

MIL-C-15104E(NU)

9 May 1979

SUPERSEDING

MIL-C-15104D(SA)

5 November 1973

MILITARY SPECIFICATION

CLOTH, COATED, FIRE RESISTANT, BERTH AND BEDDING COVER

This specification is approved for use by the Navy Clothing and Textile Research Facility, Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for fire resistant coated cloths.

* 1.2 Classification. The coated cloth shall be of the following classes (see 6.2):

Class 1 - 24 to 26 oz. per sq. yd.

Class 2 - 14 to 18 oz. per sq. yd.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

TT-S-735	- Standard Test Fluids; Hydrocarbon
PPP-P-1136	- Packaging and Packing 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: Officer in Charge, Navy Clothing & Textile Research Facility, 21 Strathmore Road, Naick, 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-595	- Colors
FED-STD-601	- Rubber: Sampling and Testing

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

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

LAWS AND REGULATIONS

US POSTAL SERVICE MANUAL

(Copies of the manual may be obtained from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402).

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

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to American Trucking Associations, Attn: Traffic Department, 1616 P Street, NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606).

3. REQUIREMENTS

3.1 Standard sample. When a standard sample is available, the finished coated cloth shall be equal to or better than the sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 First article. When specified, the contractor shall furnish a sample unit(s) for first article approval (see 6.2).

3.3 Materials

* 3.3.1 Base cloth. The base cloth for classes 1 and 2 coated cloths shall be woven or knitted from cotton yarn, polyester yarn or a blend of both yarns and suitably fabricated and treated to meet the requirements specified in table I. The base cloth may be unbleached or bleached. The cloth to be coated with chloroprene rubber shall contain not more than 0.003 percent copper and 0.0015 percent manganese when tested as specified in 4.3.1

* 3.3.2 Coating compounds. The coating compounds shall be polymerized or copolymerized vinyl chloride or chloroprene rubber suitably formulated to meet the requirements of this specification. When chloroprene rubber is used a maximum of 5.0 percent SBR (styrene butadiene rubber) or natural rubber may be used for masterbatch purposes. Materials containing mercurial compounds or water soluble ingredients shall not be used (see 4.3.1).

3.3.3 Finish

* 3.3.3.1 Surface. The vinyl coated cloth shall be finished with a smooth or finely embossed surface simulating the appearance of top grain leather. The surface of the rubber coated cloth shall be finished smooth.

* 3.3.3.2 Dust. The dusting powder for application to the surfaces of the chloroprene coated cloth shall be of a type that does not support mildew growth in the finished vulcanized item. In order to acquire the cleanest finish possible, only the minimum amount of powder necessary to prevent the rubber surfaces from blocking shall be used.

* 3.3.3.3 Topcoat. When specified, and available from the contractor, a thin vinyl or rubber base topcoat may be used as a substitute for the dusting powder used on the chloroprene coated cloth. The topcoat must be flexible, tack-free, mildew resistant, fire resistant, and completely compatible with the chloroprene rubber.

3.3.4 Coating application

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* 3.3.4.1 Class 1. The coating compounds shall be pigmented to approximate color chips in FED-STD-595; Color chip Green 24449 for the vinyl coating and color chip Green 34449 for the rubber coating. The coating shall be applied to one side of the base cloth with any suitable coating equipment and shall be properly fused or vulcanized.

* 3.3.4.2 Class 2. The coating compounds shall be pigmented to approximate color chips in FED-STD-595; color chip Green 14062 for the vinyl coating and color chip Green 34058 for the rubber coating. The coating shall be applied to one side of the base cloth with any suitable coating equipment and shall be properly fused or vulcanized.

* 3.3.4.3 As an option, to increase fire resistance, the reverse side of the coated cloth may be skim coated with the same coating used on the face side. The weight of the skim coating shall not exceed 1.0 ounce per square yard and shall be included as part of the coated cloth weight requirement in Table I.

3.4 Physical requirements. The base and coated cloths shall conform to the physical requirements specified in Table I when tested as specified in Table IV.

* Table I - Base and Coated Cloth Requirements (see Note:)

Characteristic	Class 1	Class 2
<u>Base Cloth</u>		
Weight, oz/sq. yd	8.0 to 11.0	8.0 to 11.0
Weave or knit	Plain or twill	Plain or twill
<u>Coated cloth</u>		
Weight, oz/sq. yd.	24.0 to 26.0	14.0 to 18.0
Breaking strength, lbs (min)		
Initial - Warp or wales	125	125
Filling or courses	100	100
After Heat Aging - Warp or wale	100	100 <u>1/</u>
Filling or courses	75	75
Adhesion of coating (min)		
lbs/2 inch width	10.0	10.0
Abrasion resistance (min)		
double rubs	1500 <u>2/</u>	500 <u>2/</u>
Fire resistance (max)		
Flame time, sec.	2.0	2.0
Length of char, in.	3 1/2	3 1/2
Hydrostatic resistance (min)		
lbs/sq. in.	100	100
Resistance to mildew	Shall not support mildew growth <u>3/</u>	Shall not support mildew growth <u>3/</u>
Resistance to accelerated aging (rubber coated cloth only)	Pass <u>1/</u>	Pass <u>1/</u>
Resistance to low temperature	Shall not crack	Shall not crack

