



PIA-T-5666D

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Superseding

PIA-T-5666C

08 November 2010

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 by DoD and Industry to reflect technology and design evolution.

TAPE, TEXTILE, NYLON, MULTIPLE TUBULAR

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 one type of nylon multiple tubular tape.

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 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 publications form a part of this document (see 2.4).

STANDARDS

FEDERAL

FED-STD-595 - Colors Used in Government Procurement

(Unless otherwise indicated, copies of the above standard are available from the DLA Document Services, Building 4/D, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.

Electronic copies of Federal Standards may be obtained from

[https://assist.daps.dla.mil/quicksearch/.](https://assist.daps.dla.mil/quicksearch/))

FEDERAL TRADE COMMISSION (FTC)

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

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Documents

Document Sharing Hub

(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 www.access.gpo.gov/.)

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 16.2	- Colorfastness to Light: Carbon-Arc
AATCC 16.3	- Colorfastness to Light: Xenon-Arc
AATCC 20	- Fiber Analysis: Qualitative
AATCC 20A	- Fiber Analysis: Quantitative
AATCC 61	- Colorfastness to Laundering; Accelerated
AATCC 81	- pH of the Water-Extract from Wet Processed Textiles
AATCC 192	- Weather Resistance of Textiles: Sunshine-Arc Lamp Exposure with and without Wetting
AATCC Evaluation Procedures:	
- Gray Scale for Color Change	
- 2 Gray Scale for Staining	
- 9 Visual Assessment of Color Differences of Textiles	

(Application 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.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ANSI/ASQ Z1.4	- Sampling Procedures and Tables for Inspection by Attributes
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(Copies are available online at: www.asq.org or from the American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

ASTM INTERNATIONAL (ASTM)

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 Skein Method
ASTM D3774	- Standard Test Method for Width of Textile Fabric
ASTM D3775	- Standard Test Method for Warp (End) Count and Filling (Pick) Count of Woven Fabric

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| ASTM D3776 | - Standard Test Method for Mass Per Unit Area (Weight of Fabric) |
| ASTM G151 | - Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices That Use 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 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-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. 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 Standard. The dyed tape shall match the standard for shade and shall be equal to or better than the standard with respect to all characteristics for which the standard is referenced (see 6.1).

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 used in the manufacture of the tape shall be a bright, high tenacity, light and heat resistant, nylon 6. The yarn shall not be bleached.

3.4.2 Weave. The tape shall be composed of two ground warps (face and back) and one filling. The face and back warps shall weave plain, with one filling yarn per shed. The filling shall accomplish a cross-over; first on the face, then on the back at each 40-warp end interval so that five separated tubular sections shall be formed in the total width.

3.5 Construction and physical properties. The construction and physical properties of

the tape shall be specified in TABLE I and 3.4.1 through 3.6.2 when tested as specified in 4.7.4.

TABLE I Construction and physical properties.

Characteristic	Requirement
Width	1 5/16 to 1 7/16 inches
Thickness	0.020 to 0.025 inch
Weight (maximum)	0.40 ounces per linear yard
Breaking strength (minimum)	500 pounds
Elongation (minimum)	20 percent
Total ends (minimum)	199
Picks per inch (minimum)	84
Twist (warp and fill) (minimum)	2 1/2 turns per inch for warp and fill
Denier:	
Warp	210 $\pm$ 5 percent
Fill	420 $\pm$ 5.0 percent

3.5.1 Resistance to light and heat. The tape shall lose no more than 25 percent of the original breaking strength upon exposure to the light and heat tests as specified in 4.7.4.

3.5.2 Nonfibrous materials. The water-soluble and chloroform-soluble materials shall be not greater than 2.0 percent when tested as specified in 4.7.4.

3.5.3 pH. The pH value of the water extract of the dyed and finished tape shall be not less than 5.5 and not greater than 9.0 when tested as specified in 4.7.4.

3.6 Color. The color of the tape and its referenced standard shall be as specified by the procuring activity or order. The tape shall be yarn or piece dyed (see 6.2).

3.6.1 Visual shade matching. When evaluated in accordance with 4.8.3, 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.

3.6.2 Colorfastness to light. PIA has adopted AATCC 16.3 as an acceptable alternative test method to AATCC 16.2 for the testing of Narrow Fabrics using Xenon (see TABLE IV).

3.6.3 Colorfastness. The dyed tape shall show fastness to laundering as follows:

Characteristic	Rating (minimum)
Laundering ^{1/} :	
Color change	3-4
Stain	3-4
Testing shall be as specified in 4.7.4	

Note:

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

3.7 Length and put-up. Unless otherwise specified, the tape shall be put up in rolls of not less than 95 yards and not greater than 105 yards. No roll shall contain more than three