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Superseding

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The following commercial specification is 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. Revisions B and forward include changes adopted to reflect technology and design evolution.

TAPE AND WEBBING, TEXTILE, WOVEN REINFORCING, COTTON

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 five types of woven cotton reinforcing textile tape and webbing intended for use in the manufacture of aeronautical equipment.

1.2 Classification. The tape and webbing shall be of the following types, as specified (see 6.2).

Type I	- Plain weave
Type II	- Double herringbone weave
Type III	- Twill weave
Type V	- Plain (transverse cord) weave
Type VI	- Non-elastic weave.

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.

FEDERAL TRADE COMMISSION (FTC)

16 CFR303 - Rules and Regulations Under the Textile Fiber Products Identification Act

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(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/>.)

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, Milwaukee, WI 53203.)

ASTM INTERNATIONAL (ASTM)

ASTM D1776	- Standard Practice for Conditioning and Testing Textiles
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
ASTM D3776	- Standard Test Method for Mass Per Unit Area (Weight) of Fabric

(Application for copies should be obtained from the ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19426-2959. 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 81	- pH of the Water-Extract from Wet Processed Textiles
AATCC 106	- Colorfastness to Water: Sea
AATCC 107	- Colorfastness to Water

(Applications for copies of referenced documents 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.)

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 representative of the production quality shall be submitted for first article inspection in accordance with 4.2.

3.2 Materials. The tape and webbing shall be made from carded or combed yarns evenly spun from cotton of a grade and staple length that will produce a material meeting the requirements specified herein.

3.3 Weave.

3.3.1 Type I. The weave of Type I shall be plain (1 up and 1 down).

3.3.2 Type II. The weave of Type II shall be that commercially designated as 2 up, 2 down herringbone twill, having 3 reversals of twill, 1 at the center and 1 on each side of the center midway between the center and each edge. The tape or webbing shall be made with 2 ends weaving as one, or all ends weaving singly in the warp.

3.3.3 Type III. The weave of Type III shall be a 2 up and 2 down twill with reversal at 1/4 and 3/4 of the width.

3.3.4 Type V. The weave of Type V shall be plain with 2 warp yarns weaving as 1, except that at the selvage there shall be 3 warp yarns weaving singly.

3.3.5 Type VI. The weave of Type VI shall be what is commercially known as “non-elastic” and shall be in accordance with FIGURE 1. The ground and binder warp ends shall be 2 ply. The stuffer warp ends shall be 5 ply. The filling yarn shall be evenly distributed between the face and back of the tape and webbing. The 1 inch shall contain 24 ends in each selvage or 12 ends in each selvage.

3.3.6 Filling yarn. The weave for all types shall be with one filling yarn per shed when a shuttle loom is used. The weave for all types shall be with two filling yarns per shed when a shuttleless loom is used (see 6.2).

3.4 Construction and physical properties. The construction and physical properties of the tapes and webbings shall be as specified in TABLE I. When latch type shuttleless looms are utilized, the filling yarn shall traverse the full width of the tape and shall be held at the edge by an extra catch-cord end interlacing with the filling yarn, in a method depicted in FIGURE 2. When bobbin type shuttleless looms are utilized, interlacing of the catch-cord and filling shall occur within the selvage area before the first binder end (FIGURE 3).

3.5 Extractable matter. The natural color tape and webbing shall contain no more than 5.0 percent methyl-ethyl ketone extractable matter, and the dyed tape and webbing shall contain no more than 4.0 percent methyl-ethyl ketone extractable matter, when tested as specified in 4.5.

3.6 Acidity (pH). The water extract of the tape and webbing shall have a pH of 5.5 to 9.0 when tested as specified in TABLE IV.

