



PIA-W-1100B

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**Superseding
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Supersession (see 6.6)

The following commercial specification is an original Parachute Industry Association specification.

WEBBING, TEXTILE, NYLON TUBE EDGE

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 four types of untreated tubular edge nylon webbing used in the manufacture of load bearing systems.

1.2 Classification. The nylon tube edge webbing shall be furnished in the type specified in 6.2. The types shall conform to the requirements of TABLES I and II as applicable for the type specified.

1.3 Type Designation. The nylon webbing shall be of the following types as specified (see 6.2):

Type VII	-1 23/32" wide; 6000 pound min. breaking strength
Type XIII	-1 23/32" wide; 7000 pound min. breaking strength
Type XVII	-1" wide; 2500 pound min. breaking strength
Type XXVI	-1 3/4" wide; 15000 pound min. breaking strength.

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.

2.2.1 Government publications. The following Government publication forms a part of this document to the extent specified herein.

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Documents
Document Sharing Hub

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 20580-001 or may be obtained from
www.access.gpo.gov/.)

2.3 Non-government publications. The following document(s) form a part of this
document to the extent specified herein.

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 D276 | - Standard Test Methods for Identification of Fibers in Textiles |
| ASTM D1423 | - Standard Test Method for Twist in Yarns by Direct-Counting |
| ASTM D1776 | - Standard Practice for Conditioning and Testing Textiles |
| ASTM D1777 | - Standard Test Method for Thickness of Textile Materials |
| ASTM D1907 | - Standard Test Method for Linear Density of Yarn (Yarn
Number) by the Skein Method |
| ASTM D3774 | - Standard Test Method for Width of Textile Fabric |
| ASTM D3775 | - Standard Test Method for Warp (End) and Filling (Pick)
Count of Woven Fabrics |
| ASTM D3776 | - Standard Test Method for Mass per Unit Area (Weight) of
Fabric |
| ASTM D6770 | - Standard Test Method for Abrasion Resistance of Textile
Webbing (Hex Bar Method) |
| ASTM G151 | - Standard Practice for Exposing Nonmetallic Materials in
Accelerated Test Devices that Uses Laboratory Light Sources |
| ASTM G155 | - Standard Practice for Operating Xenon Arc Light Apparatus
for Exposure of Non-Metallic Materials. |

(Application for copies should be addressed to ATM 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 16.2 | - Colorfastness to Light: Carbon-Arc |
| AATCC 16.3 | - Colorfastness to Light: Xenon-Arc |
| AATCC 20 | - Fiber Analysis: Qualitative |
| 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 of referenced documents should be addressed to the American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle Park, NC 27709-2215. Electronic copies may be obtained from www.aatcc.org.)

PARACHUTE INDUSTRY ASSOCIATION (PIA)

- PIA-TEST METHOD-504 - CURVATURE TEST METHOD FOR NARROW FABRIC TAPES AND WEBBING
- PIA-STD-1480 - COLOR CODES FOR WEBBING, TEXTILE; MANUFACTURER'S IDENTIFICATION
- PIA-TEST METHOD-4108 - STRENGTH AND ELONGATION, BREAKING; TEXTILE WEBBING, TAPE AND BRAIDED ITEMS

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

COLOR ASSOCIATION OF THE UNITED STATES (CAUS)

- CA # - Cable Number

(Obtain color standards from www.colorassociation.com or email caus@colorassociation.com or address to The Color Association of the United States, 315 West 39th Street, New York, NY 10018.)

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. 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 operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Materials.

3.4.1 Nylon yarns. The nylon yarn used in the manufacture of the webbing shall be bright, high tenacity, light and heat resistant. Nylon 6 or 6,6 shall be used as specified in the procurement document. If the type of nylon is not specified either type shall be used. The yarn shall not be bleached. Testing shall be as specified in 4.3.1.1.

3.4.1.1 Denier and filament. The warp, fill, identification and catch-cord yarns used in the manufacturing of the webbing shall be of the denier and filament specified in TABLES I and II before dyeing. The following yarn substitution can be made for each webbing: 840/3=1260/2; 840/2=1680/1; 420/3=1260/1.

3.4.1.2 Twist. The warp and binder yarns shall have a minimum of 2 ½ turns per inch in the final twist, whether single or plied. The number of single yarns specified in TABLE I shall be twisted together in one operation.

3.5 Color. The color of the webbing and its reference standard shall be as specified by the procuring activity or order (see 6.2).

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

3.5.2 Visual Shade Matching. When evaluated in accordance with 4.5.64, 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.

3.5.3 Colorfastness. When tested as specified in 4.4.4, the dyed webbing shall show fastness to light, laundering and crocking as follows:

Characteristic	Rating, minimum
Light (Fade) ^{2/}	3-4
Laundering ^{1/} :	
Color Stain	2-3
Shade Change	2-3
Crocking ^{3/} :	
Wet and Dry	3.5

Notes:

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

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

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

3.5.4 Type XIII spectral reflectance/Infrared Reflective Resistance (IRR). Spectral reflectance/Infrared Reflective Resistance (IRR) will be established by the procuring activity. When spectral reflectance is required, see Para 4.5.4 for the test method.

