

INCH-POUND

MIL-B-41826G

30 June 1989

SUPERSEDING

MIL-B-41826F

10 December 1984

MILITARY SPECIFICATION**BATTING, SYNTHETIC FIBERS, POLYESTER, (UNQUILTED AND QUILTED)**

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

1. SCOPE

1.1 Scope. This specification covers the requirements for unquilted and quilted polyester synthetic fiber battings.

1.2 Classification. The battings shall be of the following types, covers, classes, and styles, as specified (see 6.2).

Type VII - Unquilted polyester batting

- Class 6 - 2.2 oz./sq. yd. batting, continuous filament or cut staple (see 3.4)
- Class 7 - 3 oz./sq. yd. batting, cut staple
- Class 8 - 4 oz./sq. yd. batting, cut staple
- Class 9 - 4.4 oz./sq. yd. batting, continuous filament or hollow cut staple (see 3.4)
- Class 10 - 6 oz./sq. yd. batting, continuous filament or hollow cut staple (see 3.4)
- Class 11 - 10 oz./sq. yd. batting, continuous filament or hollow cut staple (see 3.4)
- Class 12 - 8 oz./sq. yd. batting, continuous filament or hollow cut staple

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8320

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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Type VIII - Quilted polyester batting

- Cover A - Ripstop nylon cloth, Olive Green 106
- Cover B - Ripstop nylon cloth, Natural
- Cover C - Ripstop nylon cloth, US Army Camouflage Pattern 1948
- Cover D - Nylon taffeta cloth, USAF Sage Green 1511
- Style a - Dumbbell pattern
- Style b - Straight pattern
- Class 6 - 2.2 oz./sq. yd. batting, continuous filament or cut staple
- Class 7 - 3 oz./sq. yd. batting, cut staple
- Class 8 - 4 oz./sq. yd. batting, cut staple
- Class 9 - 4.4 oz./sq. yd. batting, continuous filament or hollow cut staple
- Class 10 - 6 oz./sq. yd. batting, continuous filament or hollow cut staple

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

- V-T-295 - Thread, Nylon
- PPP-P-1133 - Packaging of Synthetic Fiber Fabrics

MILITARY

- MIL-C-332 - Cloth, Balloon, Cotton
- MIL-C-21852 - Cloth, Taffeta, Nylon
- MIL-C-43637 - Cloth, Plain Weave, Ripstop, Nylon; For Liners
- MIL-S-44309 - Sleeping Bag, Extreme Cold Weather Sleep System (ECWSS)

STANDARDS

FEDERAL

- FED-STD-191 - Textile Test Methods
- FED-STD-751 - Stitches, Seams, and Stitchings

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MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by
Attributes

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.1.2 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.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available from the Federal Trade Commission, Pennsylvania Avenue at Sixth Street, N.W., Washington, DC 20580-0001.)

2.2 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 4770 - Standard Test Method for Evaluation of Man-Made Fiber
Batting Used as Filling in Outerwear Apparel; Photo-
graphic Rating Standard for Fiberfill Durability

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1137.)

THE COLOR ASSOCIATION OF THE UNITED STATES, INC.

Standard Color Card of America

Department of Defense Standard Shades for Sewing Thread

(Color cards may be available from the Color Association of the United States, Inc., 343 Lexington Avenue, New York, NY 10016-0927. If color cards are not available from the Color Association, individual color samples may be obtained from the contracting activity or as directed by the contracting activity.)

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(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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 (see 6.3) in accordance with 4.3.

3.2 Materials.

3.2.1 Polyester. The fibers shall be polyester in the natural undyed color. The use of any form of polyester waste is prohibited, e.g., undrawn fiber, mixtures of deniers, lusters or cross sections, and waste from any stage of fiber production; whether drawn, undrawn or mixed or garnetted fibers. The contractor shall submit the fiber producer's certification that each lot of polyester staple used conforms to the requirements specified herein.

3.2.1.1 Fiber for type VII classes 6, 7, and 8 batting. The polyester fiber shall be 4.0 to 6.0 denier, $2 + 1/8$ inch long, crimped cut staple having a minimum melting point of 470°F.

