



PIA-T-5038G
19 June 2013

Superseding
PIA-T-5038F
14 April 2009

The following commercial specification is adopted from the military document. Revision A included 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.

TAPE, TEXTILE AND WEBBING, TEXTILE, REINFORCING, 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 nylon reinforcing tape and webbing.

1.2 Classification. The tape and webbing shall be of the following Types, Classes and Widths as specified in TABLES I and II (see 6.2).

1.3 Type designation. The tape and webbing shall be of the following types as specified (see 6.2).

Type II	- Tape - Herringbone twill weave
Type III	- Tape - Plain weave
Type IV	- Webbing - Double plain weave
Type V	- Tape - Herringbone twill weave
Type VI	- Tape - Herringbone twill weave
Type VII	- Tape - Plain weave (Preshrunk)

1.4 Classes. The tape and webbing shall be furnished in the following Classes, as specified (see 6.2). Type VII is Shuttle loom only.

Class 1	- Shuttle loom, nylon 6,6
Class 1A	- Shuttleless loom, nylon 6,6
Class 2	- Shuttle or shuttleless loom, nylon 6 or nylon 6,6

1.4.1 Class reference. When procurement documents referencing this specification do not specify the class of webbing, the requirements for Class 1 webbing shall apply. When Class 2 webbing is specified, Classes 1 or 1A are acceptable alternates.

2. APPLICABLE DOCUMENTS

DISTRIBUTION STATEMENT: All Rights Reserved. No Part of this publication may be reproduced without prior written permission from Parachute Industry Association. Additional copies may be purchased on-line from PIA Specifications and Products at: www.pia.com.

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 of the 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.

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. Electronic copies may also be obtained from <http://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 North Plankinton Avenue, Milwaukee, WI 53203. Electronic copies may also be obtained from www.access.gpo.gov/.)

ASTM INTERNATIONAL (ASTM)

ASTM D 276	- Standard Test Methods for Identification of Fibers in Textiles
ASTM D 1776	- Standard Practice for Conditioning and Testing Textiles
ASTM D 1777	- Standard Test Method for Thickness of Textile Materials
ASTM D 1907	- Standard Test Method for Linear Density of Yarn (Yarn Number) by Skein Method
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 Fabrics
ASTM D 3776	- Standard Test Methods for Mass per Unit Area (Weight) of Fabrics
ASTM G 151	- Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
ASTM G 155	- Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

(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.)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 8	- Colorfastness to Crocking; AATCC Crockmeter Method
AATCC 16	- Colorfastness to Light
AATCC 20	- Fiber Analysis: Qualitative
AATCC 61	- Colorfastness to Laundering: Accelerated
AATCC 81	- pH of Water-Extract from Wet Processed Textiles
AATCC 192	- Weather Resistance of Textiles: Sunshine-Arc Lamps Exposure With and Without Wetting

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, 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.)

COLOR ASSOCIATION OF THE UNITED STATES (CAUS)

CA # - Cable Number

(To obtain color standards go to <http://www.colorassociation.com> or Email info@colorassociation.com or address 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 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.

3.3 Standard. When applicable, the finished tape and 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).

3.4 Material.

3.4.1 Nylon Yarns. The nylon yarn used in the manufacture of the tape and webbing shall be bright, high tenacity, light and heat resistant. Nylon 6,6 shall be used for Classes 1 and 1A. Nylon 6 or 6,6 shall be used for Class 2. The yarn shall not be bleached. Testing shall be as specified in 4.4.4.

3.4.2 Denier. The nominal denier of the warp, filling, and binder yarns, prior to dyeing, shall be as specified in TABLES I and II. The catch-cord for shuttleless loom tapes or webbings shall be 30 to 210 denier nylon or 70, 90 or 150 denier polyester.

3.4.3 Twist. The twist for Type VII preshrunk tape shall be supplied producers twist.

3.5 Color. Unless otherwise specified by the procuring activity, the color for Types II, III, IV, V and VII shall be natural. The color of Type VI shall be as specified (see 6.2). The tape or webbing shall not be bleached.

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

3.5.2 Visual shade matching. When evaluated in accordance with 4.5.5, 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.

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

Characteristic	Rating, minimum
Light (Fade) ^{2/}	3-4
Laundering: ^{1/}	
Color Stain	3-4
Shade Change	3-4
Crocking: ^{3/}	
Dry	3.5
Wet	3.5
Testing shall be as specified in 4.4.4	

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, AATCC 9-Step Chromatic Transference Scale.