3.6 Identification yarns. Colored warp ends shall be woven into the webbing, as specified herein, to permanently identify the webbing by type and manufacture, and when

shuttleless construction and/or nylon 6 is utilized, except that natural white (special purpose items) webbing shall have no colored warp ends (see 6.2). When the webbing is piece dyed, polyester yarn of approximate denier to the nylon body yarns shall be used for all required colored warp ends. When black is specified, the identification yarn shall be nylon 6 or 6,6 color-sealed black or polyester color-sealed black (see TABLE I).

3.6.1 Colorfastness of identification yarns. When tested as specified in 4.3.1.1, the type identification, manufacturer's identification and catch-cord yarns shall show fastness as follows:

Characteristic	Rating, minimum
Light (Fade) ^{2/}	3-4
Laundering ^{1/} :	
Color Stain	2-3
Shade Change	2-3

Notes:

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

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

3.6.2 Type identification. The color of the identification yarns shall match the Cable numbers of the Color Association of the United States, Inc. The identification of type shall be as follows:

- Type VII - Four yellow polyester identification yarns, Cable number 80068 shall be woven into the webbing. The size of the marker yarn shall be similar to the natural warp yarn and shall be woven as detailed in paragraph 3.8.
 - Type XIII - Four black identification yarns shall be woven into the web. The size of the marker yarn shall be similar to the natural warp yarn and shall be woven as detailed in 3.8.
 - Type XVII - As specified in the procurement document (see 6.2).
 - Type XXVI - Two yellow identification yarns, Cable number 80068, shall be woven in the center of the warp. The size of the marker yarn shall be similar to the natural warp yarn and shall be woven as detailed in paragraph 3.8.
- Note: Any yellow shade approximating number 80068 is acceptable.

3.6.3 Manufacturer's identification yarn. The identification of manufacturer shall be as follows:

- Type VII - The manufacturer of Type VII webbing shall incorporate, as part of the binder warp, 2 ends dyed to match the shade assigned to that manufacturer as per PIA-STD-1480 and shall be woven into the webbing as detailed in paragraph 3.8.1. The size of the marker yarn shall be similar to the natural binder yarn.
- Type XIII - The manufacturer of Type XIII webbing shall incorporate two binder yarns dyed to match the shade assigned to that manufacturer as per PIA-STD-1480 and shall be woven into the webbing as detailed in paragraph 3.8.2. The size of the marker yarn shall be similar to the natural binder yarn.

3.6.3.1 Manufacturer identification yarn - Stuffer alternative. An acceptable alternate weave for the Types VII and XIII webbings shall be woven as stated in paragraph 3.6.3 except the Manufacturers' identification yarns shall weave as a stuffer thread between two adjacent binder yarns.

3.6.4 Nylon 6 identification. When nylon 6 is utilized the woven edge of the webbing shall contain a red marker yarn, Cable No. 80081 of The Color Association of the United States.

3.6.5 Shuttleless loom identification. The webbing shall be woven with a knit edge containing a black catch-cord yarn as shown in FIGURE 1. The yarn shall be 1/210 – 1/500 denier (nominal) nylon or polyester color sealed black.

3.7 Physical requirements. The construction and physical requirements of the finished webbing shall be specified in TABLE I when tested as specified in 4.4.4.

3.7.1 Breaking strength. The breaking strength of any individual specimen shall be no lower than the minimum specified in TABLE I.

3.7.2 Curvature. The webbing shall show no more lateral curvature than 1/4 inch within a yard when tested as specified in 4.4.4.

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TABLE I Construction and Physical Properties.

Properties	Type VII	Type XIII	Type XVII	Type XXVI
Width, inches: Full width Each edge	1 23/32 ±3/32	1 23/32 ±3/32	1 ±1/16	1 3/4 ±1/16
	3/16	3/16	3/16	1/4
	-1/32 +1/16	-1/32 +1/16	-1/32 +1/16	-1/32 +1/16
Thickness, inches	0.060-0.100	0.080-0.120	0.045-0.075	0.150-0.190
Weight, oz./linear yard (maximum)	2.35	2.90	1.15	4.90
Tensile, lbs. (minimum)	6000	7000	2500	15000
Yarns (minimum):				
Ground	220	282	120	236
Pattern identification	4	4	--	2
Binder	22	28	8	2
Manufacturer's identification	2	2	--	--
Fill	52 (26 doubled)	48 (24 doubled)	56 (28 doubled)	32 (16 doubled)
Catch-cord	--	--	--	--
Ply-Denier (nominal):				
Ground	2/840 or 1/1680	2/840 or 1/1680	2/840 or 1/1680	5/840
Pattern identification	2/840 Yellow Polyester ^{1/}	2/840 black	1/840	5/840 Yellow Polyester
Binder	1/840	1/840	1/840	1/840
Manufacturer's identification	1/840 ^{1/} , ^{2/}	1/840 ^{1/} , ^{2/}	--	--
Fill	1/840	1/840	1/840	1/1260
Catch-cord	1/210 - 1/500 black ^{1/}	1/210 - 1/500 black ^{1/}	1/210 - 1/500 black ^{1/}	1/210 - 1/500 black ^{1/}
Twist, t.p.i. (minimum):				
Ground	2.5	2.5	2.5	2.5
Pattern identification	2.5	2.5	--	2.5
Binder	2.5	2.5	2.5	2.5
Manufacturer's identification	2.5	2.5	--	--
Fill	0	0	0	0
Catch-cord	0	0	0	0