

MIL-C-3738K
31 March 1987
 SUPERSEDING
 MIL-C-3738J
 11 October 1983

MILITARY SPECIFICATION

CLOTH, ELASTIQUE, WOOL

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

1. SCOPE

1.1 Scope. This document covers wool elastique cloth.

1.2 Classification. The cloth shall be of the following types and classes as specified (see 6.2):

Type I	-	19 ounce
Type II	-	18 ounce
Class 1	-	64's grade wool
Class 2	-	70's grade wool
Type III	-	16 ounce

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

PPP-P-1132 - Packaging of Woolen, Worsted and Wool Blend
 (Synthetic Fiber; Cotton) Fabrics

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US 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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MILITARY

MIL-C-43665 - Cloth, Wool: Mothproofing Treatment of

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

MIL-STD-655 - Provisions for Evaluating Quality of Cloth,
Wool, Worsted and Wool Blends

(Copies of documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 2130 - Diameter Of Wool and Other Animal Fibers By Microprojection

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

Rules and Regulations Under the Wool Products Labeling Act

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN 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 27709-2215.)

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(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard sample. The finished cloth shall match the standard sample for shade and appearance and shall be, unless otherwise indicated (see 3.4.3), equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 First article. When specified, a sample shall be subjected to first article inspection (see 4.3, 6.2, and 6.5).

3.3 Material.

3.3.1 Stock. The wool shall be fleece wool, pulled wool, or any combination thereof not lower in grade than U.S. Standard grades specified below. The use of laps, noils, or any other wool manufacturing by-products is prohibited.

Type I - 70's U.S. Standard

Type II:

Class 1 - 64's U.S. Standard

Class 2 - 70's U.S. Standard

Type III - 70's U.S. Standard

3.3.2 Yarn. The wool shall be spun from combed top on either the Bradford, French, or American system. The yarn for both warp and filling shall be 2 ply.

NOTE: Selvage yarn. To prevent edges of all types of cloth from building up when rolled, two ply yarns used in the selvage may be made of a finer count than those used in the body of the cloth.

3.4 Color. The color of the finished cloth shall be as specified (see 6.2 and 6.4). The color shall be obtained by stock or top dyeing. Piece dyeing will not be permitted.

3.4.1 Mothproofing. In the dyeing operation, the stock or top shall be mothproofed in accordance with MIL-C-43665.

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3.4.2 Matching. The color and appearance of the dyed and finished cloth shall match the standard sample when viewed under filtered tungsten lamps which approximate artificial daylight having a correlated color temperature of 7500 \pm 200 K, with illumination of 100 \pm 20 foot candles, and shall be a good match to the sample under incandescent lamplight at 2300 \pm 200 K.

3.4.3 Colorfastness. The finished cloth shall show fastness to perspiration, wet drycleaning, and light equal to or better than the standard sample or equal to or better than a rating of "good" when tested as specified in 4.4.4. The finished cloth shall show fastness to crocking equal to or better than the standard sample or shall have an AATCC Chromatic Transference Scale rating no lower than 3.5 when tested as specified in 4.4.4.

3.5 Physical requirements. The finished cloth shall conform to the requirements specified in table I when tested as specified in 4.4.4.

TABLE I. Physical requirements

Type	Weight per linear yard 56 inch width basis (minimum) (Ounces)	Yarns per inch (minimum) Warp Filling		Breaking strength (minimum) Warp Filling Pounds Pounds		Shrinkage (maximum) Warp Filling Percent Percent	
	I	19.0	128	98	160	90	5.5
II	18.0	124	80	140	80	6.5	4.0
III	16.0	138	96	130	70	6.5	3.0

3.5.1 Width. The width of all types and classes of finished cloth shall be a minimum of 60 inches exclusive of selvage or tuck-in when woven on shuttleless looms.

3.6 Weave. The weave for type II shall be as shown on figure 1. The weave for types I and III shall be as shown on figure 2 (see 4.4.4).

