

INCH-POUND

MIL-C-15104F(NU)

30 April 1991
SUPERSEDING
 MIL-C-15104E(NU)
 9 May 1979

MILITARY SPECIFICATION

*CLOTH, COATED, FLAME 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 a flame resistant coated cloth used as berth and bedding covers.

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

- Class 1 - 24 to 26 ounces per square yard
- Class 2 - 14 to 18 ounces per square yard

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specifications, standards, and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents 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 (see 6.2).

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 and Textile Research Facility, P.O. Box 59, Natick, MA 01760-0001 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

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SPECIFICATIONS

FEDERAL

- TT-S-735 - Standard Test Fluids, Hydrocarbon
 PPP-P-1136 - Packaging of Coated (Plastic; Rubber) and Laminated Fabrics

STANDARDS

FEDERAL

- FED-STD-191 - Textile Test Methods
 FED-STD-406 - Plastic, Methods of Testing
 FED-STD-595 - Color
 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
 * MIL-STD-2073-1 - DOD Materials Procedures for Development and Application of Packaging Requirements
 * MIL-STD-2073-2 - Packaging Requirement Codes

* (Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

* 2.2 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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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 sample unit(s) for first article inspection and approval (see 4.3 and 6.2).

3.3 Material.

* 3.3.1 Base cloth. The base cloth for classes 1 and 2 coated cloths shall be woven or knitted from cotton yarn 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 4.4.1.

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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 4.4.1).

3.3.3 Finish (see 4.4.1).

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 substrate for the dusting powder used on the chloroprene coated cloth. The topcoat must be flexible, tack-free, mildew resistant, flame resistant, and completely compatible with the chloroprene rubber.

3.3.4 Coating application.

* 3.3.4.1 Class 1. The coating compounds shall be pigmented to approximate color chip Green 24449 of FED-STD-595, except the finish may be gloss, semi-gloss or lusterless. 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 chip Green 14062 of FED-STD-595, except the finish may be gloss, semi-gloss or lusterless. 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 flame 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 (33.9 g/m²) 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 the physical requirements specified in Table I when tested as specified in Table IV.

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Table I - Base and Coated Cloth Requirements

Characteristic	Class 1	Class 2
Base Cloth		
Weight, oz/yd ² (g/m ²)	8.0 to 11.0 (271.2 to 372.9)	8.0 to 11.0 (271.2 to 372.9)
Weave or knit	Plain or twill	Plain or twill
Coated cloth		
Weight, oz/yd ² (g/m ²)	24.0 to 26.0 (813.6 to 881.4)	14.0 to 18.0 (474.6 to 610.2)
Breaking strength, lbs (N) - minimum		
Initial - Warp or wales	125 (556.2)	125 (556.2)
- Filling or courses	100 (445.0)	100 (445.0)
After Heat Aging - Warp or wale	100 (445.0)	100 (445.0) <u>1/</u>
- Filling or courses	75 (333.7)	75 (333.7)
Adhesion of coating - minimum lbs/2 inch width (N/m)	10.0 (1750.0)	10.0 (1750.0)
Abrasion resistance - maximum double rubs	1500 <u>2/</u>	500 <u>2/</u>
Flame resistance - maximum		
Flame time, seconds	2.0	2.0
Char length, in (cm)	3.5 (8.9)	3.5 (8.9)
Hydrostatic resistance - minimum lbs/in ² (Pa)	100 (689,400)	100 (689,400)
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
Resistance to oil	Pass <u>4/</u>	Pass <u>4/</u>
Resistance to light	Pass <u>I/</u>	Pass <u>I/</u>
Resistance to crocking	Good	Good
Resistance to blocking - maximum Scale rating	No. 2	No. 2
Volatility, percent loss - maximum (vinyl coated cloth only)	8.0	8.0

1/ Exposed specimens shall not become soft, tacky, stiff or cracked 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.

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3.6 Width. The selvage shall be trimmed from the finished 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 (137.1cm).

