

MIL-C-11065G(GL)

11 October 1983

SUPERSEDING

MIL-C-11065F(GL)

24 May 1974

MILITARY SPECIFICATION

CLOTH, FLANNEL, WOOL AND NYLON, 16-OUNCE, SHRINK RESISTANT

This specification is approved for use by the Natick Research and Development Laboratories, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This document covers one type of wool and nylon flannel cloth.

2. APPLICABLE DOCUMENTS

- * 2.1 Government documents. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

SPECIFICATIONS

FEDERAL

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

MILITARY

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

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

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 and Development Laboratories, Natick, MA 01760 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection
by Attributes
- MIL-STD-655 - Provisions for Evaluating Quality of Cloth,
Wool, Worsted and Wool Blends

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

OTHER GOVERNMENT DOCUMENTS

U.S. DEPARTMENT OF AGRICULTURE (USDA)

Methods of Test for Grades of Wool

(Application for copies should be addressed to the U.S. Department of Agriculture, Agricultural Marketing Service, Washington, DC 20402.)

Laws and Regulations

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.)

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained without charge from the Federal Trade Commission, Washington, DC 20580.)

- * 2.2 Other publications. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

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.)

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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.)

(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.

3. REQUIREMENTS

3.1 Standard sample. The finished cloth shall match the standard sample for shade and shall be 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 6.6).

3.3 Material.

3.3.1 Stock. The warp and filling yarns shall consist of the following:

- (a) Not less than 45 percent fleece wool, pulled wool or any combination thereof not lower in grade than 62's U.S. Standard.
- (b) Not less than 10 percent staple nylon (see 3.3.1.2).
- (c) Not more than 40 percent wool noils not lower in grade than 60's U.S. Standard.

3.3.1.1 Wool. The wool and noils shall be of suitable length so as to meet the requirements of this document. The use of colored noils, or any other manufacturing by-products other than those resulting from contractor's own current production of the specified cloth is prohibited.

3.3.1.2 Nylon. The nylon fiber shall be of suitable staple length so as to meet the requirements of this document.

3.3.2 Yarn. The blend for the warp and filling yarns shall be carded and spun on the woolen system into a singles yarn (see 4.4.4).

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3.4 Color. The color of the finished cloth shall be Olive Green 108 and shall be obtained by blending chrome or neutral premetallized dyed wool and nylon (see 6.4) and shall match the standard sample. Speck and piece dyeing are prohibited.

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

3.4.2 Matching. The color of the finished cloth shall match the standard sample under artificial daylight having a color temperature of 7000 + 500 kelvins and shall be a good approximation to the standard sample under incandescent lamplight at 2850 + 100 kelvins.

* 3.4.3 Colorfastness. The finished cloth shall show fastness to laundering, crocking, perspiration and light equal to or better than the standard sample. When no standard sample has been established or designated as applicable to colorfastness, the finished cloth shall show "good" fastness to laundering, perspiration and light and shall show a rating for crocking of not less than 3.5 on the AATCC Chromatic Transference Scale. Tests shall be made 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

Width exclusive of selvage (minimum) Inches	Weight (based on linear yard of 56-inch width) (minimum) Ounces	Yarns per inch (minimum)		Breaking strength in pounds (minimum)		Weave
		Warp	Filling	Warp	Filling	
60	16.0	38	33	50	40	2 <u>2</u> 2
						Broken twill: 2 ends right 2 ends left

3.6 Finish. The cloth shall be fullled, (wool stock carbonized if necessary), napped and cropped. The finished cloth shall have a uniformly developed closely cropped finish and shall have the same appearance and degree of soft hand, drape, and character of finish as shown by the standard sample.

3.6.1 Shrink resistant treatment. The cloth shall be given a shrinkage control treatment for resistance to felting shrinkage by an approved shrink resistant process (see 6.5). The relaxation shrinkage of the treated cloth shall not exceed 5.0 percent in the warp and 5.0 percent in the filling when tested as specified in 4.4.4. The felting shrinkage of the treated cloth shall not exceed 5.0 percent in the warp and 3.0 in the filling when tested as specified in 4.4.4.

