

MIL-C-3735D  
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SUPERSEDING  
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MILITARY SPECIFICATION

CUFFS, KNIT, WRIST AND ANKLE, AND CLOTH, KNITTED

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

1. SCOPE

1.1 Scope. This specification covers the requirements for ankle and wrist cuffs, knitted to shape; and for knitted fabrics for making ankle and wrist cuffs, waistbands, and collars.

1.2 Classification. The knitted cuffs and fabrics shall be procured in the following types, classes, and sizes as specified (see 6.2):

Type I - Wool

Class 1 - Cuffs, ankle, 1 x 1 rib  
Class 2 - Cuffs, wrist, 1 x 1 rib

Size 1 - 8 inches  
Size 2 - 8 3/4 inches

Class 3 - Cloth, knitted; for ankle and wrist cuffs, waistbands, and collars, 1 x 1 rib

Type III - Polyester

Class 2 - Cuffs, wrist, 1 x 1 rib

Size 2 - 8 3/4 inches

Type IV - Aramid

Class 2 - Cuffs, wrist, 1 x 1 rib

Size 2 - 8 3/4 inches  
Class 3 - Cloth, knitted, for ankle cuffs and waistbands 1 x 1 rib

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Beneficial comments (recommendations, additions, and 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, 21 Strathmore Road, 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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2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified.

SPECIFICATIONS

FEDERAL

- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-T-45 - Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing

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- MIL-B-17757 - Boxes, Shipping, Fiberboard (Modular Sizes)
- MIL-C-43665 - Cloth Wool: Mothproofing Treatment of

STANDARDS

FEDERAL

- FED-STD-191 - Textile Test Methods

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-1491 - Glossary of Knitting Imperfections

2.1.2 Other Government documents, and drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

LAWS AND REGULATIONS

US POSTAL SERVICE MANUAL

(Copies of the manual may be obtained from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

US DEPARTMENT OF AGRICULTURE

Methods of Test for Grades of Wool Top

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(Application for copies shall be addressed to the US Department of Agriculture, Agricultural Marketing Service, Washington, D. C. 20580.)

RULES AND REGULATIONS UNDER THE WOOL PRODUCTS LABELING ACT OF 1939

(Application for copies shall be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.)

RULES AND REGULATIONS UNDER THE TEXTILE FIBER PRODUCTS IDENTIFICATION ACT

(Application for copies shall be addressed to the Federal Trade Commission, Washington, D. C. 20580.)

(Copies of specifications, standards, drawings, and publications required by contractor in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and supplement thereto, if applicable.

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies shall be addressed to the American Trucking Association, Inc., Traffic Department, 1616 P Street, N.W., Washington, D.C. 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies shall be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

3. REQUIREMENTS

3.1 Standard sample. When a standard sample is available (see 6.3), the finished types I, III, and IV knitted cuffs and cloth shall be equal to or better than the standard sample with respect to all the characteristics for which the standard sample is referenced.

3.2 First article. When specified (see 6.2), the contractor shall furnish sample unit(s) for first article inspection and approval (see 4.3 and 6.7).

3.3 Materials.

3.3.1 Wool. The wool used in the fabrication of the type I cuffs and cloth shall be fleece or pulled sheep's wool, or any combination thereof, not lower in grade than 56's US Standard (see 4.4.1). The use of reprocessed, reused, or waste wool is prohibited.

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3.3.1.1 Yarn. The yarn shall be 2-ply, spun from combed top (see 4.4.1).

3.3.2 Polyester. The polyester used in the fabrication of the type III cuffs shall be semi-dull, continuous filament and texturized, made from glycol terephthalate (see 4.4.1).

3.3.3 Aramid. The aramid used in the fabrication of the type IV cuffs and cloth, shall conform to the requirements specified in 3.3.3.1 thru 3.3.3.2.2 when tested as specified in 4.4.1 (see 6.4).

3.3.3.1 Fiber. The fiber shall be aramid, 1.5 or 2.0 denier per filament, cut to a staple length of 1 1/2 to 2 inches. The fiber shall not carbonize (turn black or become a soft friable char) at a temperature below 675°F.

3.3.3.2 Yarns. The knitting aramid yarn and the yarn for double covering of the spandex core, shall conform to the requirements specified in 3.3.3.2.1 and 3.3.3.2.2. The aramid yarn shall be autoclaved prior to knitted and covering.

3.3.3.2.1 Knitting yarn. The fiber specified in 3.3.3.1 shall be spun and twisted into two (2) ply yarn.

3.3.3.2.2 Elastic yarn. The elastic yarn shall be a 140 denier spandex core double-covered (inner and outer-cover). The core yarn shall be covered with a nominal count of 50/1 (cotton count) aramid yarn.

3.4 Color. The color of the finished types I, III, and IV cuffs and cloth shall be as specified by the procuring activity (see 6.2).

3.4.1 Wool. The color of the dyed type I cuffs and cloth shall be obtained by either top, yarn, or piece dyeing using suitable dyestuffs of required fastness properties to meet the requirements specified in 3.4.5.

3.4.1.1 Mothproofing. In the dyeing operation, the top; yarn, or fabric shall be mothproofed in accordance with MIL-C-43665.

3.4.2 Polyester. The color of the dyed type III cuffs shall be obtained with suitable dyestuffs of required fastness properties to meet the requirements specified in 3.4.5.

