



PIA-C-2754D

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Superseding

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The following commercial specification is adopted from the federal specification. 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.

CORD, POLYESTER, CORELESS

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 braided polyester coreless Parachute Cord.

1.2 Classification. The cord shall be of the following types as specified (see 6.1).

Type I - 180 feet per pound

Type II - 120 feet per pound

Type III - 900 feet per pound

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 of the documents cited in Sections 3 and 4 of this specification, whether they are listed or not.

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 20580-0001. Electronic copies may also be obtained from www.access.gpo.gov/.)

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Documents
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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 20A | - Fiber Analysis: Quantitative |
| AATCC 61, 1A | - Colorfastness to Laundering; Accelerated |
| AATCC 81 | - pH of Water-Extract from Wet Processed Textiles |
| AATCC 192, Option A | - Weather Resistance of Textiles: Sunshine-Arc Lamp
Exposure with and without wetting |

AATCC Evaluation Procedure:

- 1 Gray Scale for Color Change
- 2 Gray Scale for Staining
- 8 AATCC 9-Step Chromatic Transference Scale
- 9 Visual Assessment of Color Difference Textiles

(Application for copies should be addressed to: AATCC National Headquarters, P.O. Box 12215, Research Triangle Park, NC 27709-2215. Electronic copies may be obtained from www.aatcc.org.)

ASTM INTERNATIONAL (ASTM)

- | | |
|------------|--|
| ASTM D629 | - Standard Test Methods for Quantitative Analysis of
Textiles |
| ASTM D1776 | - Standard Practice for Conditioning and Testing Textiles |

(Copies should be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Electronic copies may be obtained from www.astm.org.)

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 be also obtained from www.access.gpo.gov/.)

PARACHUTE INDUSTRY ASSOCIATION

- | | |
|----------------------|---|
| PIA-TEST METHOD-6004 | - LENGTH PER UNIT WEIGHT; CORDAGE |
| PIA-TEST METHOD-6010 | - SHRINKAGE OF CORDAGE, BOILING WATER
METHOD; DETERMINATION OF |
| PIA-TEST METHOD-6016 | - STRENGTH AND ELONGATION BREAKING OF
CORDAGE; NON-SPLICED SPECIMEN METHOD |

(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 shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS

3.1 First article. When specified (see 6.1), a sample shall be submitted for first article inspection in accordance with 4.3.

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 Government and contractor purchases. The requirements specified in 3.13 and 3.14 apply only to cord purchased directly by the Government. All other requirements apply to cord purchased by a contractor as a component for an end item and to cord purchased directly by the Government.

3.4 Standard. The cord shall match the standard for shade, appearance and shall be, unless otherwise indicated, equal to or better than the standard with respect to all characteristics for which the standard is referenced (see 6.2).

3.5 Material. The yarn used in the fabrication of the cord shall be bright, high tenacity multifilament polyester yarn. The yarn denier shall be as specified in TABLE I.

3.6 Construction and physical requirements. The cord shall be braided without a core and conform to the requirements specified herein and in TABLE I when tested as specified in 4.4.5. The cord shall be braided on braiding machines having the number of carriers specified in TABLE I for the applicable Type and the machines shall be regulated to give a two over and two under conventional braid. The Types I and II cord after braiding shall be heat set in continuous lengths and shall not show more than a 9 percent residual shrinkage when tested as specified in 4.4.5.

TABLE I **Physical requirement.**

Characteristic	Type I	Type II	Type III
Number of carriers	24	24	12
Ends per carrier	2	3	1
Total ends	48	72	12
Basic yarn denier	1100	1100	1000
Yarn ply	single	single	single
Picks per inch	15-16	10-12	14-16
Length per pound, feet (minimum)	180	120	900
Breaking strength, pounds (minimum)	600	1000	125
Elongation percent (at 75 percent of the specified breaking strength):			
Minimum	7	7	15
Maximum	11	11	22

3.7 Color. Unless otherwise specified (see 6.1), the color of the cord shall be natural. When a color is specified, other than natural, the color shall be obtained by yarn dyeing and the cord shall match an approved shade standard (see 3.4 and 6.2).

3.7.1 Visual shade matching. When evaluated in accordance with 4.5.6, the color of the dyed cord shall match the standard with sources simulating artificial daylight and shall be a good match to the standard under incandescent lamplight.

3.7.2 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 VI).

3.7.3 Colorfastness. When tested as specified in 4.4.5, the dyed cord shall show fastness to light and laundering as follows:

Characteristic	Rating, Min
Light (Fade) ^{1/}	3-4
Laundering Color Change ^{2/}	3-4

Notes:

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

^{2/} Rating using the AATCC Evaluation Procedure 8 and AATCC 9 Step Chromatic Transference Scale.

3.8 Finish. Types I and II cords only, shall be finished with an acrylic or polyethylene resin such as to result in an additional weight not to exceed 2 percent. The process of applying finish to the cord shall cause no detrimental effect to the physical or chemical properties of the cord. Type III cord will not have any finish. The supplier shall report on the test method the type of finish used, either polyethylene or acrylic.

3.8.1 Tackiness. The cord shall not be excessively tacky. The force required to separate the lines shall be not greater than 23 pounds when tested as specified in 4.4.5.

3.9 Date of Manufacture (see 6.1). 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.

3.10 Resistance to heat and light. The polyester cord shall lose no more than 25 percent of its original breaking strength after exposure to heat and light when tested as specified in 4.4.5.

3.11 Extractable matter (water-soluble material). No material shall be added for the purpose of weighing the cord. The water-soluble material of the cord shall not exceed 4.0 percent when tested as specified in 4.4.5.

3.12 pH. The pH of the water extract of the finished cord shall be no less than 5.5 nor more than 9.0 when tested as specified in TABLE VI.

3.13 Put-up and length. Unless otherwise specified (see 6.1), the cord shall be put on