3.2.1.2 Fiber for type VII classes 6, 9, 10, 11 and 12 batting. The polyester fiber shall be either filament as specified in 3.2.1.2.1 or hollow cut staple as specified in 3.2.1.2.2 (except class 6 as specified in 3.2.1.1).

3.2.1.2.1 Filament. The polyester fiber shall be 4.0 to 6.0 denier, crimped, continuous filament having a minimum melting point of 470°F.

3.2.1.2.2 Hollow cut staple. The polyester fiber shall be hollow, drawn, crimped, cut staple, 5.25 to 6.0 denier, 12 to 18 percent void, 6 to 11 crimps per inch, having a minimum melting point of 464°F. The polyester fiber shall be 2.0 to 2.5 inch staple with a maximum 0.22 percent finish level. The fibers for the core of hollow cut staple batting shall additionally be coated with a durable polydimethyl siloxane to a level of 0.17 to 0.43 percent silicon.

3.2.2 Bonding agents. Only bonding agents which have received prior approval shall be used for bonding the battings (see 6.6).

3.2.3 Cloth for cover A. The cloth shall be ripstop nylon conforming to class 1 of MIL-C-43637. The color shall be Olive Green 106.

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3.2.4 Cloth for cover B. The cloth shall be ripstop nylon conforming to class 2 of MIL-C-43637.

3.2.5 Cloth for cover C. The cloth shall be ripstop nylon conforming to class 3 of MIL-C-43637.

3.2.6 Cloth for cover D. The cloth shall be nylon taffeta conforming to type III of MIL-C-21852 except that the flex stiffness and colorfastness to dry cleaning requirements shall not apply. The color shall be AF Sage Green 1511.

3.2.7 Thread, nylon. The thread for the quilting stitchings of type VIII battings shall conform to either type I, II or III, class A, size B needle and size AA (minimum) bobbin of V-T-295. Dyed thread shall show fastness to laundering equal to or better than the standard sample or equal to or better than a rating of "good". The color of the thread shall be as follows:

<u>Cover</u>	<u>Thread color</u>
A	Olive Drab S-1, CA 66022
B	Natural
C	Olive Drab S-1, CA 66022
D	AF Sage Green 1511

3.3 Type VII batting fabrication. The batting shall be fabricated as specified in 3.3.1 or 3.3.2 as applicable such as to meet the requirements in 3.4. Type VII, classes 6, 9, 10, and 11 batting, when used for MIL-S-44309; Sleeping Bag, Extreme Cold Weather Sleep System (ECWCS) shall be made only from continuous filament fibers.

3.3.1 Bonding, classes 6, 7, and 8 (cut staple). The fiber specified in 3.2.1.1 shall be fabricated into batting of appropriate length, width (see 6.2), and thickness and bonded with an approved durable bonding agent (see 6.6) uniformly applied to both sides of the batting such that the amount of bonding agent on the finished batting will not exceed 18.0 percent by weight. The bonded fibers in the finished batting shall be well opened and separated without excessive breakage, neps, and multi-fiber ends.

3.3.2 Bonding, classes 9, 10, 11, and 12. The classes 9, 10, 11 and 12 batting shall be bonded as specified in 3.3.2.1 or 3.3.2.2.

3.3.2.1 Bonding, classes 6, 9, 10, 11, and 12 (filament fiber). The fibers specified in 3.2.1.2.1 shall be fabricated into batting of appropriate length, width (see 6.2), and thickness and bonded with an appropriate durable bonding agent (see 6.6) uniformly applied to both sides of the batting such that the amount of bonding agent on the finished batting shall not exceed 12 percent by weight. The bonded fibers in the finished batting shall be well opened without excessive breakage.

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3.3.2.2 Bonding, classes 9, 10, 11, and 12 (hollow cut staple). The fibers specified in 3.2.1.2.2 shall be fabricated into a batting such that the uncoated fibers are uniformly laid as surface layers constituting 40 percent of the fiber of the finished batting. The siloxane coated fibers shall constitute the batting core between the surface layer fibers. An approved bonding agent (see 6.6) shall be uniformly applied to each outside batting surface such as to result in a 10 ± 2 percent bonding agent add-on of the finished batting. The bonding agent shall penetrate the outside fiber layers sufficiently to adhere these fibers to the core fiber such that the finished batting will meet the launderability requirements specified in 3.4.5.