3.7 Finish. The face shall be clear and closely sheared. The type and character of finish shall conform to that shown by the standard sample.

3.7.1 pH. The pH value of the water extract of the finished cloth shall be no less than 5.0 nor more than 8.5 when tested as specified in 4.4.4.

3.8 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be finished in continuous lengths, each not less than 50 yards. Each length shall be put-up on full width rolls as specified in 5.1.

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3.9 Wool content. The finished cloth shall contain not less than 95 percent wool based on the dry weight of the specimen when tested as specified in 4.4.4.

3.10 Wool content label. Cloth manufactured under this document shall be labeled in accordance with the Wool Products Labeling Act.

3.11 Marking. The back of the cloth shall be marked "BACK" at both ends of each roll with letters not less than 1/2 inch in height. The marking shall be clearly legible in any indelible marking used commercially.

3.12 Workmanship. The finished cloth shall conform to the quality established by this document. The demerit points per 100 square yards when calculated as specified in MIL-STD-655 shall not exceed the established maximum point value. Each defect shall be marked with a 1 to 1-1/2 inch long string. The string shall be sewn into the selvage near the defect. A red string shall represent a three- or four-point defect and a white string shall represent a one- or two-point defect.

4. QUALITY ASSURANCE PROVISIONS

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

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

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

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

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4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for appearance, color, and finish defects and shall be tested for the characteristics specified in table II. The presence of any defect or failure of any test shall be cause for rejection of the first article.

4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-655.

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 document or applicable purchase document.

4.4.2 In-process inspection. Inspection shall be made at any point during any phase of the manufacturing operation to assure that no laps, noils, or any other wool manufacturing by-products are used (see 3.3.1) and that the dyeing requirements have been adhered to (see 3.4). The Government reserves the right to exclude from consideration for acceptance any material for which in-process inspection has indicated nonconformance.

4.4.3 End item examination.

4.4.3.1 Point count examination. Examination of the end item shall be in accordance with the provisions of MIL-STD-655 for fabric Quality Level 10.

4.4.3.2 Limits of slubs and knots. Only slubs and knots which exceed the limits shown on Sears Fabric Defect Scales (see 6.6), "D" or "3-1/2" as applicable for slubs and "C" for knots shall be scored.

4.4.3.3 Shade match, appearance, and finish examination. A 4-inch by 20-inch swatch shall be drawn from each roll in the lot. Each swatch shall be examined visually for shade match and appearance (see 3.4.2) and examined for finish (see 3.7). Any swatch failing to meet the requirements for shade match, appearance, or finish shall be cause for rejection of the roll from which it was drawn.

4.4.4 End item testing. The cloth shall be tested for the characteristics listed in table II. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table II shall be followed. The physical and chemical values specified in section 3 apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test methods. The sample unit shall be 4-1/2 continuous yards full width of the finished cloth. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified. All test reports shall contain the individual values utilized in expressing the final result. The sample size (number of sample units) shall be in accordance with the following:

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<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 over	5

TABLE II. End item tests

<u>Characteristics</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Wool grade	3.3.1	ASTM D 2130 <u>1/</u>
Yarn ply:		
Warp	3.3.2	Visual <u>2/</u>
Filling	3.3.2	Visual <u>2/</u>
Mothproofing	3.4.1	<u>3/</u>
Colorfastness to:		
Perspiration	3.4.3	5680
Wet drycleaning	3.4.3	5622
Light	3.4.3	5660
Crocking	3.4.3	5651
Weight	3.5	5041
Yarns per inch	3.5	5050
Breaking strength	3.5	5100
Shrinkage	3.5	5558
Weave	3.6	Visual <u>1/</u>
pH	3.7.1	2811
Wool content	3.9	2101

1/ Only one sample unit shall be subjected to this test regardless of lot size. Prior to wool grade determination, two 3 inch (filling direction) wide swatches shall be cut from the sample unit. Each swatch shall be sufficiently long to weigh 5.0 ± 0.5 grams. The swatches shall be taken from areas at least 2 inches from the selvages and shall not contain the same warp or filling yarns. Both swatches shall then be stripped of dye as specified in 4.5.1. One 2 by 2 inch specimen shall then be cut from each of the stripped swatches and tested for wool grade in accordance with ASTM D 2130. If any specimen fails to meet the specified grade, the lot shall be rejected.