3.4.3 Aramid. The color of the dyed type IV cuffs and cloth shall be obtained by the use of melt spun solution-dyed fibers, using suitable dyestuffs of required fastness properties to meet the requirements specified in 3.4.5.

3.4.4 Matching. The color of the types I, III, and IV cuffs and cloth, shall match the available standard sample under artificial daylight having a color temperature of 7500° Kelvin, and shall be a good approximation to the standard sample under incandescent lamplight at 2800° Kelvin.

3.4.5 Colorfastness.

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3.4.5.1 Types I and III cuffs and cloth. The dyed and finished types I and III cuffs and cloth shall show fastness to light, laundering, perspiration, wet-dry cleaning, and crocking equal to or better than the standard sample. When a standard sample is not available, the type I and III cuffs and cloth shall show a minimum of "good" fastness to light; laundering; perspiration; wet-dry cleaning; and shall show a Munsell Value for crocking not lower than 8.5. Testing shall be performed as specified in 4.5.

3.4.5.2 Type IV cuffs and cloth. The dyed finished type IV cuffs and cloth shall show fastness to light and laundering (after 3 cycles) equal to or better than the standard sample. When a standard sample is not available, the type IV cuffs and cloth shall show a minimum of "fair" fastness to light and "good" fastness to laundering (after 3 cycles). Testing shall be performed as specified in 4.5.

3.5 Shrink resistant treatment. When specified (see 6.2), the wool used for the type I cuffs and cloth shall be treated for resistance to felting shrinkage in top, yarn, or fabric form by a chlorination method approved by the procuring activity.

3.5.1 Alkali solubility. When specified (see 6.2), the alkali solubility of the shrink resistant wool for the finished type I cuffs and cloth in the form in which it has been treated (top, yarn, or fabric), shall not be increased by more than 6.0 percent (absolute) over the untreated material when tested as specified in 4.4.1 or 4.5.

### 3.6 Construction.

3.6.1 Type I, class 1, ankle cuffs. The wool ankle cuffs, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed seamless in one size on a circular knitting machine using a 1 x 1 rib stitch with one end of yarn per feed (see 3.3.1.1). The ends of the cuffs shall be tapered with a tuck or expanding stitch (see A, Figure 1).

3.6.2 Type I, class 2, wrist cuffs. The wool wrist cuffs, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed seamless in two sizes on a circular knitting machine using a 1 x 1 rib stitch with one end of yarn per feed (see 3.3.1.1). The ends of the cuffs shall be tapered with a tuck or expanding stitch (see A, Figure 1).

3.6.3 Type I, class 3, knitted cloth. The knitted wool cloth for ankle and wrist cuffs, waistbands, and collars, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed on a circular or flat knitting machine using a 1 x 1 rib stitch with one end of yarn per feet (see 3.3.1.1).

3.6.4 Type III, class 2, wrist cuffs. The polyester wrist cuffs, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed seamless in one size on a circular knitting machine using a 1 x 1 rib stitch with yarn as specified in 3.3.2 (see 6.5). The ends of the cuffs shall be tapered with a tuck or expanding stitch (see A, figure 1).

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3.6.5 Type IV, class 2, wrist cuffs. The aramid wrist cuffs, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed seamless on one size on a circular knitting machine using a 1 x 1 rib stitch with one end of the elastic yarn specified in 3.3.3.2.2 laid in every sixth course in the rib knit area (see B, Figure 1). The ends of the cuffs shall be tapered with a tuck or expanding stitch, with one end of the above specified elastic yarn laid in every third course (see A, Figure 1).

3.6.6 Type IV, class 3, knitted cloth. The aramid knitted cloth for ankle cuffs and waistbands, conforming to the physical requirements specified in Table I when tested as specified in 4.5, shall be constructed on a circular or flat knitting machine using a 1 x 1 rib stitch with one end of the elastic yarn specified in 3.3.3.2.2 laid in every eighth course.

Table I - Physical requirements

| Type | Class | Size | Characteristic                 | Requirement |      |
|------|-------|------|--------------------------------|-------------|------|
|      |       |      |                                | Min.        | Max. |
| I    | 1     | -    | Wales per inch                 | 14          | -    |
|      |       |      | Courses per inch               | 19          | -    |
|      |       |      | Weight per dozen pairs, ounces | 15.0        | -    |
| I    | 2     | 1    | Wales per inch                 | 14          | -    |
|      |       |      | Courses per inch               | 19          | -    |
|      |       |      | Weight per dozen pairs, ounces | 11.0        | -    |
| I    | 2     | 2    | Wales per inch                 | 14          | -    |
|      |       |      | Courses per inch               | 19          | -    |
|      |       |      | Weight per dozen pairs, ounces | 11.0        | -    |
| I    | 3     | -    | Wales per inch                 | 14          | -    |
|      |       |      | Courses per inch               | 19          | -    |
|      |       |      | Weight, ounces per square yard | 11.0        | -    |
| III  | 2     | 2    | Wales per inch                 | 13          | -    |
|      |       |      | Courses per inch               | 17          | -    |
|      |       |      | Weight per dozen pairs, ounces | 11.0        | -    |
| IV   | 2     | 2    | Wales per inch                 | 15          | -    |
|      |       |      | Courses per inch               | 22          | -    |
|      |       |      | Weight per dozen pairs, ounces | 15          | -    |
| IV   | 3     | -    | Wales per inch                 | 15          | -    |
|      |       |      | Courses per inch               | 24          | -    |
|      |       |      | Weight, ounces per square yard | 12.5        | -    |
|      |       |      | Flame resistance: <u>1/</u>    |             |      |
|      |       |      | Flaming time, seconds          | -           | 2.0  |
|      |       |      | Glow time, seconds             | -           | 25.0 |
|      |       |      | Char length, inches            | -           | 3.5  |

1/ Test to be conducted in both the length (wale) and width (course) direction of fabric.