Table I - Base and Coated Cloth Requirements (See Note:) (Cont'd)

Characteristic	Class 1	Class 2
<u>Coated Cloth (cont'd)</u>		
Resistance to oil	Pass <u>4</u> /	Pass <u>4</u> /
Resistance to light	Pass <u>1</u> /	Pass <u>1</u> /
Resistance to crocking	Good	Good
Resistance to blocking (max)		
Scale rating	No. 2	No. 2
Volatility, percent loss (max)		
(vinyl coated cloth only)	8.0	8.0

- 1/ Exposed specimens shall not become soft, tacky, stiff or crack when folded over a 1/8 inch diameter rod.
- 2/ The specimen shall fail if visible loose fibers of the base cloth are exposed in the center one inch of the abraded portion.
- 3/ A certificate of compliance shall be submitted and accepted for this requirement.
- 4/ Specimen shall show no signs of oil permeating the outside bottom of coated cloth basin.

* 3.5 Color matching. When dusting powder has been used as a finish the dust shall be removed from the vulcanized sample with a wet cloth and the sample allowed to dry before color matching.

* 3.6 Width. The selvage shall be trimmed from the finished coated cloth. The minimum finished width shall be as specified in the contract or order (see 6.2). When no width is specified in the contract the minimum finished width shall be 54 inches.

3.7 Length and put up. Each length shall be put up in a full width roll as specified in PPP-P-1136. Each roll shall contain not more than three (3) pieces and no piece shall be less than ten (10) yards. Splices (seams) in the coated fabric are not permitted in the shipping rolls. The length of the rolls shall be as follows:

Class 1 - 50 to 65 yards, linear
Class 2 - 60 to 80 yards, linear

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

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 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 First article inspection. The first article submitted in accordance with 3.2 shall be inspected as specified in 4.3.2 for color, finish, and overall appearance and shall be tested for physical properties in accordance with the methods specified in 4.4.

4.3 Inspection. Inspection shall be in accordance with the provisions set forth in MIL-STD-105, except where otherwise indicated herein.

* 4.3.1 Component and material inspection. In accordance with 4.1, component and materials shall be inspected and tested 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, a certificate of compliance shall be submitted for the base cloth requirements of 3.3.1, coating compound requirements of 3.3.2 and finish requirements of 3.3.3.

* 4.3.2 Examination of the end item. Defects found during the end item examination shall be classified as specified in 4.3.2.1 thru 4.3.2.4. Definitions of coated fabric defects found in this specification are described in MIL-STD-1487.

4.3.2.1 Yard-by-yard examination. The required yardage of each roll shall be examined on the coated side only. The defects listed below shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the coated cloth, in which case only the more serious defects shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The unit of product for this examination shall be one linear yard. The inspection level shall be level II of MIL-STD-105. The acceptable quality level shall be 1.5 for major defects and 4.0 for total defects per 100 units. The number of rolls selected for this examination shall be in accordance with Table II. An approximate equal number of yards shall be examined from each roll in the sample.

Defects	Classification	
	Major	Minor
1. Any cut, hole, tear or uncoated area	X	
2. Any scratch or scuff mark resulting in a weak place or coating removal <u>1/</u>	X	
3. Any blister or lump:		
a. hollow	X	
b. solid		X
4. Any permanent crease or wrinkle:		
a. Adhesion of surfaces	X	
b. No adhesion of surfaces		X
5. Any separation of coating from base cloth	X	
6. Permanent stain, streak or other blemish - one inch or more in combined directions		X
7. Impression in coating resulting from seamed splicing		X
8. Any thinly coated area evidenced by light area or window - one inch or more in combined directions		X
9. Any scorched area	X	
10. Embedded foreign matter, affecting appearance or serviceability:		
a. Seriously	X	
b. Not seriously		X

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

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* 4.3.2.2 Overall examination. Each defect listed shall be counted not more than once in each roll examined. The sample unit for this examination shall be one roll. The sample size (number of rolls selected as sample) for this examination and the acceptance numbers shall be as listed in Table II.

Defects

Objectionable odor (odors of chemicals commonly used in coating compounds shall not be regarded as objectionable)
 Width below minimum specified
 Uneven coating
 Excessive dusting powder
 Not fully cured
 Overall uncleanness
 Color not as specified, off shade, not uniform, mottled, blotchy
 Tackiness (coating adheres to opposite surface upon unrolling)
 Puckering, waviness, dimensional distortion (material does not lie uniformly flat along its entire width when no tension is applied)
 Selvages not trimmed
 Trimmed edges curled, folded over, not straight, scalloped

Table II - Sample sizes for yard-by-yard, overall and length examination
Acceptance numbers for overall and length examinations

Lot size in yards	Sample size in rolls	Acceptance NO.
Up to 1,200 ^{1/}	3	0
1,201 thru 3,200	5	0
3,201 thru 10,000	8	0
10,001 thru 35,000	13	0
35,001 and up	20	1

^{1/} If a lot contains fewer than 3 rolls, each roll in lot shall be examined.