3.4 Batting requirements. The bonded batting for type VII shall conform to the requirements specified in table I and 3.4.1 through 3.4.5 (see 3.3) when tested as specified in 4.4.3.

TABLE I. Batting requirements

Characteristic	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12
Weight, oz/sq yd	2.2 ± 0.2	3.0 ± 0.3	4.0 ± 0.4	4.4 ± 0.4	6.0 ± 0.6	10.0 ± 1.0	8.0 ± 0.8
Thickness, inches at 0.01 psi: minimum:							
Initial	0.29	0.39	0.52	0.49	0.70	1.00	0.85
After laundering	0.15	0.21	0.32	0.42	0.60	0.85	0.72

3.4.1 Compressional recovery. The compressional recovery for finished bonded batting before and after laundering shall be a minimum of 80 percent when tested as specified in 4.4.3.

3.4.2 Batting evenness. The evenness of the finished bonded batting shall be such that no single weight determination shall deviate more than ± 10 percent from the target weight for each batting class weight cited in table I when tested as specified in 4.4.3.

3.4.3 Blocking. The finished bonded battings shall not block to an extent greater than represented by scale rating No. 2 when tested as specified in 4.4.3.

3.4.4 Dimensional stability. Classes 6, 7, 8, and 9 finished bonded battings shall have a dimensional change of not more than 5.0 percent in length and width directions. Classes 10, 11 and 12 finished bonded battings shall have a dimensional change of not more than 5.0 percent in the length and not more than 7.0 percent in the width when tested as specified in 4.4.3.

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3.4.5 Laundryability. Type VII, classes 6, 9, 10, 11 and 12 finished bonded batting shall show a minimum average laundryability rating of "4" with no specimen differing by more than 1.0 from any other specimen in the sample, when tested as specified in 4.4.3

3.5 Construction of quilted batting, type VIII. Type VII batting of the specified class (see 6.2) shall be quilt stitched between two outer layers of cloth of the cover specified (see 6.2). The cloth coverings and the batting shall be so positioned as to yield a straight edge on one side of the assembly. The batting shall be flush or extend beyond the cloth selvage on both sides of the assembly. Any extension of the batting on the straight edge side shall not exceed 1/4 inch wide while the extension of the batting on the opposite side shall not exceed 1 inch. The extending edges of the polyester batting shall be evenly trimmed without ragged edges.

3.5.1 Stitching and stitch patterns. All stitching shall conform to type 301 of FED-STD-751. The tension of the two thread system shall be balanced in order that the stitch is interlocked midway within the quilted composite as defined in FED-STD-751, type 301. The number of stitches shall be as indicated below for the stitch pattern styles specified (see 6.2):

Style a, Dumbbell pattern (figure 1) 6 to 8 stitches per linear inch, calculated as 1/6 of the total number of stitches in a 6-inch repeat of the stitching pattern. Total stitches per linear inch in any area of the pattern shall not exceed 9 nor be less than 5.

Style b, straight pattern (figure 2) 6 to 8 stitches per inch. Distance between stitch rows shall be 3 to 6 inches as specified (see 6.2).

3.5.1.1 Thread breaks and open stitching. Thread breaks or open stitches shall be secured by stitching back of the break in conformance with the pattern, not less than 1 inch.

3.5.1.2 Bobbin changes. The area of complete bobbin changes on type VIII batting shall be cut out of the piece and shall not be furnished to the government.

3.6 Length and put-up. Unless otherwise specified (see 6.2 and 6.8), unquilted and quilted batting (types VII and VIII) purchased directly by the Government shall be furnished in continuous lengths for each class as specified below with a tolerance of ± 2 yards:

Class 6	-	100 yards
Class 7	-	70 yards
Class 8	-	60 yards
Class 9	-	58 yards
Class 10	-	48 yards
Class 11	-	28 yards
Class 12	-	38 yards

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The batting shall be furnished in rolls as specified in 5.1, except that type VII batting shall be furnished without laps or otherwise joining of ends, and type VIII batting shall be furnished without fabric splices (joining of fabric outer coverings), laps or gaps, and without evidencing complete bobbin changes. The minimum width shall be as specified (see 6.2).