Table II - Finished measurements

| Type | Class | Size | Measurement           |                       |                       |                              |       |                                   |                         |                                  |                      |                      |
|------|-------|------|-----------------------|-----------------------|-----------------------|------------------------------|-------|-----------------------------------|-------------------------|----------------------------------|----------------------|----------------------|
|      |       |      | A <u>1/</u><br>(Min.) | B <u>1/</u><br>(Min.) | C <u>1/</u><br>(Min.) | D <u>1/</u><br>(Min.) (Max.) |       | Length <u>2/</u><br>(Min.) (Max.) |                         | Width <u>2/</u><br>(Min.) (Max.) |                      |                      |
| I    | 1     | -    | 2 1/2                 | 6                     | 11                    | 11 3/4                       | 3     | 3 3/4                             | -                       | -                                | -                    | -                    |
| I    | 2     | 1    | 1 3/4                 | 4 1/2                 | 8                     | 8 1/4                        | 2 5/8 | 2 3/8                             | -                       | -                                | -                    | -                    |
| I    | 2     | 2    | 2                     | 4 3/4                 | 8 3/4                 | 9 1/2                        | 2 1/4 | 2 3/4                             | -                       | -                                | -                    | -                    |
| I    | 3     | -    | -                     | -                     | -                     | -                            | -     | -                                 | 3/ as<br>speci-<br>fied | 3/ as<br>speci-<br>fied          | as<br>speci-<br>fied | as<br>speci-<br>fied |
| III  | 2     | 2    | 2                     | 4 3/4                 | 8 3/4                 | 9 1/2                        | 2 1/4 | 2 3/4                             | -                       | -                                | -                    | -                    |
| IV   | 2     | 2    | 2                     | 4 3/4                 | 8 3/4                 | 9 1/2                        | 2 1/4 | 2 3/4                             | -                       | -                                | -                    | -                    |
| IV   | 3     | -    | -                     | -                     | -                     | -                            | -     | -                                 | 3/ as<br>speci-<br>fied | 3/ as<br>speci-<br>fied          | as<br>speci-<br>fied | as<br>speci-<br>fied |

1/ See Figure 1.

2/ The length of the knitted material shall be interpreted in the direction of the wales and the width in the direction of the courses.

3/ Unless otherwise specified, waistbands procured by the Department of the Army and Air Force shall be not less than 8 3/4 inches nor more than 9 1/2 inches in length (wale) direction.

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3.7 Measurements. The finished cuffs and cloth shall conform to the dimensions specified in Table II. All measurements are expressed in inches.

3.8 Figure. Figure 1 is furnished for information purposes only. To the extent of any inconsistencies between the written specification and the figure, the written specification shall govern.

3.9 Shrinkage. When specified (see 6.2), the finished type I wool cuffs and cloth shall not shrink more than 13 percent in the length or width when subjected to a test for felting shrinkage including relaxation shrinkage as specified in 4.5. The shrinkage shall be calculated on the basis of the original unrelaxed condition of the material.

3.10 Wool content. The finished type I wool cuffs and cloth shall contain not less than 95 percent wool based on the dry weight of the specimen when tested as specified in 4.5.

3.11 Fiber content label. The type I wool cuffs and cloth when applicable, shall be labeled in accordance with the Wool Products Labeling Act of 1939. The types III and IV cuffs and cloth shall be labeled in accordance with the Textile Fiber Products Identification Act (see 2.2).

3.12 pH. The pH value of the water extract of the finished type I wool cuffs and cloth shall be not less than 4.0 nor more than 8.0, and for the type III polyester cuffs not less than 5.0 nor more than 8.5 when tested as specified in 4.5.

3.13 Non-fibrous material. The starch and protein content, including chloroform-soluble and water-soluble material, shall not exceed 3.0 percent for the type I cuffs and cloth when tested as specified in 4.5.

3.14 Length and put-up. Unless otherwise specified (see 6.2), the finished types I and IV knitted cloth shall be furnished in continuous lengths each not less than 40 yards. The put-up shall be as specified in Section 5.

3.15 Workmanship. The finished items, 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, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements as 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 assure supplies and services conform to prescribed requirements.



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4.1.1 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).

4.3 First article inspection. When required, the first article submitted in accordance with 3.2, shall be inspected as specified in 4.4.2.1 or 4.4.2.2 for compliance with design, construction, workmanship, and dimensional requirements.

