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The following commercial specification is adopted from the military document. Initial and Revision A included in 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 by DoD and Industry to reflect technology and design evolution.

WEBBING, TEXTILE, TEXTURED OR MULTIFILAMENT 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 textured or multifilament nylon webbing used for individual equipment belts and load carrying equipment.

1.2 Classification. The webbing shall be of the Types indicated in TABLE I as specified (see 6.2). All Types may be manufactured by either shuttle or shuttleless looms except Types I Alternate, III Alternate, III Hybrid, VI and VII which shall be manufactured on shuttleless looms only. Type I Alternate, Type III Alternate and Type III Hybrid constructions (see TABLE I) are acceptable substitutes for Types I and III respectively.

Type I	- 2¼ inches
Type II	- 1¼ inches
Type III	- 1 inch
Type IV	- ¾ inch
Type V	- 5/8 inch
Type VI	- 1½ inches
Type VII	- 2 inches

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 Government publications.

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Documents
Document Sharing Hub

2.2.1 Government publications. The following Government publications form 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 www.access.gpo.gov/.)

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 from the American Society for Quality, 600 Plankinton Avenue, Milwaukee, WI 53203.)

ASTM INTERNATIONAL (ASTM)

ASTM D 276 - Standard Test Methods for Identification of Fibers in Textiles
ASTM D 747 - Apparent Bending Modulus of Plastics By Means of a Cantilever Beam
ASTM D 1423 - Standard Test Method for Twist in Yarns by Direct-Counting
ASTM D 1776 - Standard Practice for Conditioning and Testing Textiles
ASTM D 1777 - Standard Test Method for Thickness of Textile Materials
ASTM D 3774 - Standard Test Method for Width of Textile Fabric
ASTM D 3775 - Standard Test Method for Warp (End) and Filling (Pick) Count of Woven Fabric
ASTM D 3776 - Standard Test Method for Mass per Unit Area (Weight) of Fabric

(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; Crockmeter Method
AATCC 16 - Colorfastness to Light
AATCC 61 - Colorfastness to Laundering: Accelerated
AATCC 81 - pH of the 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 should be addressed to the AATCC National Headquarters, P.O. Box 12215, Research Triangle Park, NJ 27709-2215. Electronic copies may be obtained from www.aatcc.org.)

PARACHUTE INDUSTRY ASSOCIATION

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 specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard. When applicable, the dyed webbing shall match the standard for shade and appearance, unless otherwise indicated, shall 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 (see 6.2), a sample representative of the production quality shall be submitted for first article inspection in accordance with 4.2.

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 Nylon yarn. The yarn for the warp and filling for Types II, III, III Hybrid, IV, V, and the warp for Type I and filling for Types III Alternate, VI and VII shall be heat and light resistant, continuous filament textured nylon or Air Jet textured yarn. The warp yarn for Types I Alternate, III Alternate, VI and VII shall be heat and light resistant multifilament nylon. The yarn for the filling for Type I shall be heat and light resistant continuous filament textured nylon or multifilament nylon. The textured and multifilament nylon yarns shall not be subjected to any type of bleaching process.

3.4.1.1 Twist. The face, back and binder warps of the Type I Alternate construction shall have a minimum of 2½ turns per inch in the final twist. The number of single yarns shall be

twisted together in one operation.

3.5 Color. Unless specified (see 6.2), the color of the webbing shall be as specified in the procurement document.

3.5.1 Dyeing. When dyeing is required the webbing shall be yarn or piece dyed. The dye penetration shall be equal to or better than the standard (see 6.1).

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

3.6 Colorfastness. The dyed webbing shall show colorfastness to light, laundering and crocking as follows:

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

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.

3.7 Physical requirements. The dyed webbing shall conform to the requirements specified in TABLE I when tested as specified in 4.4.4.

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TABLE I Physical requirements.

