

PURCHASE DESCRIPTION  
CLOTH, KNITTED, VELOUR, STRETCH, FLAME RESISTANT

This purchase description is approved for use by the Department of the Navy.

1. SCOPE

1.1 Scope. This document covers the requirements for the flame resistant, midweight velour cloth used in the Multi Climate Protective clothing.

1.2 Classification.

1.2.1 Classes. The velour fabric shall be furnished in the following classes as specified (see 6.2).

Class 1: Black 3239

Class 2: Olive Green 3400

Class 3: Tan 3700

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

2.2.1 Specifications. The following specifications 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-83429 - Cloth, Plain and Basket Weave, Aramid

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

NAWC CAGE CODE: 30003

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 the documents are those cited in the solicitation or contract.

#### ASTM INTERNATIONAL

ASTM-D-737 - Test Method for Air Permeability of Textile Fabrics  
ASTM-D-1776 - Standard Practice for Conditioning and Testing Textiles  
ASTM-D-1777 - Standard Test Method for Thickness of Textile Materials  
ASTM-D-2594 - Standard Test Method for Stretch Properties of Knitted Fabrics Having Low Power  
ASTM-D-3776 - Standard Test Method for Mass Per Unit Area (Weight) of Fabric  
ASTM-D-6413 - Standard Test Method for Flame Resistance of Textiles (Vertical Test)  
ASTM-F-1358 - Standard Test Method for Effects of Flame Impingement on Materials Used in Protective Clothing Not Designated Primarily for Flame Resistance

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

#### AATCC

AATCC Evaluation Procedure 9- Visual Assessment of Color Difference of Textiles  
AATCC Test Method 8 - Colorfastness to Crocking: AATCC Crockmeter Method  
AATCC Test Method 16 - Colorfastness to Light  
AATCC Test Method 20A - Fiber Analysis: Quantitative  
AATCC Test Method 61 - Colorfastness to Laundering, Home and Commercial: Accelerated  
AATCC Test Method 135 - Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics

(Copies of these documents are available from [www.aatcc.org](http://www.aatcc.org) or AATCC, PO Box 12215, Research Triangle Park, NC 27709-2215.)

#### AMERICAN SOCIETY FOR QUALITY

ASQ-Z1.4 - Procedures, Sampling and Tables for Inspection by Attributes

(Copies of this document are available from [www.asq.org](http://www.asq.org) or American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

#### SEARS ROEBUCK AND COMPANY

##### SEARS FABRIC DEFECT KIT

(Copies of this kit are available from Sears Roebuck and Company, Department 817 HG, FC568B, 3333 Beverly Rd., Hoffman Estates, IL 60179, see 6.5)

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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2 (see 6.3).

3.2 Standard sample. The cloth shall match the standard sample for shade, colorfastness and appearance on the face side and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 4.6.3). Face of cloth is the non-fleece (non-pile) side of the cloth and fleece (pile) is back of cloth.

3.3 Cloth. The cloth shall be a circular knitted mid-weight nylon and spandex jersey plaited to a one-sided aramid velour. Overall fabric content shall be 70% Aramid (92% Nomex/5% Kevlar/3% anti-static fiber blend), 24% nylon and 6% lycra blend. The color shall be as specified (6.2). The cloth shall meet the requirements specified in Table I when tested as specified in 4.5.

TABLE I: Physical requirements

| CHARACTERISTIC                 | REQUIREMENT              |
|--------------------------------|--------------------------|
| Weight, oz per sq yd           | 7.8 - 9.6                |
| Dimensional Stability, %, max  |                          |
| Wales                          | 7.0                      |
| Courses                        | 5.0                      |
| Air Permeability, max          | 175                      |
| Thickness, inches, min         | 0.090                    |
| Stretch, %, min                | Length:50%<br>Width: 80% |
| Wales                          | 80                       |
| Courses                        | 55                       |
| Flame resistance, Vertical     |                          |
| After flame, seconds, max      | 2                        |
| After glow, seconds, max       | 25                       |
| Char length, inches, max       | 3 ½                      |
| Flame resistance, Folded Flame |                          |
| After flame, seconds, max      | 2                        |
| After glow, seconds, max       | 25                       |
| Char length, inches, max       | 3 ½                      |
| Colorfastness to Laundering    | Polyester &<br>Nylon:3   |
| Colorfastness to Light         | 4                        |
| Crocking                       | Wet:3<br>Dry:4           |

3.4 Workmanship. The finished cloth shall be uniform in width, quality and free from irregular defects that can adversely affect usage or durability or are cited under Table II.

#### 4. VERIFICATION

4.1 Classification of inspection. 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. First article inspection shall consist of the examinations and tests specified in 4.4 and 4.5.

4.2.1 First article samples. Unless otherwise specified in the contract (see 6.2), the number of samples for first article inspection shall be 5. The sample unit shall be one yard and the lot size shall be expressed in units of yards.

