine direction	3.2.4	ASTM D 1424
Abrasion resistance	3.2.4	4.3.2
Adhesion of coating	3.2.4	4.3.3
Resistance to accelerated weathering	3.2.4	4.3.4
Blocking	3.2.4	5872
Colorfastness to crocking	3.2.4	[1]
Elongation:		
Classes 4 and 7:		
Wales	3.2.4	4.3.5
Courses	3.2.4	4.3.5

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TABLE VIII. Test methods - Continued

Characteristic	Requirement paragraph	Test method
Classes 9 and 10:		
Machine direction	3.2.4	4.3.5
Cross machine direction	3.2.4	4.3.5
Hydrostatic resistance	3.2.4	5512 [2]
Cold resistance	3.2.4	5874 [3]
Plasticizer test:		
Activated carbon extraction	3.2.4	4.3.6
Additional tests on coated cloths:		
Treatment a:		
Flame resistance:		
Flame time	3.2.5	5903
Char length	3.2.5	5903
Breaking strength after accelerated aging:		
Warp or wales	3.2.5	5850 [4] and 5100
Filling or courses	3.2.5	5850 [4] and 5100
Treatment b:		
Mildew inhibitor content for copper-8-quinolinolate when added to coating	3.2.5	4.3.7
Treatment c:		
Oil resistance	3.2.5	4.3.8

[1] The specimen shall be tested on the coated side, using the AATCC Chromatic Transference Scale as a reference.

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- [2] The water pressure shall be applied to the coated side.
 - [3] Except that a 5-lb roller shall be used in testing classes 1, 2, 3, and 7, and the specimens shall be exposed at minus 20 deg. +/- 2 deg. F for a period of 2 hours. One specimen shall be tested per sample unit. The hydrostatic test shall not be performed.
 - [4] Except that the test shall be for a period of 7 days at 158 deg. +/- 2 deg. F.
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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. 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 the specimen and test apparatus under standard conditions as defined in FED-STD-191.

4.3.1 Determination of total weight and coating weight. The total weight of the coated cloth shall be determined in accordance with Method 5041 of FED-STD-191. The same specimens shall then be used to determine the weight of the coating in accordance with the following procedure:

Soak the back of the specimen with cyclohexanone or other suitable solvent to assist in stripping the coating from the cloth (flash coated materials may be totally immersed in a container of solvent prior to stripping). The cloth, as well as any loose fibers or yarns that may have been separated from the piece during stripping, shall be immersed in hot cyclohexanone (approximately 82 deg. C (180 deg. F)) for two to five hours, and then thoroughly rinsed with methyl ethyl ketone, dried, and reweighed. The loss in weight of the specimen will indicate the weight of the coating.

4.3.2 Abrasion. The resistance to abrasion shall be determined as specified in Method 5304 of FED-STD-191, with the following exceptions:

- a. The long dimension of the specimen shall be parallel to the lengthwise direction of the sample.
- b. The tension on the specimen shall be 6 pounds.
- c. The load on the specimen shall be 3 pounds.
- d. The abradant shall be silicon-carbide cloth 240 grit.

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e. The wear on the coating shall be observed after 300 double rubs for class 1 coated cloth and the test discontinued. For all other classes, the abradant shall be changed after each 250 double rubs and the test continued. Classes 2, 3, and 7 shall be subjected to 500 double rubs; classes 4 and 5 to 1500 double rubs; class 6 to 2500 double rubs; class 10 to 500 double rubs; and class 9 to 1500 double rubs.

f. Three specimens shall be tested from each sample unit.

g. Results of this test shall be reported as pass or fail. The specimen shall fail if visible loose fibers are exposed in the center one inch of the abraded portion.

NOTE: Prior to the test, the uncoated and coated side of all test specimens shall be examined and discarded if base cloth defects which may affect test results are discovered.

4.3.3 Coating adhesion. If the coating can be separated from the cloth of the test specimen without the aid of a solvent or adhesive, the specimens shall be tested in the following manner:

The specimen shall be 2 inches wide by 8 inches in length. Prepare the specimen for test by carefully cutting the coating through to the cloth on two parallel cuts one inch apart with the cuts running the length of the specimen. Each cut shall be approximately 1/2 inch from the edge of the specimen. One cut shall extend from one end to within one inch of the opposite end. The other parallel cut shall extend from one end to within 2 inches of the opposite end. Join the ends of the cuts together with a diagonal cut, which shall be carefully cut through the coating to the cloth. Work the edge of a knife under the point formed by the cuts, and separate the coating of the 1-inch strip from the backing for a distance of 2 inches from that point. Clamp the separated portion of the 1-inch strip in the lower jaw of the testing machine and clamp the end of the specimen in the other jaw so that the movement of the lower jaw will separate the coating from the base cloth. The rate of travel of the lower jaw shall be 12 inches per minute. The adhesion of the specimen shall be the average of the five highest peak loads of resistance registered for 3 inches of separation of the coating. The adhesion of coating shall be reported as specified in Method 5970 of FED-STD-191, and three specimens shall be tested from each sample unit.

4.3.3.1 Coating adhesion. If the coating cannot be removed as specified in 4.3.3, coating adhesion shall be determined by Method 5970 of FED-STD-191.

4.3.4 Weatherometer test. The test shall be performed for a period of 200 hours on a specimen 3 by 6 inches minimum with the coated side exposed as specified in Method 5804 of FED-STD-191.