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3.6.1.1 Stiffness. When a resin or reactive treatment is used for producing shrink resistance, the stiffness of the treated cloth shall not be greater than 0.011 load pounds in the warp direction when tested as specified in 4.4.4.

3.6.1.2 Alkali solubility. When an oxidation or oxidation/resin method of producing shrink resistance is used, the alkali solubility of the treated cloth shall not be more than 6.0 percent (absolute) over the untreated cloth when tested as specified in 4.4.4.

3.6.2 pH. The pH value of the water extract of the finished cloth shall not be less than 4.0 nor more than 8.0 when tested as specified in 4.4.4.

3.7 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be furnished in continuous lengths, each not less than 50 yards. The cloth shall be put up in full width rolls as specified in PPP-P-1132.

3.8 Fiber content. The finished cloth shall contain no less than 80 percent wool and no more than 20 percent nylon, based on the dry weight of the specimen, when tested as specified in 4.4.4.

3.9 Wool content label. Cloth manufactured under this document shall be labeled in accordance with the Wool Products Labeling Act (see 2.1).

3.10 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 medium used commercially (see 4.4.3.3).

3.11 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 section 4, 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 (see 4.4.3.1.1 and 4.4.3.5).

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 the document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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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).

* 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 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-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 document or applicable purchase document.

4.4.1.1 Wool. The wool shall be visually examined and approved for grade (see 3.3.1) in scoured form prior to dyeing, picking, or carding, by comparison with the applicable U.S. Standard. The examination for grade shall be performed on a composite sample of 1 pound of scoured wool for each 10,000 pounds, or fraction thereof in the lot. The composite sample shall be selected from not less than 10 percent of the bales or bags in the lot. The lot shall be unacceptable if any one sample does not conform to the requirements of 3.3.1. In the event of dispute resulting from comparison, the grade shall be determined by the width method (wedge).

4.4.2 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to assure that only approved wools and nylons are blended in the required proportions and to determine that materials are dyed in accordance with the requirements of 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 Yard-by-yard examination. The yard-by-yard examination shall be as specified in MIL-STD-655. The fabric quality shall be quality level 10.

4.4.3.1.1 Limits of slubs and knots. Only slubs and knots which exceed "D" for slubs and "C" for knots on the Sears Fabric Defect Scale (see 6.7) shall be scored.

4.4.3.2 Examination for length. The examination for length shall be as specified in MIL-STD-655.

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4.4.3.3 Examination for back marking and compliance with the Wool Products Labeling Act. The examination for back marking and compliance with the Wool Products Labeling Act shall be as specified in MIL-STD-655.

4.4.3.4 Examination for shade and finish. A 4-inch by 20-inch swatch from each roll in the lot shall be examined visually for shade match (see 3.4.2) and finish (see 3.6). A roll shall be unacceptable if the swatch from that roll fails to meet the requirements for shade match and finish.

4.4.3.5 Examination for defect marking (stringing of defects). The examination for defect marking shall be as specified in MIL-STD-655.

4.4.4 End item testing. 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 method. The sample unit shall be 1/4 yard untreated cloth, and 3 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. The lot size shall be expressed in units of 1 yard. All test reports shall contain the individual value utilized in expressing the final result. The sample size (number of sample units) shall be in accordance with the following:

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

TABLE II. End item tests

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Yarn ply <u>1/</u>	3.3.2	Visual
Mothproofing	3.4.1	<u>2/</u>
Colorfastness to:		
Light	3.4.3	5660
Perspiration	3.4.3	5680
Crocking	3.4.3	5651
Laundering	3.4.3	5614 <u>3/</u>

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TABLE II. End item tests (cont'd)

