

INCH-POUND
MIL-DTL-44346A
04 September 2020
SUPERSEDING
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DETAIL SPECIFICATION

BATTING, SYNTHETIC FIBER, MEDIUM DENSITY

This specification is approved for use by all Departments and Agencies of the Department of Defense (DoD).

1. SCOPE

1.1 Scope. This specification covers one (1) type of polyester synthetic fiber, medium density, batting material.

1.2 Classification. Not applicable.

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

2.2 Government documents.

Comments, suggestions, or questions on this document should be addressed to: Attn: DLA Troop Support Standardization Team, 700 Robbins Avenue, Philadelphia, PA 19111-5096. Since contact information can change, verify the currency of the address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database <https://assist.dla.mil/>.

AMSC N/A

FSC 8320

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MIL-DTL-44346A

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-DTL-43637- Cloth, Plain Weave, Ripstop, Nylon

(Copies of this document are available online at <https://quicksearch.dla.mil>.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies of this document are available online at <https://www.ftc.gov>.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC TM 20 - Test Method for Fiber Analysis: Qualitative
AATCC TM135 - Test Method for Dimensional Changes of Fabrics after Home Laundering

(Copies of these documents are available on line at <https://www.aatcc.org>.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ/ANSI Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of this document are available online at <https://www.asq.org>.)

ASTM INTERNATIONAL

ASTM D1776/D1776M - Standard Practice for Conditioning and Testing Textiles
ASTM D1777 - Standard Test Method for Thickness of Textile Materials
ASTM D1907/D1907M - Standard Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method

MIL-DTL-44346A

ASTM D5103	- Standard Test Method for Length and Length Distribution of Manufactured Staple Fibers (Single-Fiber Test)
ASTM D7138	- Standard Test Method to determine Melting Temperature of Synthetic Fibers

(Copies of these documents are available online at <https://www.astm.org>.)

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 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 4.3.

3.2 Recycled, recovered, or environmentally preferable or biobased materials. Recycled, recovered, or environmentally preferable, or biobased 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 Materials. The batting shall be composed of the multiple denier polyester fibers blended together.

3.3.1 Polyester binder fiber, 4.0 denier. The fiber shall be 4.0 denier and shall consist of a core of polyester having a minimum melting point of 465°F sheathed with polyester polymer mixture having a melting point of 275°F to 300°F. The core and sheath shall each make up 50±10 percent by weight of the fiber. The fiber shall have 8 to 10 crimps per inch and a 1.5 to 2.0 inch cut staple length.

3.3.2 Polyester fiber, 1.65 denier. The fiber shall be 1.65 denier and shall be formed from polyester having a minimum melting point of 465°F. The fiber shall have 8 to 10 crimps per inch and a 1.5 to 2.0 inch cut staple length. This fiber shall be available uncoated and coated with silicone treatment (see 3.4.1).

3.4 Batting construction.

3.4.1 Batting fiber blend. The polyester fibers specified in 3.3.1, 3.3.2 shall be intimately blended in the following proportions:

<u>Fiber</u>	<u>Percent of blend (±5)</u>
4.0 denier (3.3.1)	25
1.65 denier, uncoated (3.3.2)	37.5
1.65 denier, silicone coated (3.3.2)	37.5

MIL-DTL-44346A

3.4.2 Batting fabrication. The intimate fiber blend specified in 3.4.1 shall be made into batting by air-laying or card/cross lapping fibers into a web which is then consolidated by needle-punched to achieve the batting weight and thickness requirements specified in Table I. The consolidated batting shall be heat set to bond the fibers. A time/temperature exposure shall be established for heat treatment which enables the binder fibers in the batting center to be activated without providing excessive heat exposure (excessive heat exposure can result in a harsh surface hand).

3.5 Physical requirements. The finish bonded batting shall conform to the requirements specified in Table I, 3.5.1 and 3.5.2 when tested as specified in 4.5.

TABLE I. Physical requirements.

Characteristic	Requirement
Batting weight, oz./yd ²	8.4±0.8
Thickness, inches at 0.002 psi, (min.)	
Initial	0.63
After laundering (3 cycles)	0.57
Dimensional change, percent (max.) ^{1/}	
Length and width	3.0

^{1/} The dimensional change requirement refers to both shrinkage (-) and growth (+).

