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

WEBBING, TEXTILE, WOVEN 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 document covers the requirements for woven nylon webbing, woven on shuttle or shuttleless looms.

1.2 Classification. The nylon webbing shall be procured in the following classes as specified (see 6.2):

Class 1 - Lifesaving Equipment (Shuttle Construction - Nylon 6,6)

Class 2 - Loadcarrying Equipment (Shuttle or Shuttleless Construction - Nylon 6 or Nylon 6,6).

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 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 documents cited in Sections 3 and 4 of this specification, whether or not they are listed.

2.2.1 Government publications.

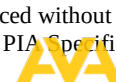
2.2.2 Government publications. The following Government publication forms a part of this document.

FEDERAL TRADE COMMISSION (FTC)

16 CFR 303 - Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available online at: www.ftc.gov or from the Federal Trade Commission, 600 Pennsylvania Avenue, N.W. Washington, DC 20580-0001. Electronic copies may also be obtained from <http://www.access.gpo.gov/>.)

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

AMERICAN SOCIETY FOR QUALITY (ASQ)

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

(Copies are available online at: www.asq.org or the American Society For Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203. Electronic copies may be obtained from www.access.gpo.gov/.)

ASTM INTERNATIONAL (ASTM)

ASTM D 1388 - Standard Test Method for Stiffness of Fabrics
ASTM D 1776 - Standard Practice for Conditioning and Testing Textiles
ASTM D 1777 - Standard Test Method for Thickness of Textile Materials
ASTM D 3776 - Standard Test Method for Mass per Unit Area (Weight) of Fabrics

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 8 - Colorfastness to Crocking; AATCC Crockmeter Method
AATCC 16 - Colorfastness to Light
AATCC 61 - Colorfastness to Laundering Accelerated
AATCC 81 - pH of Water-Extract from Wet Processed Textiles
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 of Textiles

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

PARACHUTE INDUSTRY ASSOCIATION (PIA)

PIA-TEST METHOD-4108 - STRENGTH AND ELONGATION, BREAKING; TEXTILE WEBBING, TAPE AND BRAIDED ITEMS

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

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 takes precedence. Nothing in this document however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard. Where applicable, the dyed webbing shall match the standard for shade and appearance and shall, unless otherwise indicated, be equal to or better than the standard with respect to all characteristics for which the standard is referenced (see 6.1).

3.2 First article. When specified in the contract or purchase order, a sample is subject to first article inspection (see 4.3.5 and 6.2).

3.3 Recycled, recovered or environmentally preferable materials. Recycled, recovered or environmentally preferable materials 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.

3.4 Material

3.4.1 Yarn. The yarn for the warp and filling shall be singles, bright, high tenacity, continuous filament nylon, which has not been subject to any type of bleaching process (see 4.3.5). For Class 1 webbing, only nylon 6,6 shall be used. For Class2 webbing, either nylon 6 or nylon 6, 6 shall be used.

3.3.2 Yarn size. The yarn size shall be 840 denier (warp and filling) for shuttle loom construction, and a combination of 840 denier warp and 420 denier filing for shuttleless loom construction (see 3.5.1 and 4.3.5).

3.4 Color. When undyed webbing is specified, the color of the webbing may deviate from the natural state to that degree imposed by the color of the treating agent used. When dyed webbing is specified, the dyed, untreated webbing shall match the applicable shade standard (see 6.1 and 6.2), and the shade imparted by the treatment shall be acceptable.

3.4.1 Dyeing. When dyed webbing is required, the webbing shall be yarn or piece dyed.

3.4.2 Visual shade matching. When evaluated in accordance with 4.5.2, the color of the dyed tape, or webbing, shall match the standard with sources simulating artificial daylight, and shall be a good match to the standard under incandescent lamplight.

3.4.3 Colorfastness. When tested as specified in 4.5.2, the webbing shall show fastness to light, laundering and crocking as follows:

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Characteristic	Rating, minimum
Light (fade) ^{1/}	3-4
Laundering: ^{2/}	
Color change	2-3
Staining	2-3
Crocking ^{3/} :	
Dry	3.5
Wet	3.5
Testing shall be as specified in 4.5	

Notes:

^{1/} Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change.