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4.3.5 Elongation (applicable to classes 4, 7, 9 and 10 only). The elongation test shall be conducted in the following manner:

- a. Cut a 3 by 9-inch specimen from the center section of the coated cloth with the long dimension of the specimen parallel to the direction of the coated cloth being tested. Mark off a 3-inch long section in the center of the specimen.
- b. Clamp one end of the specimen in a fixed clamp such that the specimen will hang vertically. Clamp a 27-lb weight to the other end of the specimen and suspend it vertically for 10 minutes.
- c. Before removing the weight, measure the increase in length of the 3-inch section and calculate the percent elongation based on the original 3-inch section.

NOTE: If the result of the first tested specimen does not meet the specification requirement, three additional specimens from the sample unit shall be tested. The percent elongation of the sample unit shall then be computed as the average value obtained from testing the four specimens.

4.3.6 Plasticizer test.

4.3.6.1 Activated carbon extraction. The volatile loss of the coated cloth shall be determined in accordance with Method 6081 of FED-STD-406, except that two 2 by 2-inch specimens shall be heated at 104 deg. +/- 2.7 deg. C for a period of 24 hours.

4.3.7 Analysis of copper-8-quinolinolate added to the coating compound. When the mildew inhibitor is added to the coating compound, the coated cloth shall be analyzed for metallic copper content according to Method 2050 of FED-STD-191, except that the specimen shall be 5 grams and that the results of the analysis shall be expressed as follows:

$$\text{Copper content (percent)} = \frac{\text{Weight of copper deposit (grams)} \times 100}{\frac{A \times B - C}{B}}$$

where A = Sample weight (grams) of coated cloth,

B = Weight (oz/sq yd) of coated cloth, and

C = Lot average weight (oz/sq yd) of base cloth.

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4.3.8 Oil resistance. Place an 8 by 8-inch specimen on a wood frame. The inside dimension of the wood frame shall be 6 inches by 6 inches by 1 inch. Insert the coated cloth with the coated side up. Force the specimen into the frame by a wooden block 5-3/4 inches by 5-3/4 inches by 3/4 inch with rounded corners to form a basin of uniform depth. Tack the edges of the specimen to the frame and remove the block. Pour oil conforming to type IV of TT-S-735 into the basin as rapidly as possible to a depth of 1/2 inch. After the oil has been in the basin for 4 hours, the outside bottom of the specimen forming the basin shall feel dry and there shall be no indication that the oil has permeated the coated cloth.

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 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 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 applicable requirements of PPP-P-1136.

6. NOTES

6.1 Intended use.

6.1.1 Classes. Class 1 is primarily intended for applications where there is no great stress on the coated cloth, such as for flat upholstery (slip seats and other padded applications), headlinings, slipcovers, door panels, weather stripping, welting, and miscellaneous applications in which the properties of the coating and decorative values are the principal considerations; classes 2 and 10 are intended for medium spring upholstery applications; classes 3, 4, 5, 7, and 9 are intended for deep spring construction; class 6 is intended for exceptionally heavy-duty rugged service such as that used in buses. (Deep spring construction is spring construction on a depth greater than 3 inches.)

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6.1.2 Treatments. Fire-resistant, mildew-resistant, and oil-resistant treated cloths are intended for use in special installations, in unusually damp climates, or where exposed to solvents and oil, respectively.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- a. Title, number, and date of this specification.
- b. Class and treatment required (1.2.1).
- c. Color and grain required (3.3).
- d. Selection of applicable levels of put-up, preservation, and packing (5.1 and 5.2).
- e. When bid sample is required (6.3.2).

6.3 Samples. For access to standard shade samples, address the procuring activity issuing the invitation for bids (see 3.1.2 and 3.3.1).

6.3.1 Standard samples. For military requirements, standard samples for grain and for patterns containing more than one color are available from the procuring agency. The grain requirements for military agencies are limited to the following:

- a. Smooth surface
- b. Fine grain
- c. Pebble grain
- d. Colonial grain
- e. Spanish grain

6.3.2 Bid samples. The procuring activity should require the submission of bid samples with invitations to bid for use in determining conformance with color and grain requirements. The contracting officer should arrange for the evaluation of bid samples which, upon approval by the contracting officer, should be used as standards for color and grain for the life of the contract.

6.4 Approval of mildew inhibitor. Approval of the mildew inhibitor is the responsibility of the U.S. Army Natick Research, Development, and Engineering Center (GL), Natick, MA 01760-5014 and is based on extensive tests, including those for toxicity, which are not set forth in this specification. Because of the time necessary to conduct full evaluation, only these chemical treatments already approved and so listed in the invitation for bids or request for proposal shall be considered acceptable for the related procurement.

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6.5 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification (see 3.2).

6.6 Supersession data. Class 8 cloth and its requirements have been deleted from this specification.

6.7 Subject term (key word) listing.

Cloth
Coated cloth
Upholstery
Vinyl coated

MILITARY INTERESTS:

CIVIL AGENCY COORDINATING ACTIVITY:

Custodians:

GSA-FSS

Army - GL
Navy - NU
Air Force - 99

PREPARING ACTIVITY:

Army - GL

Review activities:

Project No. 8305-0078

Army - MD, ME
Air Force - 82
DLA - CT

User activities:

Navy - SH, MC, CG
Air Force - 45