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- 2/ One determination per sample unit and the results reported as "pass" or "fail".
- 3/ As specified in MIL-C-43665.

4.4.5 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1132.

4.5 Methods of inspection.

4.5.1 Stripping procedure. The swatches shall be stripped of dye in a launderometer or similar machine as described in Method 5614 of FED-STD-191 as follows. Place 1 gram of zinc or sodium sulfoxylated formaldehyde (see 6.7) in each of two of the machine canisters. Add 400 ml of distilled water to each and adjust pH to 3.0 to 3.5 with acetic acid. Place a 5-gram swatch in each canister, seal, and rotate in the machine until the temperature reaches 208°F. Then, while maintaining the temperature at $208 \pm 3^\circ\text{F}$, continue the rotation for an additional 30 minutes. Remove the swatches and rinse them with warm (120°F) water for 5 minutes and then with cold water for 5 minutes. Air dry on a flat surface under ambient conditions.

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 cloth shall be put-up and preserved in accordance with the applicable requirements of PPP-P-1132.

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 cloth shall be packed in accordance with the applicable requirements of PPP-P-1132.

5.3 Marking. In addition to any special marking required in the contract or purchase order, shipments shall be marked in accordance with the requirements of PPP-P-1132.

6. NOTES

6.1 Intended use. The cloths are used by the Department of Defense.

- | | |
|------|---|
| Army | - Service uniform, officers': types I, II and III:
AG 44. Blue uniform; types I, II and III:
Blue 150, Blue 151 |
| Navy | - Uniform, dinner dress, types I, II or III, dark blue shade |

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- Uniform, man's, aviation, working, types I, II or III, forest green shade
 - Cap, garrison, officers, type I, forest green shade
- Marine Corps
- Green service uniforms; officers and SNOC's coat; trousers, garrison; garrison cap; service cap crown; overcoat, type III; Green 2211
 - Blue dress uniforms; general officers coat and trousers; male field and company grade officers and SNOC's blue dress coat; type III; Dark Blue 2309
 - Field and company grade officers and SNOC's blue dress trousers, type III; Light Blue 2311
- Air Force
- Air Force Academy uniform items: type II, AF Academy Blue shade 500

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Type and class required (see 1.2).
- c. When a first article is required (see 3.2, 4.3 and 6.5).
- d. Color required (see 3.4).
- e. Minimum length if other than specified (see 3.8).
- f. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

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

6.4 Dyes. A suggested but not mandatory dye formulation for Army Green 44, Army Blue 150, Army Blue 151, and Air Force Academy Blue Shade 500 is as follows:

The standard shade samples have been dyed with these formulations:

- (a) Army Green 44
 - Acid Green 70
 - Acid Green 58
 - Acid Orange 85
 - Acid Orange 86

The ratio of Acid Green 70 to Acid Green 58 shall be 1:1 for equal strengths of the two dyes. The formulation has been shown to provide optimum colorfastness properties when dyed with either ammonium sulfate or ammonium acetate.

NOTE: Since Army Green 44 is essentially a solid shade, no specific blends of primaries are recommended; however, if a system of blending primaries is used, shade difference between primaries should be kept at a minimum in order to avoid a two-tone or heathery effect which is not acceptable.