3.5.1 Batting evenness. The evenness of the finished bonded batting shall be such that no single batting weight determination shall deviate more than 10 percent from the average batting weight recorded. A 12 by 12-inch specimen shall be used for each determination. Testing shall be as specified in 4.5.

3.5.2 Batting launderability. The laundered batting specimen shall show no greater batting separation, thin or thick spots, or curling than the batting material before laundering when viewed over a black background. The laundered batting shall not demonstrate a thickness reduction greater than 10 percent from its measured thickness before laundering when tested as specified in 4.5.

3.6 Width. For Government procurements only, the width of the finished batting shall be as specified (see 6.2) and shall be the minimum acceptable width.

3.7 Length and put-up. For Government procurements only, unless otherwise specified (see 6.2), the batting shall be furnished in continuous lengths, each not less than 30 yards. Each length shall be put-up full width on a roll as specified in 5.1.

3.8 Fiber identification. Each roll of the finished batting shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

MIL-DTL-44346A

3.9 Workmanship. The finished batting shall conform to the quality of product established on this specification. The occurrence of defects shall not exceed the quality acceptance levels as specified in the contract or purchase order.

4. VERIFICATION

4.1 Classification of inspections. 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. A first article, submitted in accordance with 3.1, shall be inspected, examined for appearance and finished defects listed in 4.4 and tested for the characteristics as specified in 4.5.

4.3 Conformance inspection. Conformance inspection shall include the visual examination of 4.4 and the tests of 4.5 through 4.6 as applicable. Sampling for inspection shall be performed in accordance with ASQ/ANSI Z1.4 and with acceptance quality limits (AQLs) specified in the contract and/or order, except where otherwise indicated (see 6.2).

4.3.1 Inspection conditions. Unless otherwise specified, excluded, amended, modified or qualified in this specification or applicable procurement documents (see 6.2), all inspections shall be performed in accordance with all the requirements of referenced documents.

4.4 Visual examination. The batting shall be examined for the defects listed in Table II when inspected at a normal inspection distance of 3-feet when viewed against a dark background. The defects as specified in Tables II shall be scored four (4) points for each yard in which they occur.

TABLE II. Visual defects.

Defect
Any hole, cut or tear
Any crease or wrinkle clearly visible
Uneven batting, resulting in thin, thick or weak place, clearly visible
Any clearly visible spot and stain
Clearly visible differences in batting evenness
Breakage of fibers
Batting not made from well opened fibers
Surface not uniform or smooth due to neps or multiple fiber ends
Harsh batting hand
Objectionable odor

MIL-DTL-44346A

4.5 Material testing. The finished batting shall be tested for the characteristics listed in Table III. The methods of testing as specified wherever applicable and as listed in Table III shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The sample unit shall be five (5) continuous yards full width of the finished batting for all physical and chemical tests. The lot shall be unacceptable if one (1) or more tests fail to meet the requirement specified. The sample size shall be in accordance with the following:

<u>Lot size (yards)</u>	<u>Sample size (sample units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

TABLE III. Material tests.

Characteristic	Requirement Reference	Test Method
Fiber identification	See 3.3.1 & 3.3.2	AATCC TM20 (see 6.3)
Polyester: denier melting point staple length	See 3.3.1 & 3.3.2	ASTM D1907/D1907M ASTM D7138 ASTM D5103
Batting weight	Table I	See 4.6.1 <u>1/</u>
Batting evenness	See 3.5.1	See 4.6.2
Dimensional change	Table I	See 4.6.3, AATCC TM135 (3)(III)(Aiii)
Thickness at 0.02 psi Initial After three (3) laundering	Table I	ASTM D1777 <u>1/</u> AATCC TM135 (3)(III)(Aiii), 4.6.5 & ASTMD1777
Batting launderability	See 3.5.2	See 4.6.4

1/ The same cut specimens used to measure nominal batting weight specified in 4.6.1 shall be used to measure initial batting thickness.