3.7 Workmanship. The finished quilted or unquilted batting shall be clean, free from objectionable odor and shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.3 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When a first article is required (see 3.1 and 6.2), the type VII batting shall be examined for the defects specified in table III and 4.4.5, and tested for the characteristics in 4.4.3. The type VIII quilted batting shall be examined for the defects in table III and tested for the characteristics in 4.4.3 prior to stitching on the cover, and examined for the defects in table V and 4.4.5 after stitching on the cover.

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4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.4.1.1 Component and material certification. A certificate of compliance may be acceptable as evidence that the characteristics listed in table II conform to the specified requirements.

TABLE II. Component and material certification

Component	Characteristic	Requirement paragraph
Cut staple fiber	Material identification <u>1/</u> , crimping, denier, length of staple, and melting point	3.2.1.1
Continuous filament fiber	Material identification <u>1/</u> , crimping, denier, and melting point	3.2.1.2.1
Hollow cut staple fiber	Material identification <u>1/</u> , denier, length of staple, percent void, crimp, melting point, surface fiber finish level, and core fiber coating	3.2.1.2.2
Bonding agent	Resin trade name <u>2/</u> Percent on bonded batting	3.2.2

1/ The certification shall include the fiber manufacturer's identification data.

2/ The certification shall include the trade name of the resin used by the batting manufacturer.

NOTE: When type VIII quilted batting is specified in the procurement document the tests specified in table IV shall be performed as component testing.

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4.4.2 Batting visual examination, type VII end item/type VIII in-process. When type VII batting is specified in the procurement document, this examination shall be performed as an end item examination and when type VIII batting is specified in the procurement document this examination shall be performed as an in-process examination. The batting (type VII or VIII) shall be examined for the defects listed in table III. The defects shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the batting, in which case only the more serious defects shall be counted. A continuous defect shall be counted as one defect for each lengthwise yard or fraction thereof in which it occurs. The lot size shall be expressed in units of linear yards. The sample unit shall be 1 linear yard. The inspection level shall be II and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total (major and minor combined) defects.

TABLE III. Batting visual defects

Defect	Classification	
	Major	Minor
Any hole, cut, or break (tear)	101	
Crease or wrinkle, embedded		201
Bonding agent, not uniformly applied	102	
Bonding agent not applied to both sides of batting	103	
Batting uneven - resulting in thin, thick or weak place, clearly visible <u>1/</u>	104	
Spot or stain, clearly visible <u>1/</u>		202
Batting not made from well opened fibers, clearly visible <u>1/</u>	105	
Excessive breakage of fibers, clearly visible <u>1/</u>	106	
Neps and multiple fiber ends, clearly visible <u>1/</u>	107	

1/ At normal inspection distance approximately 3 feet when viewed against a black background.

4.4.3 Batting testing, type VII end item/type VIII component. When type VII batting is specified in the procurement document, the testing shall be performed as an end item test and when type VIII batting is specified in the procurement document, the testing shall be performed as component testing. The batting (type VII end item or type VIII component testing) shall be tested for the characteristics listed in table IV. The methods of testing specified in FED-STD-191 wherever applicable and as listed in table IV shall be followed.

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The lot size shall be expressed in units of linear yards. The sample unit shall be three linear yards for batting widths greater than 66 inches and four linear yards for batting widths less than 66 inches. The sample unit length shall be cut at right angles to the trimmed edge of the batting roll. All test results shall contain the individual values utilized in expressing the final result. Any test failure shall be cause for rejection of the lot.

<u>Lot size (yards)</u>	<u>Sample size (sample units)</u>
800 or less	3
801 up to and including 22,000	5
22,001 and over	7

TABLE IV. Batting tests

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method <u>1/</u></u>
Weight	3.4	5041 <u>2/</u>
Thickness, initial and after laundering	3.4	4.5.1
Compressional recovery:		
Initial	3.4.1	4.5.2
After laundering	3.4.1	4.5.2
Evenness	3.4.2	<u>3/</u>
Blocking	3.4.3	5872 <u>4/</u>
Dimensional stability	3.4.4	4.5.4
Launderability	3.4.5	4.5.5

- ° 1/ The number of specimens required for each cited method shall be divided into three equal groups and spaced diagonally across the entire sample unit length in order that one-third of the specimens are sampled from each of the left, center, and right areas of the batting width at different batting lengths. No two specimens for any one test shall be sampled from the same machine or cross-machine direction.

