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INCH-POUND

MIL-DTL-3738L
14 April 2005
SUPERSEDING
MIL-C-3738K
31 March 1987

DETAIL 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 the requirements for wool elastique cloth.

1.2 Classification. The cloth should 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
Type IV	-	19 ounce

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center Philadelphia, Clothing and Textiles Directorate, ATTN: DSCP-CRDD, 700 Robbins Avenue, Bldg. 6D, Philadelphia, PA 19111-5092, or emailed to http://ct.dscp.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

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2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure completeness of this list, document users are cautioned that they must meet all the specified requirements documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARD

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

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other documents, drawings, and publications. The following other documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issue of this document is that cited in the solicitation or contract.

RULES AND REGULATIONS UNDER THE WOOL PRODUCTS LABELING ACT

(Copies of this document may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the solicitation or contract.

ASTM INTERNATIONAL

ASTM D3775	-	Fabric Count of Woven Fabric
ASTM D3776	-	Mass Per Unit Area (Weight) of Fabric
ASTM D5034	-	Breaking Force and Elongation of Textile Fabrics (Grab Test), G-E or G-T

(Copies of these documents are available from http://www.astm.org/ or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AATCC 8	-	Colorfastness to Crocking: AATCC Crockmeter Method
AATCC 15	-	Colorfastness to Perspiration
AATCC 16	-	Colorfastness to Light
AATCC 20	-	Fiber Analysis: Quantitative
AATCC 61	-	Colorfastness to Laundering Home and Commercial, Accelerated
AATCC 81	-	pH of the Water-Extract from Bleached Textiles
AATCC 99	-	Dimensional Changes of Woven or Knitted Textiles: Relaxation, Consolidation, and Felting
AATCC 132	-	Colorfastness to Drycleaning

(Copies of these documents are available from www.aatcc.org/ or American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Research Triangle Park, NC 27705-2215.)

2.4 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. The finished cloth shall match the standard sample for shade and appearance. Unless otherwise specified (see 3.4.2), the cloth shall be equal to or better than the standard sample with respects 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 4.2, 6.2, and 6.5).

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3.3 Material.

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

Type I	-	70's U.S. Standard
Type II		
Class I	-	64's U.S. Standard
Class 2	-	70's U.S. Standard
Type III	-	70's U.S. Standard
Type IV	-	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 for Types I, II, and III 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. The color for Type IV shall be Cadet Gray 172.

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

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 Kelvin (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 and shall have an AATCC Chromatic Transference Scale rating of 3.0 when tested as specified in 4.3.4. The finished cloth shall show fastness to crocking and shall have an AATCC Chromatic Transference Scale rating of 3.5 when tested as specified in 4.3.4.

3.5 Physical requirements. The finished cloth shall conform to the requirements specified in Table I and when tested as specified in 4.3.4.

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TABLE I. Physical requirements.

Type	Weight per linear yard 56 inch width basis (minimum)	Yarns per inch (minimum)		Breaking strength (minimum)		Dimensional stability (minimum)	
		Warp	Filling	Warp	Filling	Warp	Filling
	(Ounces)			Pounds	Pounds	Percent	Percent
I	19.0	128	98	160	90	5.5	3.0
II	18.0	124	80	140	80	6.5	4.0
III	16.0	138	96	130	70	6.5	3.0
IV	19.0	128	98	160	90	5.5	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 , III, and IV shall be as shown on Figure 2 (see 4.3.4).

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 between 5.0 and 8.5 inclusive when tested as specified in 4.3.4.

3.8 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be finished in continous lengths, each not less than 50 yards.

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 4.3.4.

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.

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4. VERIFICATION

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

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article is required (see 6.2), it shall be examined for appearance, color, and finished 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.

4.3 Conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-655.

4.3.1 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.

4.3.2 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.

4.3.3 End item examination

4.3.3.1 Point count examination. Examination of the end item shall be in accordance with the provisions of MIL-STD-655 for Fabric Quality Level 7. The demerit point 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.

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4.3.3.2 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.

4.3.3.3 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.

4.3.4 End item testing. The cloth shall be tested for the characteristics listed in Table II, and shall follow the methods of testing listed in Table II. 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:

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

TABLE II. End item tests

Characteristics	Requirement paragraph	Test method
Wool grade	3.3.1	ASTM D2130 1/
Yarn ply:		
Warp	3.3.2	Visual 2/
Filling	3.3.2	Visual 2/
Mothproofing	3.4.1	3/
Colorfastness to:		
Perspiration	3.4.3	AATCC 15
Wet-drycleaning	3.4.3	AATCC 132
Light	3.4.3	AATCC 16
Crocking	3.4.3	AATCC 9

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TABLE II. End item tests - continued

Characteristics	Requirement paragraph	Test method
Weight	3.5	ASTM D3776
Yarns per inch	3.5	ASTM D3775
Breaking strength	3.5	ASTM D5034
Dimensional stability	3.5	AATCC 99
Weave	3.6	Visual 1/
pH	3.7.1	AATCC 81
Wool content	3.9	AATCC 20A

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 weight 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 4.4.1. 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 D2130. If any specimen fails to meet the specified grade, the lot shall be rejected.