TABLE I Construction and physical properties

Type	Width inch ±1/32	Weight oz./ linear yd., maximum	Yarn ply minimum ^{1/}		Total warp ends, minimum	Picks/inch minimum shuttle loom	Picks/inch minimum shuttleless loom	Breaking strength lbs. minimum ^{2/}
			Warp	Filling				
I	1/4	0.11	4	2	7	20	16	80
	3/8	0.15	4	2	10	20	16	120
	1/2	0.22	4	2	14	20	16	150
	5/8	0.28	4	2	18	20	16	170
	3/4	0.33	4	2	22	20	16	200
	1	0.47	4	2	30	20	16	250
II	1/2	0.15	2	2	142	48	32	110
	3/4	0.22	2	2	212	48	32	165
	1	0.29	2	2	284	48	32	220
	1-1/4	0.36	2	2	356	48	32	275
	1-1/2	0.43	2	2	426	48	32	330
	1-3/4	0.50	2	2	496	48	32	375
	2	0.57	2	2	568	48	32	425
III	1/2	0.10	2	1	64	60	45	45
	5/8	0.12	2	1	85	60	45	55
	3/4	0.14 ^{3/}	2	1	96	60	45	75
V	1	0.65	4	4	48	16	15	350
	2	1.30	4	4	96	16	15	650
					Ground Binder Stuffer			
VI	5/8	0.23	See 3.3.5	2	95 22 37	46	32	80
	1	0.98	See 3.3.5	2	112 30 31	52	32	375

Notes:

^{1/} For suggested yarn numbers (see 6.3).^{2/} All individual readings shall meet or exceed the minimum requirements.^{3/} For Type III, 3/4 inch width ONLY, if 60/2 filling yarn number shuttleless loom (see TABLE V) is not readily available, a substitute of 40/2 filling yarn number shuttleless loom can be used and the weight (oz/linear yd.) maximum shall be 0.19.

3.7 Color. Unless otherwise specified by the procuring activity, the color for all types of tape and webbing shall be natural (unbleached).

3.7.1 Visual shade matching. When evaluated in accordance with 4.6.3, the color of the dyed tape and webbing shall match the standard with sources simulating artificial daylight and shall be a good match to the standard sample under incandescent lamplight.

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

3.7.3 Colorfastness. The dyed tape and webbing shall show colorfastness to water, salt water, light and crocking as follows:

Characteristic	Rating, minimum
Water ^{1/}	3-4
Salt water ^{1/}	3-4
Light (fade) ^{2/}	3-4
Crocking ^{3/}	3-4
Testing shall be as specified in TABLE IV	

Notes:

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

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

^{3/} Rated using AATCC Evaluation Procedure 8, 9-Step Chromatic Transference Scale.

3.8 Length and put-up. Unless otherwise specified, tape and webbing shall be furnished on rolls containing 100 ±10 yards. Each roll shall contain not more than 3 pieces and no piece shall be less than 5 yards long. Tape and webbing 1/2 inch or less in width may be furnished on double-headed spools or tubes containing 500 ±10 yards. Each spool or plastic tube shall have not more than 6 pieces, and no piece shall be less than 5 yards long.

3.9 Fiber identification. Each roll, spool or tube of tape or webbing shall be labeled, ticketed and invoiced for fiber content in accordance with the Textile Fiber Products Identification Act.

3.9.1 Identification of product. Each roll, spool or tube of tape or webbing shall be marked for identification in accordance with good commercial practice. In addition, each roll, spool or tube of tape or webbing shall be clearly and legibly marked with the finisher's lot number or code, on an attached durable tag.

3.10 Workmanship. The finished tape or webbing shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the levels set by the applicable quality levels.

3.11 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 finished 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).

4.2 First article inspection. The first article, submitted in accordance with 3.1, shall be inspected as specified in 4.3 through 4.4 for compliance with design, construction, workmanship

and dimensional requirements.

4.3 Conformance inspection. Unless otherwise specified by the procuring activity (see 6.2), sampling for examination and testing shall be performed in accordance with 4.3.1 through 4.4.

4.3.1 Component and material inspection. In accordance with 4.1 above, components and materials shall be inspected in accordance with all the requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable procurement documents.

4.4 End item inspection.

4.4.1 Yard-by-yard examination. The required yardage of each roll, spool or tube shall be inspected on both sides and visual defects classified as listed in TABLE II. All defects found shall be counted regardless of their proximity one to another except where two or more defects represent a single local condition of the tape or webbing, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The sample unit for this examination shall be one linear yard. Acceptance sampling shall be determined by using ANSI/ASQ Z1.4, Inspection Level II with an Acceptance Quality Limit (AQL) of 1.5 for major defects and 4.0 for total defects (major and minor combined). The lot size shall be expressed in units of one linear yard each. An approximately equal number of yards shall be examined from each roll selected. The number of rolls from which the sample is to be selected shall be in accordance with TABLE III of this specification.

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