

INCH-POUND

MIL-C-43410C
28 June 1989
 SUPERSEDING
 MIL-C-43410B
 28 December 1981

MILITARY SPECIFICATION

CLOTH, COATED; POLYESTER/COTTON, POLYESTER/RAYON;

POLYVINYL CHLORIDE OR POLYCHLOROPRENE COATED

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

1. SCOPE

1.1 Scope. This specification covers polyvinyl chloride or polychloroprene coated cloth to be used in the fabrication of fireman's coats and trousers.

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 are 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).

SPECIFICATIONS

FEDERAL

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, 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

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-C-43410C

MILITARY

MIL-C-43718 - Cloth, Polyester; Polyester and Cotton; Polyester and Rayon, For Pockets.

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-1487 - Glossary of Cloth Coating Imperfections.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.2 Non-Government 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 are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

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

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally available from organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

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

MIL-G-43410C

3. REQUIREMENTS

* 3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials.

3.2.1 Base cloth. The base cloth shall be a twill cloth, natural color, conforming to class 1 of MIL-C-43718 except that the requirement for seam efficiency shall not apply and the (pH) shall not be less than 5.5. Base cloth, only when it is to be coated with polychloroprene rubber, shall not contain more than 0.003 percent copper and 0.0015 percent manganese when tested as specified in 4.4.1.

3.2.2 Coating compound. The coating compound shall be a polymerized or copolymerized virgin polyvinyl chloride resin or polychloroprene rubber. Vinyl compounds shall be plasticized with phosphate or phthalate ester plasticizers exclusively and all compounds shall be formulated to meet the requirements herein. Chlorinated paraffines may be used as flame inhibitors. The use of water soluble compounding ingredients and reclaimed rubber is prohibited (see 4.4.1.1). The coating compound shall be natural or clear in color.

3.2.3 Dusting powder. The dusting powder for application on polychloroprene coating shall be whiting, talc or other finely divided mineral material which does not support mildew growth (see 4.4.1.1).

3.3 Coated cloth. The base cloth shall be coated on both sides with the coating compound specified in 3.2.2. Distribution of the coating shall be such that one side of the cloth is coated with no more coating than is required to meet the water absorption requirement and the other side coated with the remainder of the compound. The coated cloth shall be fused or vulcanized as applicable and shall conform to the requirements of table I when tested as specified in 4.4.3. Polychloroprene coated cloth only shall be dusted on both sides with the dusting powder specified in 3.2.3. The coated cloth shall be natural in color.

TABLE I. Physical requirements of coated cloth

Characteristic	Requirement	
	Minimum	Maximum
Weight, ounces per square yard	12.0	14.0
Breaking strength, pounds:		
Warp	70	--
Filling	50	--

MIL-C-43410C

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

Characteristic	Requirement	
	Minimum	Maximum
Tearing strength, grams:		
Warp	700	--
Filling	700	--
Hydrostatic resistance, p.s.i.	80	--
Stiffness, warp direction, centimeters:		
At 70°F	--	12.0
At 0°F	--	15.0
Flame resistance, initial:		
After flame, seconds:		
Warp	--	2.0
Filling	--	2.0
Char length, inches:		
Warp	--	4.5
Filling	--	4.5
Flame resistance, after accelerated weathering <u>1/</u> :		
After flame, seconds:		
Warp	--	2.0
Filling	--	2.0
Char length, inches:		
Warp	--	5.5
Filling	--	5.5
Adhesion of coating, pounds per 2-inch width	8.0	--
Blocking, scale rating	--	No.2
Accelerated aging (polychloroprene coated cloth only)	Pass <u>2/</u>	--
Water absorption, percent	--	1.0

1/ The coating shall show no indication of cracking, flaking, or separation from the cloth under visual examination after weathering and prior to testing for flame resistance.

2/ The specimen shall not be soft and tacky or stiff and brittle.

MIL-G-43410C

3.4 Width. The minimum width trimmed of the coated cloth shall be as specified (see 6.2). Selvages shall be trimmed to give a straight, uniform edge.

3.5 Length and put-up. For Government procurements only, unless otherwise specified (see 6.2), the cloth shall be put up in continuous lengths of not less than 50 yards. The cloth shall be put up on full width rolls as specified in 5.1.1.

3.5.1 Marking. The heavily coated side of the cloth shall be clearly marked at both the beginning and the end of the roll.

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

3.7 Workmanship. The finished coated cloth shall conform to the quality of product established by this specification, and 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 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 ensure supplies and services conform to prescribed requirements.

* 4.1.1 Responsibility for compliance. All items shall 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 accept 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 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

MIL-C-43410C

- * 4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2 and tested as specified in 4.4.3.
- 4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.
- * 4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.
- * 4.4.1.1 Component and material certification. A certificate of compliance may be acceptable as evidence that the characteristics listed in table II conform to the specified requirements, when tested by the specified methods.

TABLE II. Component and material certification

Characteristic	Requirement paragraph	Test method
Base cloth copper and manganese content (only applies when the cloth is to be polychloroprene coated)	3.2.1	2053 of FED-STD-191
Polyvinyl chloride coating formulation	3.2.2	--
Polychloroprene rubber coating does not contain reclaimed rubber or water soluble compounding ingredients	3.2.2	--
Dusting powder does not support mildew growth	3.2.3	--

4.4.2 End item examination.

- * 4.4.2.1 Yard-by-yard examination. The cloth shall be examined for the defects listed in table III. The required yardage of each roll in the sample shall be examined on one side only, however, the side shall be alternated so that alternate rolls are examined on the heavily coated side and lighter coated side respectively. The same yardage shall be given a through-light examination for pinholes and thinly coated areas in accordance with MIL-STD-1487. All defects found shall be counted regardless of their proximity to each other except where two or more defects represent a single local condition, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The lot size shall be expressed in yards. The sample unit shall be 1 linear yard. The inspection level shall be II and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 0.25 for major defects and 1.5 for total (major and minor combined). The number of rolls from which the sample yardage is to be selected shall be in accordance with table IV. The sample yardage shall be apportioned equally among the selected rolls.