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 10 yards (9.14m). 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 (45.7m to 59.4m), linear
Class 2 - 60 to 80 yards (54.8m to 73.1m), linear

3.8 Workmanship. The finished cloth shall conform to the quality 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 (examinations and tests) 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 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 ensure 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 specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this 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. 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 Classification of inspection. The inspection requirements specified herein are classified as follows:

1. First article inspection (see 4.3).
2. Quality conformance inspection (see 4.4).

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4.3 First article inspection. When required, the first article submitted in accordance with 3.2, shall be inspected as specified in 4.4.2 for color, finish, and overall appearance and shall be tested for physical properties in accordance with the methods specified in 4.5.

* 4.4 Quality conformance inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

4.4.1 Component and material inspection. In accordance with 4.1 above, components and materials shall be tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable procurement documents. 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.

4.4.2 Examination of the end item. Defects found during the end item examination shall be as specified in 4.4.2.1 through 4.4.2.4. Definitions of coated fabric defects found in this specification are described in MIL-STD-1487.

4.4.2.1 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 (91.4 cm). 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.

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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 ^{1/}	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 (91.4 cm).

4.4.2.2 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 rolling)
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

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

<u>Lot size in yards</u>	<u>Sample size in rolls</u>	<u>Acceptance No.</u>
Up to 1,200 1/	3	0
1,201 through 3,200	5	0
3,201 through 10,000	8	0
10,001 through 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.

4.4.2.3 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 (1.8 m) below the length marked on the ticket or any roll found to contain more than three pieces, or any one piece on roll less than 10 yards (9.1 m), 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.

4.4.2.4 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 the piece tickets.

4.4.3 Examination for delivery requirements. Examination shall be made to determine that the preservation, packing, and marking requirements comply with PPP-P-1136.

4.5 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 (91.4 cm). The sample unit for test purposes shall be 2 yards (183 cm), 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 units fail to meet any test requirement specified.

Table III - Sample size for testing

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

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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 & 4.6.1
Flame 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	4.6.3
Resistance to light (40 hours)	Table I	5660
Resistance to crocking	Table I	5651
Resistance to blocking	Table I	5872
Volatility	Table I	4.6.2

- 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 -18°C (0°F) ± 4° for 2 hours. Hydrostatic test is not required.

4.6 Test methods.

4.6.1 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 direction of the sample.
- b. The tension of the specimen shall be 6 pounds (2.7 Kg).
- 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.

4.6.2 Volatility. The volatile loss of the coated cloth shall be determined in accordance with test method 6081 of FED-STD-406, except that two 2 by 2 inch (5.1 by 5.1 cm) specimens shall be heated at 104°C (220°F) ± 4° for a period of 24 hours.

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4.6.3 Oil resistance. An 8 by 8 inch (20.3 by 20.3 cm) specimen shall be placed on a wood frame. The inside dimension of the wood frame shall be 6 by 6 inches (15.2 by 15.2 cm) by 1 inch (2.5 cm). 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 (14.6 by 14.6 cm) by 3/4 inch (1.9 cm) 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 (1.3 cm). After the oil has been in the basin for four hours, the outside bottom of the specimen forming basin shall feel dry and there shall be no indication that the oil has permeated the coated cloth.

5. PACKAGING

5.1 Preservation. Preservation 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, unit packs, intermediate or exterior containers, and palletized unit loads shall be marked in accordance with the applicable requirements of PPP-P-1136.

* 5.4 MIL-STD-2073. When specified (see 6.2), Preservation and Packing shall be in accordance with MIL-STD-2073-1 and MIL-STD-2073-2.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

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

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* 6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. Class required (see 1.2)
- c. Width required (see 3.6)
- d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1)
- e. When first article sample is required (see 3.2). The item will be tested and should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, quality, testing and approval of the first article.
- f. Levels of preservation and packing required (see 5.1, and 5.2)
- g. When all packaging data is to be found in MIL-STD-2073-1 and MIL-STD-2073-2 (see 5.4).

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 Subject term (key word) listing.

Fabric, cotton, laminated
Fabric, fire retardant
Green 14062
Green 24449

* 6.5 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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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL <i>(See Instructions - Reverse Side)</i>	
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3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____
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