4.6 Methods of testing and inspection.

4.6.1 Batting weight. Cut a minimum of six (6) 12-inches by 12-inches size specimens sampled diagonally across left side, center and right batting width along the entire length of a 3-yard sample so that no two samples shall have the same machine or cross-machine direction. The samples shall be conditioned in accordance with ASTM D1776/D1776M for nonwovens in a flat, relaxed state for a minimum of 4 hours. Each cut specimen shall be labeled, measured for its length and width and recorded to nearest 1/16-inch and weighed to the nearest 0.1 ounce. Each specimen weight shall be reported in ounces per square yard based on calculation below. The individual weight for each specimen and the average batting weight shall be reported.

MIL-DTL-44346A

$$\frac{(\text{Individual specimen weight (oz.)} \times 1296)}{(\text{Individual specimen length (in.)} \times \text{width (in.)})} = \text{Specimen weight (oz./sq.yd.)}$$

The average batting weight shall be calculated by averaging the weights of the six specimen individual batting weights calculated above.

4.6.2 Batting evenness. The individual batting weights reported in 4.6.1 shall be utilized to evaluate batting evenness. Batting evenness shall be evaluated by comparing the 6 individual weight determinations to the mean specified in 4.6.1. The sample unit shall be considered a failure if any weight determination deviates more than 10 percent from the average of the 6 specimens.

4.6.3 Batting laundering procedure. Three (3) 21 by 21-inch square batting specimens shall be cut from the sample unit. The batting specimens shall be prepared for laundering by sewing a square of batting between two pieces of nylon cloth conforming to MIL-DTL-43637- Cloth, Plain Weave, Ripstop, Nylon, any class. The layers shall be oriented such that the length direction of the batting coincides with the warp direction of the taffeta cover fabrics. The assembly shall be completely over-edged stitched on all four sides at approximately 1-inch in from the outer edge. The assembly shall also be stitched at the center of the square lengthwise in the warp direction to yield two quilt channels with nominal dimensions of 10-inches in width by 20-inches in length. After assembling the quilted batting squares, the specimens shall be marked for dimensional stability determination in accordance with AATCC TM135 for woven fabric on one of the nylon cloth sides except the bench marks shall be 18-inches. The three (3) prepared and marked specimens shall be laundered three (3) times in accordance with AATCC TM 135, (3)(III)(Aiii). The specimens shall be used for determination of dimensional stability, launderability and thickness after laundering (see 4.6.3, 4.6.4 and 4.6.5).

4.6.4 Batting launderability test. After completion of the laundering as specified in 4.6.3, remove the nylon cloth coverings from the three laundered specimens. The exposed batting shall be laid over a black background and visually compared to the initial batting before laundering. The appearance of thin spots, curling or separation in excess of that evidenced by the initial unlaundered batting shall be considered a test failure.

4.6.5 Thickness after laundering test. Three (3) 12 by 12-inch square size specimens shall be cut from the laundered batting specimens after the launderability test specified in 4.6.4. The specimens shall be cut such that the quilt stitching line indentation is orientated in the center area of the specimen. The specimen shall be tested for thickness as specified in ASTM D1777.

MIL-DTL-44346A

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Department or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The batting is intended for insulation for gloves and canteen carrier.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. The specific issue of individual documents referenced (see 2.2)
- c. When first article is required (see 3.1)
- d. Width of batting required (see 3.6)
- e. Length required if other than specified (see 3.7)
- f. Conformance inspection (see 4.3)
- g. Inspection conditions (see 4.3.1)
- h. Packaging (see 5.1)

6.3 Certificate of compliance. The contracting activity may select to accept a certificate of compliance for stated requirement.

6.4 Changes from previous issue. Marginal notations are not used on this revision to identify changes with respect to the previous issue due to the extent of the changes.

6.5 Subject term (key word) listing.

Eveness
Gloves
Insulation
Launderability
Needlepunch
Nonwoven
Thickness

MIL-DTL-44346A

Custodians:
Army - GL

Preparing Activity:
DLA-CT

Review activities:
Army - MD

(Project: 8320-2020-001)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST Online database at <https://assist.dla.mil/>.