4.3 Conformance inspection. Conformance testing shall consist of the examinations and tests specified in 4.4 and 4.5.

4.3.1 Conformance inspection samples. Sampling for inspection shall be performed in accordance with ASQ- Z1.4. The sample unit shall be one yard and the lot size shall be expressed in units of yards.

4.4 Visual examination. The cloth shall be examined on both sides for the defects listed in Table II.

TABLE II: End item visual defects

| Defect  | Classification |       |
|---|----------------|-------|
|   | Major          | Minor |
| Any hole, cut, tear   | 101            |       |
| Run or drop stitch  | 102            |       |
| Missing yarn or miss knit   | 103            |       |
| Crease or wrinkle embedded  | 105            |       |
| Any solid lump, defined as a slub C or 4, or knot which exceeds level C on the respective Sears Fabric Defect Scale | 106            |       |
| Fabric edges rolled, folded, doubled, scalloped or wavy   | 107            |       |
| Any spot, stain <u>1</u> / or foreign matter  | 108            |       |
| Any odor other than that which is characteristic of the component materials of the cloth                            |                | 201   |
| Any color off shade, not uniform, mottled or spotted (face side only)   | 109            |       |
| Gross length 2 or more yards less than ticketed length  | 110            |       |

4.5 Examination for length. Rolls shall be examined for gross length.

4.6 Methods of Inspection.TABLE III: End item tests

| Characteristic                  | Requirement Paragraph | Test Procedure                 |
|---------------------------------|-----------------------|--------------------------------|
| Fiber identification            | 3.3                   | AATCC Test Method 20A          |
| Weight                          | 3.3                   | ASTM D3776 (Option C)          |
| Colorfastness to Laundering     | 3.3                   | AATCC 61 – Opt 2a, 3 cycles    |
| Colorfastness to Light          | 3.3                   | AATCC 16, Opt A and E          |
| Crocking                        | 3.3                   | AATCC 8                        |
| Dimensional Stability           | 3.3                   | AATCC 135, IIIA, 3 cycles      |
| Air Permeability                | 3.3                   | ASTM D737                      |
| Thickness                       | 3.3                   | ASTM D1777, 6 psi <sup>1</sup> |
| Stretch                         | 3.3                   | ASTM D2594, Form fit           |
| Flame Resistance (Vertical)     | 3.3 and 4.6.1         | ASTM D6413, 4.6.1              |
| Flame Resistance (Folded Flame) | 3.3 and 4.6.2         | ASTM F1358, 4.6.2              |

<sup>1</sup> Woven and knitted materials, felts, nonwovens. A thickness gauge of the dead-weight type equipped with a dial graduated to read directly to .001 inches shall be used. The presser foot shall be circular, with a diameter of  $1.29 \pm 0.001$  inches and with moving parts weighted to apply a total load of  $0.06 \pm 0.03$  pounds per square inch to the specimen. The anvil shall not be less than 1.129 inches diameter. The presser foot and anvil surface shall be planed to within 0.001 inches and shall be parallel to each other to within 0.0001 inches.

4.6.1 Sample preparation for Vertical Flame Test. The vertical flame test shall be conducted on samples of the knitted cloth and aramid cloth conforming to MIL-C-83429. Both materials shall be cut in the same direction for each test. Place the knitted cloth in the sample holder face side facing up. The bottom edge (toward the flame) shall be folded back ½ inch. The back side of the fabric shall now be facing the flame. Place the aramid cloth along the edge of the knitted cloth and secure in the sample holder.

4.6.2 Sample preparation for folded flame test. The folded flame test shall be conducted on samples of the knitted cloth and aramid cloth conforming to MIL-C-83429. Both materials shall be cut in the same direction for each test. Place the aramid cloth over the knitted cloth and fold in half so the aramid cloth is exposed to the flame.

4.6.3 Visual matching. The finished cloth shall be viewed using AATCC Evaluation Procedure 9, Option A, under filtered tungsten lamps which approximate artificial daylight D75 illuminant having a correlated color temperature of 7500 (+/- 200) Kelvin, with illumination of 100 (+/- 20)

foot candles and under incandescent lamplight at 2856 (+/- 200) Kelvin to determine if it is a good match to the standard sample.

## 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 or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system commands. 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 that may be helpful, but is not mandatory.)

6.1 Intended use. The cloth is intended for use in the fabrication of multi climate protective clothing.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this purchase description.
- b. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. Quantity required.
- d. When first article inspection is required (see 3.1).
- e. Packaging requirements (see 5.1)
- f. Number of first article samples required (4.2.1)
- g. Class (see 1.2.1)

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

6.4 Sources.

Sears Roebuck and Company point of contact is Ms.J. Graf (Phone 847-286-8952, Fax 847-286-5991).

6.5 Subject term (key word) listing.

Aramid  
Midweight  
Multi Climate Protection  
Physical surface appearance  
Powerstretch

## CONCLUDING MATERIAL

Custodian  
Navy-AS

Preparing Activity:  
Navy - AS

Review Activity  
Navy-NU  
DLA-CT  
AF  
CG