*MIL-C-43410C

TABLE III. Yard-by-yard examination.

Examine	Defect	Classification	
		Major	Minor
Coating	Any uncoated area.	101	
	Any thinly coated area.		201
	Any lump or heavily coated area.		202
	Any embedded foreign matter.		203
	Any scorch or burn.	102	
	Any pit, blister, tunnel, or delamination of coating.	103	
	Any separation of coating from base fabric.	104	
	Any pinhole.	105	
	Brittle coating (cracks when flexed).	106	
	Cracked or checked coating.		204
	Any tackiness (coating will adhere and not unroll readily).		205
	Any foreign matter which on removal leaves an uncoated or poorly coated area.		206
	Crease or wrinkle resulting in doubling or delamination of coating when corrected by manual pressure.	107	
	Any spot, stain, or streak more than 1 inch in combined directions. <u>1/</u>	108	
	Coating not heavier on one side.	109	
	Heavier coated side not identified on each end of roll.	110	
	Color	Uneven or mottled.	111
Not natural.		112	
Width	Trimmed width less than specified.	113	
Workmanship	Selvages not trimmed, resulting in non-uniform edge.	114	
	Not clean.		207
	Curled, folded, scalloped (1/2 inch or more) or rolled edges.		208
	Edges not straight and uniform.		209
	Any ripples or dimensional distortion.		210
	Any cut, hole, tear, or scratch.	115	
	Baggy, wavy or puckered, will not stay flat upon normal pressure.		211
	Any abrasion exposing base cloth.	116	
Finish	Objectionable odor. <u>2/</u>		
Finish	Not dusted (when polychloroprene rubber is used).		212

MIL-C-43410C

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

TABLE IV. Sample size

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

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

2/ Applicable to 4.4.2.2 examination only.

- * 4.4.2.2 Length examination. During the yard-by-yard examination, each roll in the sample shall be examined for length. Any length found to be less than the minimum specified or more than 2 yards less than the length marked on the roll ticket shall be considered a length defect. The lot shall be rejected if the number of length defects in the sample exceeds the acceptance number specified in table IV or if the total of the actual lengths of rolls in the sample is less than the total of the lengths marked on the roll tickets.

4.4.3 End item testing. The coated cloth shall be tested for the characteristics listed in table V. The methods of testing specified in FED-STD-191, wherever applicable and as listed in table V, shall be followed. Except for blocking and accelerated aging, the physical values specified apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test methods. Requirements for blocking and accelerated aging shall apply to each determination. The sample unit shall be 3 continuous yards, full width of the coated cloth. The lot size shall be expressed in units of 1 linear yard and the sample size (number of sample units) shall be as specified below. The lot shall be unacceptable if any sample unit fails to meet any requirement specified. All test reports shall contain the individual values used in expressing the final result.

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

MIL-C-43410C

- * 4.4.3.1 Standard test conditions. Results of physical tests obtained under testing conditions defined in FED-STD-191, 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.

TABLE V. End item tests

Characteristic	Requirement paragraph	Test method
Weight	3.3	5041
Breaking strength	3.3	5100
Tearing strength	3.3	ASTM D 1424
Hydrostatic resistance	3.3	5512 <u>1/</u>
Stiffness:		
At 70°F	3.3	5204
At 0°F	3.3	5204 <u>2/</u>
Flame resistance:		
Initial	3.3	5903
After accelerated weathering	3.3	5804 <u>3/</u> and 5903
Adhesion of coating	3.3	5970
Blocking	3.3	5872 <u>4/</u>
Accelerated aging	3.3	5852 <u>5/</u>
Water absorption	3.3	5504

1/ The lightly coated side of the cloth shall contact the water.

2/ The test specimens and test apparatus shall be exposed to a temperature of $0 \pm 2^\circ\text{F}$ for a minimum of 4 hours and the test shall be performed in a still atmosphere at that temperature.

3/ The test shall be performed without filters for a period of 200 hours on a specimen of appropriate size with the heavily coated side facing the light source.

4/ Except that only one specimen shall be tested and the test temperature shall be $200 \pm 2^\circ\text{F}$.

MIL-C-43410C

5/ One specimen shall be exposed in the aging chamber for 14 days. The specimen shall then be visually examined for evidence of soft and tacky or stiff and brittle coating.

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

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, interior packages and shipping containers shall be marked in accordance with PPP-P-1136.

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 cloth is intended for use in the manufacture of clothing to be used by fire fighting personnel of the Department of Defense.

- * 6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. When a first article is required (see 3.1, 4.3, and 6.3).
- d. Width of cloth required (see 3.4).
- e. Levels of preservation and packing (see 5.1 and 5.2).

- * 6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

MIL-C-43410C

6.4 Subject term (key word) listing.

Fire fighting
Fireman's clothing
Waterproof material

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

Custodians:

Army - GL
Navy - NU
Air Force - 99

Preparing activity:

Army - GL

(Project 8305-0285)

Review activities:

Army - MD
Air Force - 50, 82
DLA-CT

User activities:

Army - AR
Navy - YD

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE ARMY

U.S. ARMY NATICK RESEARCH, DEVELOPMENT
and ENGINEERING CENTER
ATTN: STRNC-ES
Natick, MA 01760-5014



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12062 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE ARMY

Commander
U.S. Army Natick Research, Development
and Engineering Center
ATTN: STRNC-ES
Natick, MA 01760-5014