4.4 Inspection. Inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated herein.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected and 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 purchase document. In addition, testing shall be performed on the applicable component listed in Table IV for the characteristics specified and in accordance with the referenced test methods of FED-STD-191 whenever applicable. The physical and chemical values specified in Section 3, apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test method. The sample unit and the basis for expressing the lot size shall be as indicated in Table III. All test reports shall contain the individual values utilized in expressing the final results. The sample size (number of sample units), shall be as shown below:

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

Table III - Sample unit and the basis of lot size

| <u>Component</u> | <u>Basis of lot size</u> | <u>Sample unit</u> |
|------------------|--------------------------|--------------------|
| Wool:            |                          |                    |
| Top              | Pound                    | 1 yard             |
| Yarn             | Pound                    | 1 yard             |
| Polyester yarn   | Pound                    | 1 yard             |
| Aramid yarn      | Pound                    | 1 yard             |

The lot shall be unacceptable if one or more sample units fail to meet any of the requirements specified.

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Table IV - Component tests

| Component    | Characteristic               | Requirement Paragraph | Test Method      |
|--------------|------------------------------|-----------------------|------------------|
| Wool         | Material Identification      | 3.3.1                 | 1100 <u>1/</u>   |
|              | Type of wool                 | 3.3.1                 | <u>1/</u>        |
|              | Wool grade                   | 3.3.1                 | 4.4.1.1          |
|              | Ply of yarn                  | 3.3.1.1               | Visual <u>2/</u> |
|              | Alkali solubility            | 3.5.1                 | 2800 <u>3/</u>   |
| Polyester    | Material Identification      | 3.3.2                 | 1600 <u>1/</u>   |
|              | Luster                       | 3.3.2                 | <u>1/</u>        |
|              | Texturized yarn              | 3.3.2                 | <u>1/</u>        |
| Aramid       | Material Identification      | 3.3.3.1               | 1530 <u>1/</u>   |
|              | Carbonization point          | 3.3.3.1               | <u>1/</u>        |
|              | Yarn:                        |                       |                  |
|              | Autoclaving of Knitting yarn | 3.3.3.2               | <u>1/</u>        |
|              | Knitting yarn                | 3.3.3.2.1             | <u>1/</u>        |
| Elastic yarn | 3.3.3.2.2                    | <u>1/</u>             |                  |

1/ Unless otherwise specified, a certificate of compliance shall be submitted and will be acceptable for the stated requirement.

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

3/ The wool shall be tested in the form in which it has been treated, and the sample unit shall consist of equal amounts of both treated and untreated material.

4.4.1.1 Wool grade. The wool shall be visually examined for grade in top form prior to shrink resistant treatment when applicable, by comparison with the applicable US Standard (see 2.1.2). In the event of a dispute resulting from this examination, the wool grade shall be determined by the width method (wedge) approved by the Government. The sample unit shall be one yard of untreated top. The results of each sample unit shall be reported separately.

4.4.2 Examination of the end items. The finished cuffs, ankle and wrist; waistbands; and cloth furnished as piece goods shall be examined as specified in 4.4.2.1 and 4.4.2.2.

4.4.2.1 Cuffs, ankle and wrist; and waistbands. The defects found during the examination of the applicable end item, shall be classified in accordance with 4.4.2.1.1 and 4.4.2.1.2. The inspection levels and the acceptable quality levels (AQL's) shall be as specified in 4.4.2.1.3. The sample unit shall be one completely fabricated ankle cuff, wrist cuff, or waistband each. The lot size shall be expressed in units of ankle cuffs, wrist cuffs, or waistbands.

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4.4.2.1.1 Visual examination.

| Defects   | Classification |       |
|---|----------------|-------|
|   | Major          | Minor |
| MATERIAL DEFECTS AND DAMAGES  |                |       |
| a. Hole, cut, tear or rip   | X              |       |
| b. Broken yarn, dropped stitch or run   | X              |       |
| c. Slubby yarn more than twice the diameter of the normal size yarn   |                | X     |
| d. Visible mend, thin place or uneven knitting, or abrasion mark resulting in a weak area   |                | X     |
| e. Crease or wrinkle, embedded in fabric  |                | X     |
| f. Loose yarn, pulled or snagged yarn, or float   |                | X     |
| g. Barre mark   |                | X     |
| h. Knitted in waste   |                | X     |
| i. Shade bar, dye streak, or area of no dye penetration   |                | X     |
| NOTE: For knitted fabric defect definitions, see MIL-STD-1491   |                |       |
| CLEANNESS   |                |       |
| a. Any spot or stain  |                | X     |
| b. Kinks or untrimmed ends  |                | X     |
| ANKLE OR WRIST CUFFS  |                |       |
| a. When applicable, ends of cuffs not tapered as specified  | X              |       |
| b. Non-uniform in overall appearance, e.g., not well shaped   |                | X     |
| c. Off shade or paired items mismatched for shade   |                | X     |
| d. When applicable, tuck or expanding stitches omitted at one or both ends  | X              |       |
| e. When applicable, folded edge(s) of cuff scalloped  |                | X     |
| f. Type of knit stitch or construction other than specified   | X              |       |
| WAISTBANDS  |                |       |
| a. Type of knit stitch or construction other than specified   | X              |       |
| b. When applicable, folded edge(s) or waistband scalloped   |                | X     |
| c. Off shade  |                | X     |
| LABEL   |                |       |
| Not labeled in accordance with the Wool Products Labeling Act of 1939 or the Textile Fiber Products Identification Act (see 3.11) |                | X     |

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4.4.2.1.2 Dimensional examination. The finished end items shall be examined for dimensional defects. Any dimension that is not within the established tolerance, shall be classified as a defect (see 3.7).