Characteristic	Requirement paragraph	Test method
Weave <u>1/</u>	3.5	Visual
Yarns per inch	3.5	5050
Weight	3.5	5041
Breaking strength	3.5	5100
Shrinkage in relaxation	3.6.1	5558
Shrinkage in felting <u>4/</u>	3.6.1	5554
Stiffness <u>5/</u>	3.6.1.1	5202
Alkali solubility <u>6/</u>	3.6.1.2	2800
pH	3.6.2	2811
Fiber content (finished cloth)		
Nylon	3.8	2530
Wool	3.8	2101

- 1/ One determination per sample unit and the result reported as "pass" or "fail".
- 2/ The test for percent mothproofing compound shall be as specified in MIL-C-43665. The percent mothproofing compound shall be determined and calculated using the procedure for specimens containing all wool.
- 3/ On the color transfer cloth evaluation, only the stain on the wool and nylon fibers of the color transfer cloth shall be evaluated.
- 4/ The felting shrinkage (Method 5554) shall be determined on the same specimens used for relaxation shrinkage (Method 5558) and determined by the following formula:

$$\text{Felting shrinkage percent} = \frac{B - F}{B} \times 100$$

Where: B = Average measurements after relaxation.
F = Average measurements after felting.

- 5/ Five specimens only in the warp direction shall be tested.
- 6/ Two treated and two untreated specimens shall be tested per sample unit.
- * 4.4.5 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1132.

5. PREPARATION FOR DELIVERY

5.1 Put-up and packaging. Put-up and packaging shall be level A or C as specified (see 6.2).

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5.1.1 Levels A and C. The cloth shall be put-up and packaged in accordance with the applicable requirements of PPP-P-1132.

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-1132.

5.3 Marking. In addition to any special marking required by 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 wool and nylon, flannel cloth is intended for use as shirting material for wear by male Army personnel as a component of the cold-wet and cold-dry uniform for temperate and cold areas.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this document.
- b. When a first article is required (see 3.2, 4.3 and 6.6).
- c. Minimum length if other than specified (see 3.7).
- d. Selection of applicable levels of packaging 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 Dyestuff. The standard sample for Olive Green 108 has been dyed with the following permetalized dyes. This is for information only and does not constitute a mandatory requirement.

Neutral Premetalized Dark Green 2BL
Neutral Premetalized Olive 3BL (1 to 1 ratio)
Acid Blue 171
Acid Yellow 127
Acid Orange 86
Acid Orange 80

6.5 Shrink-resistant chemical treatment. Only those shrink-resistant chemical treatments already approved by the appropriate medical service and so listed in the invitation for bids or request for proposal shall be considered acceptable for the related acquisition (see 3.6.1).

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6.6 First article. When a first article sample is required, it shall be inspected and approved under the appropriate provisions of DAR 7-104.55. The first article should be a preproduction sample consisting of 1/4 yard of untreated cloth and 3 continuous yards of the finished cloth. The contracting officer should include specific instructions in all acquisition documents regarding arrangements for inspection and approval of the first article.

* 6.7 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.

6.8 Changes from previous issue. The margins of this document 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 previous issue.

Custodian:

Army - GL

Review activities:

Army - MD
DLA - CT

Preparing activity:

Army - GL

Project No. 8305-A466

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER MIL-C-11065G(GL)	2. DOCUMENT TITLE Cloth, Flannel, Wool And Nylon, 16-Ounce, Shrink Resistant
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): _____
b. ADDRESS (Street, City, State, ZIP Code) 	
5. PROBLEM AREAS	
a. Paragraph Number and Wording: 	
b. Recommended Wording: 	
c. Reason/Rationale for Recommendation: 	
6. REMARKS 	
7a. NAME OF SUBMITTER (Last, First, MI) – Optional 	b. WORK TELEPHONE NUMBER (Include Area Code) – Optional
c. MAILING ADDRESS (Street, City, State, ZIP Code) – Optional 	8. DATE OF SUBMISSION (YYMMDD)

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.

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