Characteristics	Type I	Type I (alternate)	Type II	Type III	Type III (Alternate)	Type III Hybrid	Type IV	Type V	Type VI	Type VII
Width, inches	2-1/4 + 1/8 -1/16	2-1/4 + 1/8 -1/16	1-1/4 ±1/16	1 ±1/16	1 ±1/16	1 ±1/16	3/4 ±1/16	5/8 ±1/16	1-1/2 ±1/16	2 ±1/16
Thickness, inches	0.125 – 0.150	0.125 – 0.150	0.075 ±0.007	0.046 ±0.007	0.046 ±0.007	0.046±0.007	0.055 - 0.070	0.038 -0.050	0.051 ±0.008	0.046 ±0.007
Weight oz./lin. yd. (min)	3.85	3.85	1.10	0.5	0.65	0.50	0.48	0.32	1.10	1.30
Stiffness load pounds widthwise only	0.70 – 2.30	0.70 – 2.30	--	--	--	--	--	--	--	--
Warp ends, full width:										
Face, back, and middle warps (min)	202	--	--	--	--	--	--	--	--	--
Face and back (min)	--	83	89	101	97	100	69	65	137	191
Binder warp (min)	50	38	10	15	22	18	8	9	30	44
Stuffer warp (min)	--	304	--	--	--	--	14	--	--	--
Picks/ inch (min)	33	--	23	36	—	—	33	36	--	--
Picks/inch (min) (shuttleless loom)	64 ^{1/}	58 ^{1/}	46 ^{1/}	72 ^{1/}	80 ^{1/}	75 ^{1/}	66 ^{1/}	72 ^{1/}	80 ^{1/}	80 ^{1/}
Breaking strength lbs. (min)	--	--	2000	1000	1000	1000	875	625	1500	2000

Note:

^{1/} 2 picks per shed.

3.8 Weaves.

3.8.1 Type I (see 6.3). The Type I webbing shall be composed of three ground warps (face, middle and back), one binder-warp, and one filling (see FIGURE 1). The face-warp shall weave plain weave with the picks that show on the face. The back-warp shall weave with the picks that show on the back. The middle-warp, 2 ends weaving as 1, shall weave plain weave with the picks that weave in the middle. The binder-warp, 2 ends weaving as 1, shall weave three up (one face, one middle, one face) and three down, (one back, one middle, one back). Each binder shall weave the same so as to form a filling rib effect on both face and back of the webbing. The selvage of the webbing shall be five ground warp ends on each side. The filling shall weave as follows:

1 pick on face
 1 pick on middle
 1 pick on face
 1 pick on back
 1 pick on middle
 1 pick on back.

3.8.1.1 Type I (alternate construction (see 6.3). The weave for Type I Alternate shall be as shown in FIGURE 4. When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord interlacing with the filling yarn in a method depicted in FIGURE 2.

3.8.2 Type II (see 6.3). The Type II webbing shall be a double fabric consisting of face and back-warps with two ends weaving as one, bound together by a binder-warp weaving singly and a single filling. The face-warp shall weave plain with the picks that show on the face. The back-warp shall weave plain weave with the picks that show on the back. The binder-warp shall weave plain weave throughout. The filling yarn shall traverse the full width of the webbing with one filling yarn per shed. The filling shall weave alternately on the face and back. When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord interlacing with the filling yarn in a method depicted in FIGURE 2.

3.8.3 Type III (see 6.3). The Type III webbing shall be a double fabric consisting of two warps bound together by a single filling and a binder-warp. The face-warp shall weave plain weave with the picks showing on the face. The back-warp shall weave plain weave with the picks showing on the back. The binder-warp shall weave plain weave. The filling yarn shall traverse the full width of the webbing with one filling yarn per shed. The filling shall weave alternately on the face and on the back. When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord interlacing with the filling yarn in a method depicted in FIGURE 2.

3.8.3.1 Type III (Alternate), TYPE III Hybrid, Type VI and Type VII (see 6.3). The webbing shall be a double fabric consisting of face and back-warps with two ends weaving as one bound together by a binder-warp weaving singly and a single filling. The face-warp shall