3.6 Identification yarns. Colored warp ends shall be woven into the webbing, as specified herein, to permanently identify the tape and webbing when shuttleless construction and nylon 6 is utilized.

3.6.1 Shuttleless loom identification. When shuttleless looms are utilized, the catch-cord

yarn shall be dyed to match.

3.6.2 Nylon 6 identification. When nylon 6 is utilized for Class 2 tape or webbing, it shall be identified by using a color sealed black yarn on the woven edge.

3.6.3 Colorfastness of identification yarns. The type identification, manufacturer's identification and catch-cord yarns shall show colorfastness to light and laundering as follows:

Characteristic	Rating, Min
Light (Fade) ^{2/}	3-4
Laundering: ^{1/}	
Color Change	2-3
Staining Shade Change	2-3
Testing shall be as specified in 4.3.1.1	

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.

3.7 Physical requirements. The finished tape and webbing shall conform to the construction and physical requirements specified in TABLES I and II when tested as specified in 4.4.4.

3.7.1 Resistance to light and heat. The nylon tape and webbing shall not lose more than 25 percent of the original breaking strength upon exposure to light and heat when tested as specified in 4.4.4.

3.7.2 Curvature. All classes of tapes and webbings shall show no more lateral curvature than 1/4 inch within a yard when tested as specified in 4.4.4 (see FIGURE 2).

3.7.3 Breaking strength. The initial breaking strength of any individual specimen shall be no lower than the minimum specified in TABLES I and II.

3.7.4 Residual shrinkage. For Type VII only, the residual shrinkage shall be no higher than 2.0 percent as specified in TABLE VI.

(THIS SPACE LEFT INTENTIONALLY BLANK)

TABLE I Physical requirements for Class 1 and shuttle loom woven Class 2.

Type	Width, inches	Thickness, inch	Weight oz./yd. maximum	Breaking strength lbs. minimum ^{1/}	Elongation, minimum ^{2/}	Yarns (minimum)			Yarn denier		
						Total warp	Binder	Per inch filling	Warp	Binder	Filling
II	1 ±1/32	.025 - .035	0.40	900	18	96	—	40	840	—	210
II	1-1/2 ±1/32	.025 - .035	0.60	1300	18	144	—	40	840	—	210
II	2 ±1/32	.025 - .035	0.80	1700	18	192	—	40	840	—	210
III	3/8 ±1/32	.015 - .025	0.12	200	18	74	—	33	210	—	420
III	1/2 ±1/32	.015 - .025	0.15	250	18	100	—	33	210	—	420
III	3/4 ±1/32	.015 - .025	0.20	400	18	150	—	33	210	—	420
III	1 ±1/32	.015 - .025	0.30	525	18	200	—	33	210	—	420
III	1-1/2 ±1/32	.015 - .025	0.40	850	18	300	—	33	210	—	420
IV	1/2 +1/32, - 1/16	.030 - .040	0.35	550	18	99	8	48	420	420	420
IV	5/8 +1/32, - 1/16	.030 - .040	0.40	625	18	123	10	48	420	420	420
IV	1 +1/32, -1/16	.030 - .040	0.50	1000	18	197	16	48	420	420	420
IV	1 1/8 +1/32, - 1/16	.030 - .040	0.60	1100	18	221	18	48	420	420	420
IV	1-1/2 +1/32, - 1/16	.030 - .040	0.75	1500	18	293	24	48	420	420	420
V	9/16 ±1/32	.020 - .030	0.20	500	18	42	—	32	840	—	420
VI	3/4 ±1/32	.020 - .030	0.20	425	18	150	—	38	210	—	420
VII	1 ±1/16	.012 ±.02	0.14 ±.05	325	18	124	—	46	210	—	210
VII	2 ±3/32	.012 ±.02	0.30 ±.05	550	18	240	—	46	210	—	210
VII	3 ±3/32	.012 ±.02	.42 ±.05	1000	18	365	—	46	210	—	210

Notes:

^{1/} No individual determination shall fall below the minimum specified.^{2/} Minimum elongation measured at 90 percent or more of the minimum rated breaking strength requirement.

(THIS SPACE LEFT INTENTIONALLY BLANK)