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- (b) Army Blue 150
Slate primary:
Mordant Blue 9, CI 14855
Mordant Blue 13, CI 16680
Acid Black 48, CI 65005
Red-blue primary:
Mordant Blue 9, CI 14855
Mordant Blue 13, CI 16680
Acid Black 48, CI 65005
Mordant Orange 8
Blue primary:
Mordant Blue 13, CI 16680
Acid black 48, CI 65005
- (c) Army Blue 151
Red primary:
Acid Blue 80, CI 61585
Acid Blue 81, CI 64515
Mordant Red 7, CI 18760
Mordant Orange 8
Blue primary:
Acid Blue 80, CI 61585
Mordant Blue 7, CI 17940
Mordant Blue 13, CI 16680
Green primary:
Sol. Vat Blue 1, CI 73002
Sol. Vat Violet 2, CI 73386

(d) The standard sample for USAF Academy Blue Shade 500 has been dyed with these formulations:

Fiber Reactive Blue W-3G
Fiber Reactive Red W-6G
Fiber Reactive Blue W-3R
Algosol Blue - 0

6.5 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 reproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.6 Defect scales. Sears Fabric Defect Scales are available from Sears, Roebuck and Co., "Fabric Defect Replica Kit", Dept. 817 (ATTN: BSC 23-29), Sears Tower, Chicago, IL 60684.

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6.7 Stripping chemical source. Zinc sulfoxylated formaldehyde (parolite) can be purchased from:

Diamond Shamrock Chemicals Company
Process Chemical Division
350 Mt. Kemble Avenue
Morristown, New Jersey 07960-1931

6.8 Subject term (key word) listing.

Cloth, elastique
Cloth, wool
Uniforms

6.9 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - GL
Navy - NU
Air Force - 11

Preparing activity:

Army - GL
Project No. 8305-0125

Review activities:

Army - MD
Navy - MC
Air Force - 82, 99
DLA - CT

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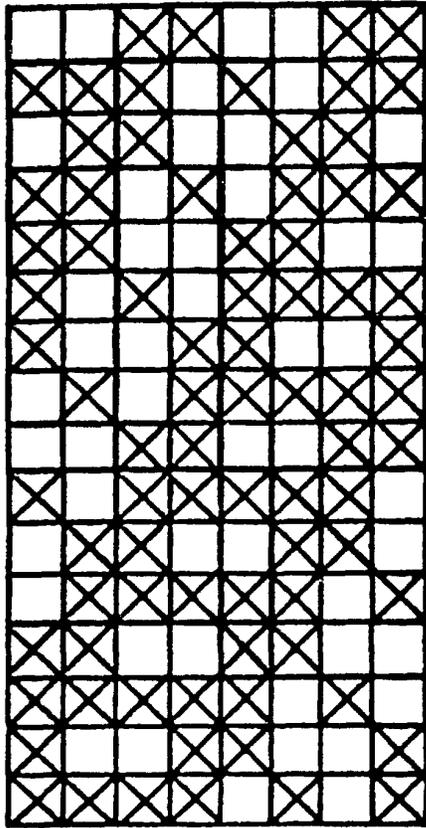


FIGURE 1
Cloth, wool, elastique, type II

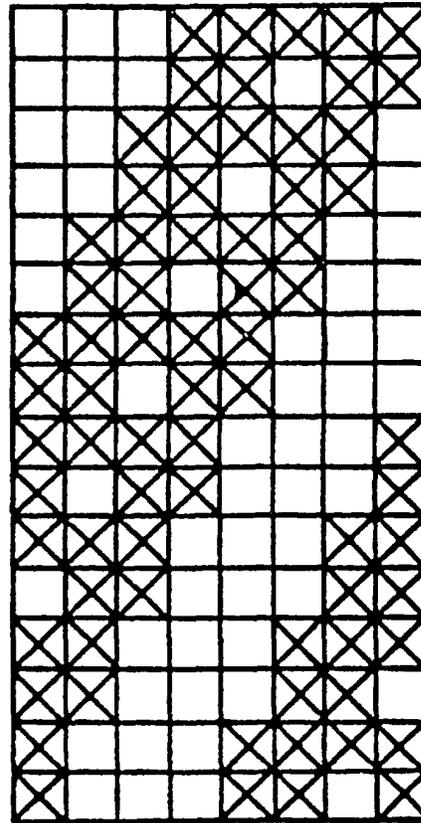


FIGURE 2
Cloth, wool, elastique
type I and III

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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.

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