^{2/} Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change and AATCC Evaluation Procedure 2, Gray Scale for Staining.

^{3/} Rated using the AATCC Evaluation Procedure 8, AATCC9-Step Chromatic Transference Scale.

3.5 Physical requirements. The construction and physical requirements of the finished webbing shall be as specified in TABLE I when tested as specified in 4.5. The webbing shall be furnished in the width as specified (see 6.2).

TABLE I Construction and physical requirements.

Width, inches	Thickness, inches	Weight per linear yard, ounce (maximum)	Breaking strength, pounds, warp, full (minimum)	Yarns per inch filling (minimum)	Threads full width		
					Total warp	Warp ends	Binder ends
1 ±1/16	.038 - .050	0.71	1200	48 ^{1/}	119	97	22
1 1/2 ±1/16	.038 - .050	1.07	1800	48 ^{1/}	179	145	34
2 ±1/16	.038 - .050	1.42	2200	48 ^{1/}	239	193	46
3 ±1/16	.038 - .050	2.20	3200	48 ^{1/}	355	287	68

Note:

^{1/} When a shuttles loom is employed, 96 picks (two per shed) of 420 denier yarn is required.

3.5.1 Catch-cord. When latch type shuttleless looms are utilized, the filling yarn shall traverse the full width of the webbing, and shall be held by an extra catch-cord end interlacing with the filling yarn in a method as shown in FIGURE 1. When bobbin type shuttleless looms are utilized, interlacing of the catch-cord and filling shall occur within the first four ends of warp yarn at the edge (see FIGURE 1). For Class 2 webbing, dyed or natural, the catch-cord shall be 200 denier or 210 denier nylon for latch type shuttles looms, and 420 denier nylon for bobbin type shuttleless looms.

3.5.2 Curvature in shuttleless construction. Finished shuttleless webbing shall show no more lateral curvature than 1/4 inch when tested as specified in 4.5.1 (see FIGURE 2).

3.5.3 Weave. The weave shall consist of a face warp and back warp bound together by a binder warp and filling. The face warp shall weave plain with picks that show on the back. The binder warp end shall be evenly spaced across the width of the webbing. One binder warp end shall weave 2 up and 2 down. The adjacent binder warp end shall weave 2 down and 2 up. Testing shall be in accordance with 4.5.

3.6 Water-soluble. The water-soluble material, only of the finished webbing, shall not exceed 2 percent when tested as specified in 4.5.

3.7 pH. The pH value of the water extract of the finished webbing shall not be less than 5.5 nor more than 9.0 when tested as specified in 4.5.

3.8 Length and put-up. Unless otherwise specified, each roll shall contain 90 to 110 yards. No roll shall contain more than 2 pieces and no piece shall be less than 10 yards in length.

3.9 Identification ticket. Each roll or spool shall have a ticket attached with not finer than 5-ply cotton string doubled to not less than 6 inches long. The tickets shall be made of paperboard not less than 0.015 inch in thickness and the color shall be manila or light in intensity to permit easy reading of printed, stamped or typed markings. The use of handwritten entries is prohibited. The ticket shall have clipped corners at the end where a reinforcing patch (with or without a metal eyelet) is firmly affixed for attaching the tying string. The ticket shall be legibly printed with water insoluble ink, with the following information:

Stock number
Nomenclature
Specification number
Yardage
Contract number and date of manufacture (month and year)
Contractor's name
Name of contracting agency.

When webbing is not procured directly by the Government, the above information shall appear on the container, in which case roll or spool tickets are not required.

3.10 Fiber identification. When directed in the procurement document or purchase order, each roll or spool of webbing shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

3.11 Workmanship. The finished webbing shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels.

3.12 Date of Manufacture (see 6.2). When required by the procurement document, the textile manufacturer shall properly identify the age of the textile materials by placing a tag on the treated goods, or label on the containers, identifying the specification to which the material is manufactured, the lot number and the date of manufacture. The date of manufacture is defined as the date (month and year) of the last manufacturing process that affects the physical characteristics of the material.

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).