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Superseding
PIA-C-7219B
12 April 2007

The following commercial specification is originally adopted from the military documents. Revision A includes all known accepted revisions, amendments, notices, and Department of Defense (DoD) engineering changes previously developed for this item. Revisions B and forward include changes adopted to reflect technology and design evolution.

CLOTH, DUCK, NYLON

The Parachute Industry Association makes this document available for use by Industry and Government organizations that wish to apply this specification to their products.

1. SCOPE

1.1 Scope. This specification covers the requirements for nylon cloth woven for use in the manufacture of parachute packs and other military items.

1.2 Type designation. The cloth covered by this specification shall be of the following Types and Classes, as specified in 6.2:

- | | |
|----------|---|
| Type I | - 9.5 oz./sq. yd. maximum |
| Type II | - 8.75 oz./sq. yd. maximum (not applicable for Air Force procurement) |
| Type III | - 7.25 oz./sq. yd. maximum |
| Class 1 | - Untreated |
| Class 2 | - Nondurable water repellent treated |
| Class 3 | - Durable water repellent treated |
| Class 4 | - Durable water repellent with IR requirements |
| Class 5 | - Woodland camouflage and Quarpel water repellent treated (Type III only) |
| Class 6 | - Universal camouflage and Quarpel water repellent treated (Type III only). |

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in Sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification nor is it 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 the documents cited in Sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government publications.

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2.2.1 Government publications. The following Government publications form a part of this document.

STANDARDS

FEDERAL

- FED-STD-4 - Glossary of Fabric Imperfections
- FED-STD-595 - Colors Used in Government Procurement

(Unless otherwise indicated, copies of the above and standards are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

FEDERAL TRADE COMMISSION (FTC)

- 16 CFR Part 1500 - Federal Hazardous Substances Act Regulations
- 29 CFR Part 1910 - Occupational Safety and Health Standards

(Copies are available online at: www.ftc.gov or from the Federal Trade Commission, 600 Pennsylvania Avenue, N.W., Washington, DC 20580-0001.)

Title 40, part 798.4470 (Primary Dermal Irritation).

(This reference may be found on the Internet at: www.access.gpo.gov/nara/cfr/cfr-table-search.html.)

DRAWINGS

U.S. Army Soldier Systems Center

- 2-1-1516B - Woodland Pattern, 60-inches
- 2-1-2519 - Universal Camouflage Pattern, 60-inches
- 2-1-2519-1 - ARPAT Camouflage Pattern Desert Sand 500
- 2-1-2519-2 - ARPAT Camouflage Pattern Urban Gray 501
- 2-1-2519-3 - ARPAT Camouflage Pattern Foliage Green 502

2.3 Non-government publications. The following documents form a part of this document.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

- AATCC 8 - Colorfastness to Crocking; Crockmeter Method
- AATCC 16 - Colorfastness to Light
- AATCC 20 - Fiber Analysis: Qualitative
- AATCC 22 - Water Repellency: Spray Test
- AATCC 61 - Colorfastness to Laundering: Accelerated
- AATCC 81 - pH of the Water-Extract from Wet Processed Textiles
- AATCC 96 - Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics Except Wool
- AATCC 119 - Frosting (Color Change Due to Flat Abrasion): Screen Wire Method

AATCC 127 - Water Resistance: Hydrostatic Pressure Test
AATCC 132 - Colorfastness to Dry-cleaning
AATCC Evaluation Procedures:

- 1 Gray Scale for color Change
- 2 Gray Scale for Staining
- 8 AATCC 9-Step Chromatic Transference Scale
- 9 Visual Assessment of Color Difference Textiles.

(Applications for copies should be addressed to the AATCC National Headquarters, P.O. Box 12215, Research Triangle Park, NC 27709-2215. Electronic copies may be obtained from www.aatcc.org.)

ASTM INTERNATIONAL (ASTM)

- ASTM D 737 - Standard Test Method for Air Permeability of Textile Fabrics
- ASTM D 1776 - Standard Practice for Conditioning and Testing Textiles
- ASTM D 2261 - Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine)
- ASTM D 3775 - Standard Test Method for Warp (End) and Filling (Pick) Count of Woven Fabrics
- ASTM D 3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Woven Fabric
- ASTM D 5035 - Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

(Application for copies should be addressed to the ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Electronic copies may be obtained from www.astm.org.)

PARACHUTE INDUSTRY ASSOCIATION (PIA)

- PIA-C-7020 - CLOTH, PARACHUTE, NYLON-RIPSTOP AND TWILL WEAVE
- PIA-TEST METHOD-503 - PERMANENCE OF SET AND SHRINKAGE IN PARACHUTE FABRIC (BOILED WATER TEST METHOD)

(Electronic copies may be obtained from www.pia.com.)

MISCELLANEOUS

Principles and Methods of Toxicology, A. Wallace Hayes (editor), 1989, pp 394-396

(Applications for copies of referenced documents should be addressed to Raven Press, 1185 Avenue of the Americas, New York, NY 10036.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard. The cloth shall, unless otherwise indicated (see 3.5.1), match the standard for shade and appearance and shall be equal to or better than the standard with respect to all characteristics for which the standard is referenced (see 6.3).

3.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, and environmentally preferable material should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.2.1 First article. When specified (see 6.2), a sample representative of the production quality shall be submitted for first article inspection in accordance with 4.2.

3.3 Yarn. The yarn for Types I and III cloth shall be bright, high tenacity nylon, filament for both warp and filling. For Type II cloth, the warp yarn shall be bright high tenacity filament, and the filling yarn shall be bright or semi-dull nylon staple of such staple length and denier to conform to the requirements of this specification. The nylon filament yarn used in the manufacture of cloth shall be bright, high tenacity, light and heat resistant, polyamide. A polyamide (nylon) with a melting point of at least 392°F (200°C) shall be used for all Types and Classes, except for Type III. The yarn used for Type III shall have a minimum melting point of 471°F (244°C). The yarn shall not be bleached in any manner or in any subsequent process.

3.4 Construction and physical properties. The construction and physical properties shall be as specified in TABLE I when tested as specified in TABLE III. The use of fly-shuttle or shuttleless looms is permitted.

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