4.4.2.1.3 Inspection levels and acceptable quality levels (AQL's). The inspection levels, expressed in defects per 100 units for visual and dimensional examination, shall be as follows:

|                                     | <u>Inspection level</u> | <u>AQL</u>   |              |
|-------------------------------------|-------------------------|--------------|--------------|
|                                     |                         | <u>Major</u> | <u>Total</u> |
| For defects applicable to 4.4.2.1.1 | II                      | 2.5          | 6.5          |
| For defects applicable to 4.4.2.1.2 | S-3                     |              | 4.0          |

4.4.2.2 Cloth, knitted for ankle and wrist cuffs; waistbands; and collars. Examination of the knitted cloth shall be in accordance with 4.4.2.2.1 through 4.4.2.2.3.2.

4.4.2.2.1 Yarn-by-yard examination. The required yardage of each roll shall be examined and visual defects as defined in MIL-STD-1491 shall be classified as listed below. All defects found shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the cloth, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each wale-wise (length-wise) yard or fraction thereof in which it occurs. The sample unit shall be one linear yard. The sample size shall be in accordance with inspection level II of MIL-STD-105. The acceptable quality levels shall be 2.5 major defects and 6.5 total defects (major and minor combined) per 100 units. The lot size shall be expressed in units or one linear yard each. The number of rolls selected shall be in accordance with Table V. An approximate equal number of yards shall be examined from each roll in the sample.

| <u>Defects 1/</u>  | <u>Classification</u> |              |
|--|-----------------------|--------------|
|  | <u>Major</u>          | <u>Minor</u> |
| Hole, cut, tear or rip   | X                     |              |
| Broken yarn, dropped stitch or run   | X                     |              |
| Slubby yarn, more than twice the diameter of the normal size of the yarn               |                       | X            |
| Visible mend, thin place or uneven knitting, or abrasion mark resulting in a weak area |                       | X            |
| Off shade  |                       | X            |
| Crease or wrinkle, embedded in fabric  |                       | X            |
| Loose yarn, pulled or snagged yarn, or float   |                       | X            |
| Any spot or stain  |                       | X            |
| Cockled (ridgy) fabric   |                       | X            |
| Kinks or untrimmed ends  |                       | X            |
| Knitted in waste   |                       | X            |
| Barre mark   |                       | X            |

1/ Clearly visible at normal inspection distance (approximately three feet).

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4.4.2.2.2 Overall examination. Each defect listed below shall be counted not more than once in each roll examined. The sample unit shall be one roll. The sample size (number of rolls selected as sample) and the number of defects acceptable shall be as shown in Table V.

Defects

Overall uncleanness throughout the roll.  
 Uneven knitting throughout the roll.  
 Off shade, shaded end to end, side to side, side to center, or throughout the roll.  
 Poor dye penetration, mottled, streaky or cloudy throughout the roll.  
 Edges frayed, reveled, curled, rolled, folded, scalloped, or uneven continuously throughout the roll.  
 Not labeled in accordance with the Wool Products Labeling Act of 1939 or the Textile Fiber Products Identification Act, as applicable (see 3.11).  
 Degree and character of finish not equal to standard sample when available throughout the roll.

Table V

| Lot size, yards                    | Sample size<br>rolls | Maximum number of<br>defects acceptable<br>in sample <sup>2/</sup> |
|------------------------------------|----------------------|--|
| Up to 1200                         | 3 <sup>1/</sup>      | 0  |
| 1201 up to and including 3200      | 5                    | 0  |
| 3201 up to and including 10,000    | 7                    | 0  |
| 10,001 up to and including 35,000  | 10                   | 0  |
| 35,001 up to and including 150,000 | 15                   | 1  |
| 150,001 and over                   | 25                   | 1  |

- <sup>1/</sup> If a lot contains fewer than three (3) rolls, each roll in the sample shall be examined.
- <sup>2/</sup> Except that the acceptance number shall be "0" for color and uniformity of shade defects found in the overall examination (see 4.4.2.2.2).

4.4.2.2.3 Examination for length.

4.4.2.2.3.1 Individual rolls. The rolls shall be examined for gross length. Any gross length found to be less than the minimum specified or more than 2 yards less than the gross length marked on the roll ticket, shall be considered a defect with respect to length. The sample unit shall be one roll. The sample size (number of rolls selected as the sample) and the acceptance number shall be as shown in Table V.

4.4.2.2.3.2 Total yardage in sample. The lot shall be unacceptable if the total of the actual gross lengths of rolls in the sample is less than the total of the gross lengths marked on the roll tickets.

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4.4.3 Examination of packing requirements. An examination shall be made to determine that packaging, packing, and marking complies with Section 5 requirements of this specification. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully prepared for delivery, with the exception that it need not be closed. Defects of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per 100 units.

| <u>Examine</u>                   | <u>Defect</u>   |
|----------------------------------|---|
| Markings (exterior and interior) | Omitted, incorrect, illegible, of improper size and location  |
| Materials                        | Any component omitted, damaged, or not as specified.  |
| Workmanship                      | Inadequate application of components such as incomplete closure of container flaps, loose strapping, improper taping, etc.<br>Bulging or distortion of container or roll, incomplete closure of roll, inadequate securing or sealing of wrapping materials. |
| Content                          | Number of bundles or rolls per container is more or less than specified.<br>Number of pairs (cuffs) per bundle is more or less than specified. 1/<br>Number of waistbands per bundle is more or less than specified. 1/                                     |

1/ For this defect, one bundle shall be examined for each shipping container in the sample.