2/ One determination per sample unit and the results reported as “pass” or “fail”.

3/ As specified in MIL-C-43665

4.4 Methods of inspection.

4.4.1 Stripping procedure. The swatches shall be stripped of dye in a launderometer or similar machine in accordance with AATCC 61, Test 1A. Place 1 gram of zinc or sodium sulfoxylated formadelhyde in each of the two machine canisters. Add 400 ml of distilled water shall be added to each, and adjust pH to 3.0 to 3.5 with acetic acid. Place a 5-gram swatch shall in each canister, seal, and rotate in the machine until the temperature reaches 208° F. Then, while maintaining the temperature at 208 ± 3°F, continue the rotation for an additional 30 minutes. Remove the swatches and rinse them with warm (120° F) water for 5 minutes, then with cold water for 5 minutes. Air dry on a flat surface under ambient conditions.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, those personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging. Activity.

6. NOTES

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

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

Army	-	Service Uniform, Officers': Types I, II, and II: 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
	-	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; Make 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
West Point	-	United States Military Academy Items, Type IV, Cadet Gray Shade 172

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6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. When a first article is required (see 3.2, 4.2, and 6.5)
c. Color required (see 3.4).
d. Minimum length if other than specified (see 3.8).

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

6.4 Dyes. A suggested but not mandatory dye formulation for Army Green 44, Army Blue 150, Army Blue 151, Air Force Academy Blue Shade 500, and Cadet Gray 172 is as follows:

The standard shade sample 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 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 that is not acceptable.

(b) Army Blue 150
Slate primary:
Mordant Blue 9, CI 14855
Mordant Blue 13, 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

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(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 should 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 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 Company, "Fabric Defect Replica Kit", Dept. 817, ATTN: BSC 23-29, Sears Tower, Chicago, IL 60684.

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

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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 - MC
Air Force – 11

Preparing activity:

DLA – CT

Project 8305-0807

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.

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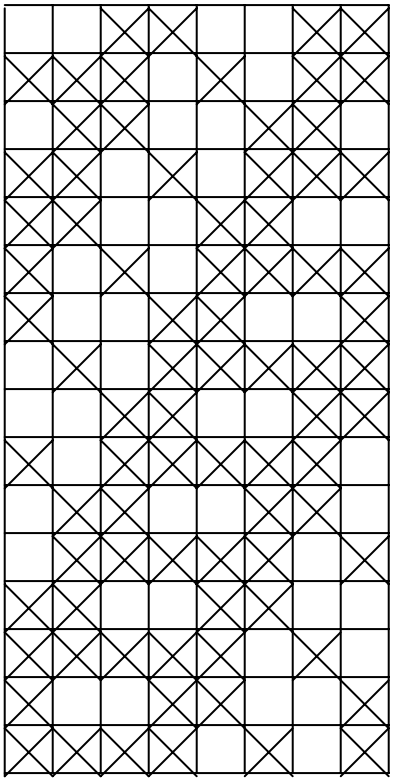

FIGURE 1

Cloth, Wool, Elastique, Type II

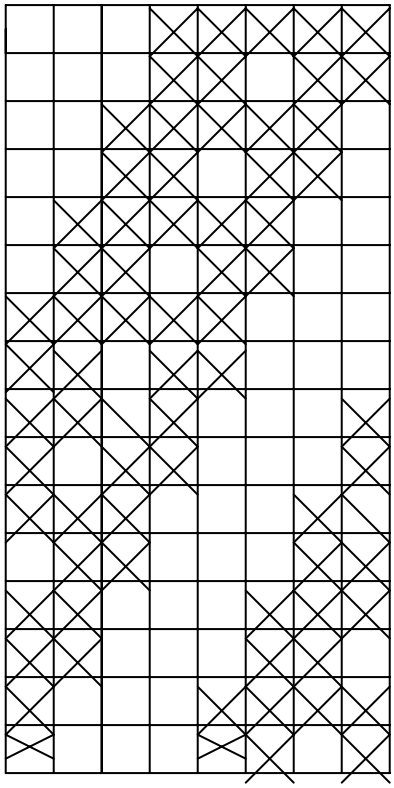

FIGURE 2

Cloth, Wool, Elastique, Types I, III, and IV