* 4.3.2.3 Examination for length of individual rolls. The individual roll shall be examined for length and the number of pieces in the roll. Any length found to be more than 2 yards below the length marked on the ticket or any roll found to contain more than three pieces, or any one piece on roll less 10 yards, shall be considered a defect with respect to length. The unit of product for this examination shall be one roll. The sample size for this examination and the acceptance number shall be as listed in Table II.

4.3.2.4 Examination for total yardage in sample. The lot shall be unacceptable if the total of the actual lengths of pieces in the sample are less than the total of the lengths marked on piece tickets.

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4.3.3 Examination of delivery requirements. Examination shall be made to determine that the packaging, packing, and marking requirements comply with PPP-P-1136.

* 4.4 Testing of the end item. The methods of testing specified in FED-STD-191 wherever applicable and as listed in Table IV shall be followed. The requirements specified in Section 3 apply to the average of 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 1 linear yard. The sample unit for test purposes shall be 2 yards, full width of finished vulcanized coated fabric. The sample size shall be in accordance with Table III. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified.

Table III - Sample size for testing

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

Table IV - Instructions for testing end item

Characteristic	Requirement reference	Test method
Weight	Table I	5041
Breaking strength		
Initial	Table I	5100
After heat aging	Table I	5100 & 5850 <u>1/</u>
Adhesion of coating	Table I	5970 <u>2/</u>
Abrasion resistance	Table I	5304 & 4.5.1
Fire resistance	Table I	5903
Hydrostatic resistance	Table I	5512 <u>3/</u>
Resistance to accelerated aging	Table I	5852
Resistance to low temperature	Table I	5874 <u>4/</u>
Resistance to oil	Table I	4.5.3
Resistance to light (40 hours)	Table I	5660
Resistance to crocking	Table I	5651
Resistance to blocking	Table I	5872
Volatility	Table I	4.5.2

1/ The specimens shall be exposed for 7 days at 70°C (158°F) + 2°.

2/ When the coating can be separated from the base cloth without the aid of a solvent or adhesive, the coating may be peeled off dry.

3/ The coated side shall face the water.

4/ Specimens shall be subjected to a temperature of minus 18°C (0°F) + 4° for 2 hours. Hydrostatic test is not required.

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4.5 Test methods

* 4.5.1 Abrasion. The resistance to abrasion shall be determined as specified in test method 5304 with the following exceptions:

- a. The long dimension of the specimen shall be parallel to the warp or wale direction of the sample.
- b. The tension on the specimen shall be six pounds.
- c. The abrader shall be silicon-carbide cloth 240 grit.
- d. The wear on the coating shall be observed after 1500 double rubs for class 1 coated cloth and 500 double rubs for class 2 coated cloth. The abradant shall be changed after each 250 double rubs and the test continued.
- e. Three specimens shall be tested from each sample unit.

* 4.5.2 Volatility. 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°C (220°F) \pm 4° for a period of 24 hours.

* 4.5.3 Oil resistance. An 8 by 8 inch specimen shall be placed on a wood frame. The inside dimension of the wood frame shall be 6 by 6 inches by 1 inch. The coated cloth shall be inserted with the coated side up. The specimen shall be forced into the frame by a wooden block 5 3/4 by 5 3/4 inches by 3/4 inch with rounded corners to form a basin of uniform depth. The edges of the specimen shall be tacked to the frame and the block removed. Oil conforming to type IV of TT-S-735 shall be poured into the basin as rapidly as possible to a depth of 1/2 inch. After the oil has been in the basin for four 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 Preservation-packaging. Packaging shall be level A or C, as specified (see 6.2 and 6.2.1).

5.1.1 Levels A and C. The coated cloth, put up as specified (see 3.7), shall be packaged in accordance with the applicable requirements of PPP-P-1136.

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

5.2.1 Levels A, B, and C. The cloth shall be packed in accordance with the applicable requirements of PPP-P-1136.

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

6. NOTES

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* 6.1 Intended use. The coated cloths are intended mainly for use in the manufacture of berth and bedding covers, but are also adaptable for use in covering upholstery, etc.

* 6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. Class required (see 1.2)
- c. First article requirements (see 3.2)
- d. Width of cloth required (see 3.6)
- e. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).

6.2.1 In the preparation of contracts or orders, it must be noted that various options, choices and alternatives as indicated in PPP-P-1136 may be exercised in the preparation for delivery of the cloth.

6.3 Standard sample. To determine availability of standard sample, address the procuring activity issuing the invitation for bids.

6.4 Changes from previous issue. The margins of this specification 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.

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Navy - NU

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