4.5 Testing of the end item. The methods of testing specified in FED-STD-191 whenever applicable and as listed in Table VI 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. All test reports shall contain the individual values utilized in expressing the final result. For the finished knitted cloth when furnished as piece goods, the lot size shall be expressed in units of 1 yard each and the sample size shall be in accordance with 4.4.1. The sample unit shall be 2 continuous yards full width except when the type I wool cloth subjected to a shrink resistant treatment is applicable 1/4 yard of the untreated material shall also be required for comparable purposes. For the finished cuffs and waistbands the lot size shall be expressed in units of one cuff or waistband each. With the exception of weight per dozen pairs of cuffs, the sample size shall be in accordance with 4.4.1. The sample unit shall be as follows:

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Cuffs, wrist and ankle

Weight determinations - One dozen (12) pairs of cuffs in one size, with a sample size of (1) regardless of lot size.

All remaining test characteristics - Six (6) individual cuffs except when the type I wool cuffs subjected to a shrink resistant treatment is applicable, three (3) untreated cuffs shall also be required for comparable purposes.

Waistbands

Six (6) individual waistbands for all test characteristics except when the type I wool waistband subjected to a shrink resistant treatment is applicable, three (3) untreated waistbands shall also be required for comparable purposes. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

Table VI End item tests

| Characteristic  | Requirement paragraph                                      | Test method       |
|---|--|-------------------|
| Colorfastness to (types I and III cuffs, waistbands, and cloth):        |  |                   |
| Light   | 3.4.5.1  | 5660              |
| Laundering  | 3.4.5.1  | 5614 <u>1/</u>    |
| Perspiration  | 3.4.5.1  | 5680 <u>1/</u>    |
| Wet-dry cleaning  | 3.4.5.1  | 5622              |
| Crocking  | 3.4.5.1  | 5651              |
| Colorfastness to (type IV cuffs waistbands, and cloth):                 |  |                   |
| Light   | 3.4.5.2  | 5660 <u>2/</u>    |
| Laundering (after 3 cycles)   | 3.4.5.2  | 5610 <u>3/ 1/</u> |
| Alkali solubility (type I cuffs, waistbands, and cloth when applicable) | 3.5.1  | 2800 <u>4/</u>    |
| Type of knit stitch and construction                                    | 3.6.1, 3.6.2, 3.6.3, 3.6.4, 3.6.5, and 3.6.6 as applicable | Visual <u>5/</u>  |
| Wales per inch of cuffs, waistbands, and cloth                          | Table I  | 5070              |
| Courses per inch of cuffs, waistbands, and cloth                        | Table I  | 5070              |

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| Characteristic  | Requirement paragraph | Test method |
|---|-----------------------|-------------|
| Weight per dozen pairs of cuffs                                     | Table I               | 4.5.1       |
| Weight per square yard of waistbands and cloth                      | Table I               | 5041        |
| Flaming Time <u>6/</u>  | Table I               | 5903        |
| Glow time <u>6/</u>   | Table I               | 5903        |
| Char time <u>6/</u>   | Table I               | 5903        |
| Shrinkage (type I cuffs, waistbands, and cloth when applicable)     | 3.9                   | 5554        |
| Wool content (type I cuffs, waistbands, and cloth)                  | 3.10                  | 2101        |
| pH (types I and III cuffs, waistbands, and cloth)                   | 3.12                  | 2811        |
| Non-fibrous material (types I and III cuffs, waistbands, and cloth) | 3.13                  | 2611        |

- 1/ On the color transfer cloth, only the stain on the wool; polyester; or the nylon fiber whichever is applicable, shall be evaluated.
- 2/ Except that the contractor's submission shall be compared with the standard sample or rated adjectively after exposure of 6 standard fading hours.
- 3/ The specimens must be dried after each of the 3 laundering cycles.
- 4/ Three treated and three untreated specimens per sample unit.
- 5/ One determination shall be performed per sample unit and the results reported as "pass" or "fail".
- 6/ When performing the test in the length (wale) direction, the test specimen shall be not less than 15 inches.

4.5.1 Determination of weight per dozen. Twelve (12) pairs of the types I, III, and IV ankle or wrist cuffs as applicable, shall be allowed to reach equilibrium under standard conditions as defined in FED-STD-191. When under standard conditions, the cuffs shall be weighed as a unit to the nearest 1.0 ounce. The entire lot shall be rejected if the weight per dozen is below the minimum weight specified in table I.

## 5. PACKAGING

5.1 Preservation-packaging. Packaging shall be level A or C as specified (see 6.2).

### 5.1.1 Level A.



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5.1.1.1 Cuffs, ankle and wrist; and waistbands. Twelve (12) pairs of ankle or wrist cuffs as applicable; or ten (10) each waistbands folded in quarters to an approximate dimension of 14 inches in length by 4 3/4 inches in width; consisting of one type, class, and size only, shall be evenly stacked in a bundle and tied at each end with cotton tape, twine, or rubber bands.

5.1.1.2 Cloth, knitted (rolls). The cloth furnished for ankle and wrist cuffs; waistbands; and collars; of one type and class only, shall be rolled open-width on a convolute or spiral-wound chipboard tube. The tube shall conform to the following requirements.

- a. The tube shall have an outer cover of kraft paper glued to the surface.
- b. The ends of the tube shall have a minimum wall thickness of 0.1875 inch and a minimum inside diameter of 1.5 inches.

The ends of the tube shall be flush with or extend not more than one inch beyond each side of the maximum width of the rolled fabric. The cloth shall be restrained from unwinding by securing the fabric with cloth or cotton tape. Each roll of cloth shall be wrapped with a sheet of kraft paper of any suitable commercial grade. The roll shall be wrapped so that the paper will completely encircle the roll twice with a minimum overlap of 3 inches, and the width of the sheet of paper shall be sufficient to fold over and protect the ends of the roll. Gummed paper tape conforming to type III, grade C, 2 1/2 inches minimum width, of PPP-T-45 shall be applied on the overlap seam the full length of the roll, across each end, and approximately 2 1/2 inches on the side of the roll opposite the overlap seam. Strips of tape shall be applied crosswise over the ends, and shall extend a minimum of 2 1/2 inches along the length of the roll.

5.1.2 Level C (commercial packaging). Cuffs, waistbands, or cloth, which ever is applicable, shall be packaged to afford adequate protection against deterioration and physical damage during shipment from the contractor to the first receiving activity. The package and the quantity per package shall be the same as that normally used by the contractor for retail distribution.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 Type I, class 1, ankle cuffs. Two hundred eighty-eight (288) pairs of ankle cuffs, packaged as specified in 5.1.1, shall be packed in a fiberboard shipping container assembled, closed, and reinforced conforming to type CF, class weather-resistant, grade V2s, size 3A, of MIL-B-17757. The fiberboard for the box liner shall conform to type CF, class domestic, in accordance with the requirements as specified in MIL-B-17757. Level A bundles shall be packed within the shipping container on side edge, two in length, three in width, and four in depth. Each shipping container shall have the contents completely covered on the top and bottom with a sheet of kraft paper of any suitable commercial grade.

5.2.1.2 Types I, III, and IV, class 2, wrist cuffs. Five hundred seventy-six (576) wrist cuffs of one type and size only, packaged as specified in 5.1.1, shall be packed in a fiberboard shipping container assembled, closed and reinforced conforming to type CF, class weather-resistant, grade V2s, size 3A,

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of MIL-B-17757. The fiberboard for the box liner shall conform to type CF, class domestic, in accordance with the requirements specified in MIL-B-17757. Level A bundles shall be packed within the shipping container on side edge, eight per layer and six in depth as follows:

- a. Place five bundles against one side panel, with the length of the bundles parallel to the end panels.
- b. Place three bundles parallel to the side panel of the container in the remaining space at the opposite side panel.
- c. Each alternate layer shall be reversed.

Each shipping container shall have the contents completely covered on the top and bottom with a sheet of (commercial grade) kraft paper. Toward the end of the contract or when there are less than the required amount per container of the same size, mixed sizes may be packed in the same shipping container.

5.2.1.3 Types I and IV, class 3, waistbands. Two hundred fifty (250) waistbands of one type only, packaged as specified in 5.1.1, shall be packed in a fiberboard shipping container assembled, closed, and reinforced conforming to type CF, class weather-resistant, grade V2s, size 3A, of MIL-B-17757. The fiberboard for the box liner shall conform to type CF, class weather-resistant, in accordance with the requirements specified in MIL-B-17757. Level A bundles shall be packed flat within the shipping container, five in length, one in width, and five in depth. Each shipping container shall have the contents completely covered on the top and bottom with a sheet of commercial grade kraft paper.

5.2.1.4 Types I and IV, class 3, cloth. Rolls of cloth of one type only, packaged as specified in 5.1.1, shall be packed in a snug-fitting fiberboard shipping container conforming to type CF, class weather-resistant, grade V2s, of PPP-B-636. The inside of each shipping container shall be fitted with a taped box liner conforming to type CF, class weather-resistant, variety DW, grade V15c, of PPP-B-636. Each shipping container shall be closed, waterproofed, and reinforced in accordance with the appendix of the box specification. The net weight of contents in each shipping container shall not exceed 65 pounds.

#### 5.2.2 Level B.

5.2.2.1 Type I, class 1, ankle cuffs. The ankle cuffs, packaged as specified in 5.1.1, shall be packed in the same manner as specified in 5.2.1.1 except for the following:

The fiberboard shipping container shall be assembled and closed conforming to type CF, class domestic, variety DW, grade 275, size 3A, of MIL-B-17757. The fiberboard for the box liner shall conform to type CF, class domestic, in accordance with the requirements specified in MIL-B-17757.

5.2.2.2 Types I, III, and IV, class 2, wrist cuffs. The wrist cuffs, packaged as specified in 5.1.1, shall be packed in the same manner as specified in 5.2.1.2 except for the following:

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The fiberboard shipping container shall be assembled and closed conforming to type CF, class domestic, grade 275, size 3A, of MIL-B-17757. The fiberboard for the box liner shall conform to Type CF, class domestic, in accordance with the requirements specified in MIL-B-17757.

5.2.2.3 Types I and IV, class 3, waistbands. The waistbands packaged as specified in 5.1.1, shall be packed in the same manner as specified in 5.2.1.3, except for the following:

The fiberboard shipping container shall be assembled and closed conforming to type CF, class domestic, variety DW, grade 275, size 3A, of MIL-B-17757. The fiberboard for the box liner shall conform to type CF, class domestic, in accordance with the requirements specified in MIL-B-17757.

5.2.2.4 Types I and IV, class 3, cloth. Rolls of cloth packaged as specified in 5.1.1, shall be packed in the same manner as specified in 5.2.1.4 except for the following:

The fiberboard shipping container shall conform to type CF, class domestic variety DW, grade 275, of PPP-B-636. The inside of each shipping container shall be fitted with a taped box liner conforming to type CF, class domestic, variety DW, grade V15c, of PPP-B-636. Each shipping container shall be closed in accordance with method II as specified in the appendix of the box specification.

5.2.3 Level C (commercial packing). Cuffs, waistbands, or cloth, whichever is applicable, packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the contractor for retail distribution. Containers shall comply with the US Postal Service Manual, Uniform Freight Classification Rules, or National Motor Freight Classification Rules as applicable.

5.3 Marking. In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with MIL-STD-129.

5.3.1 Labels, mixed sizes. Each shipping container packed with mixed sizes shall have securely attached to the end and sides, directly under the printing or stenciling, a white paper label 5 by 4 inches with the words "MIXED SIZES" plainly stamped or printed thereon, and under these words shall be legibly stamped or printed the correct quantity and sizes contained therein.

## 6. NOTES

6.1 Intended use. The cuffs, ankle and wrist; waistbands; and cloth covered by this specification are intended for use by Military personnel of the Department of Defense.

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification
- b. Type, class, or size required (see 1.2)
- c. Whether first article sample is required (see 3.2)
- d. Color required (see 3.4)
- e. Shrink-resistant treatment required (see 3.5)
- f. Alkali-solubility requirements required (see 3.5.1)
- g. Felting shrinkage requirements required (see 3.9)
- h. Minimum length, if other than specified (see 3.14)
- i. Selection of applicable levels of packaging and packing (see 5.1 and 5.2)

6.3 Samples. For access to samples, address the procuring office issuing the invitation for bids.

6.4 Nomex fiber, manufactured by E.I. DuPont de Nemours & Company, has been found to be satisfactory in meeting the requirements of this specification.

6.5 The construction of the type III polyester wrist cuffs using three ends of 150 denier yarn per feed has been found to be satisfactory in meeting the requirements of this specification.

6.6 First article. When a first article inspection is required, 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 examinations, quantity, and testing and approval of the first article.

Custodians:

Army - GL  
Air Force - 99

Preparing activity:

Navy - NU

Project No. 8315-0254

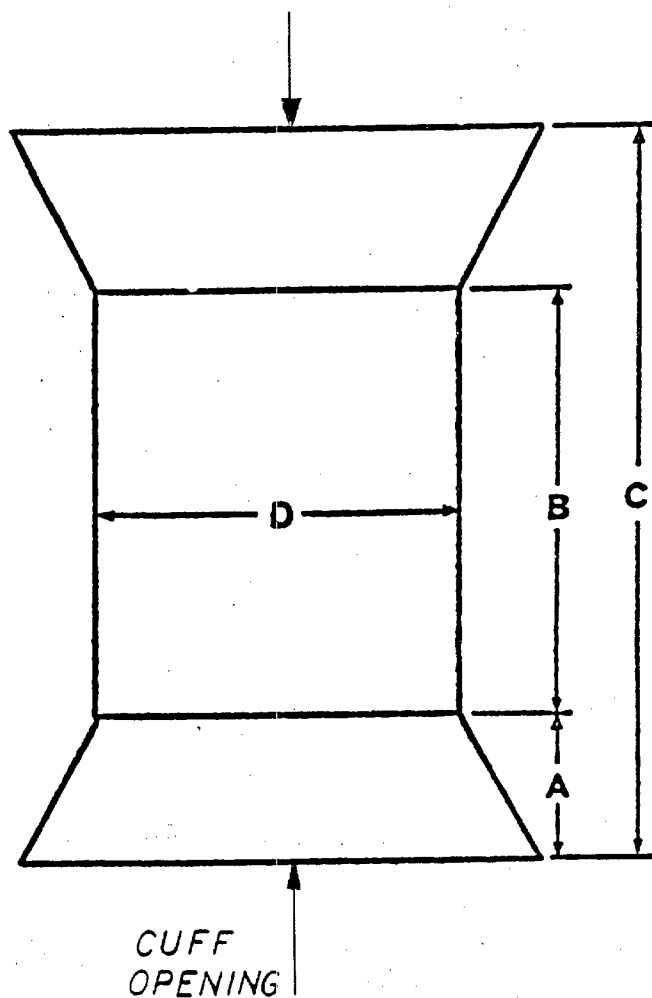
Review activities:

Navy - MC  
Army - MD  
Air Force - 11  
DLA - CT

User activity:

Navy - AS

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**FIGURE 1 - CUFFS, KNIT, WRIST AND ANKLE,  
AND CLOTH, KNITTED**

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DOCUMENT IDENTIFIER (Number) AND TITLE

MIL-C-3735D CUFFS, KNIT, WRIST AND ANKLE, AND CLOTH, KNITTED

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

 VENDOR       USER       MANUFACTURER

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B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

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1 OCT 76

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