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- 2/ Method 5041 except six 12 by 12 inch square specimens shall be tested. The individual and mean weight of the six specimens shall be reported to the nearest 0.1 oz./sq.yd.
- 3/ Batting evenness shall be evaluated by comparing the six individual weight results determined by Method 5041, 2/, to the target weight for the specified batting class. The sample unit shall be considered a failure if any weight result deviates more than ± 10 percent from the target weight cited for the specific batting class.
- 4/ The test specimen shall be a 15 by 15 inch square double folded to make a 7-1/2 by 7-1/2 inch square, and placed between two 8 by 8 by 1/8 inch glass plates. A 14 pound weight shall be placed on the top plate in a position to insure even pressure.

4.4.4 Quilted batting examination type VIII. The quilted batting shall be examined on one side only (alternating every other roll) for the defects listed in table V. The defects found during this examination shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the batting, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each lengthwise yard or fraction thereof in which it occurs. The lot size shall be expressed in yards. The sample unit shall be 1 linear yard of batting. The inspection level shall be II and the AQL, expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total (major and minor combined) defects.

TABLE V. Quilted batting defects type VIII

Examine	Defect	Classification	
		Major	Minor
Cloth covering	Material not as specified	101	
	Color not as specified	102	
	Any smash	103	
	Any cut, hole, or tear	104	
	Spot or stain, clearly visible <u>1/</u>		201
	Abrasion resulting in a weak place or any weak place	105	
	Floats and skips:		
	-Multiple, 3/4 inch or more in combined warp and filling directions	106	
	-Multiple, less than 3/4 inch in length in combined warp and filling directions, or single float or skip extending over more than one warp-wise or filling-wise inch		202

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TABLE V. Quilted batting defects type VIII (cont'd)

Examine	Defect	Classification	
		Major	Minor
Cloth covering (cont'd)	Broken or missing yarns (warp and filling):		
	-Three or more contiguous, regardless of length	107	
	-Two or more contiguous missing, regardless of length		203
	Single missing 4 inches or more	108	
	Crease or wrinkle, embedded	109	
	Five or more kinks, knots, or loops in 9 linear inches, clearly visible $\frac{1}{4}$ and protruding from surface of cloth		204
	Any tight warp section resulting in waviness or dimensional distortion of cloth	110	
	Any cut, broken, torn, folded or rolled selvage	111	
	Any stringy or loopy, scalloped tight or slack selvage		205
Thread, nylon	Not color specified or not within established tolerances		206
Workmanship	Type not as specified	112	
	Class not as specified	113	
	Style (pattern) not as specified	114	
	Stitching pattern not within established tolerances by more than $\frac{1}{4}$ inch	115	
	Stitching pattern not within established tolerances by $\frac{1}{4}$ inch or less		207
	Thread ends not trimmed		208
	One or more rows of stitching omitted	116	
	Needle chews	117	
	Loose or irregular tension		209
	Not stitch type 301 throughout	118	
	Broken or missing stitches 1 inch or more (not repaired)	119	

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TABLE V. Quilted batting defects type VIII (cont'd)

Examine	Defect	Classification	
		Major	Minor
Workmanship (cont'd)	Broken or missing stitches less than 1 inch (not repaired)		210
	Style "a" - average stitches per linear inch on 6 inch repeat, 4 or less, or 10 or more	120	
	Style "a" - 5 or 9 average stitches per linear inch on 6 inch repeat		211
	Style "b" - 5 or 9 stitches per inch		212
	Style "b" - 4 or less, or 10 or more stitches per inch	121	
	Any area evidencing complete bobbin change	122	
	Repaired thread breaks or open stitches stitched back less than 1 inch		213

1/ At normal inspection distance approximately 3 feet when viewed against a black background.

4.4.5 Overall examination (type VII and type VIII). The unquilted and quilted batting shall be examined for the defects listed below. Each defect listed below shall be counted not more than once in each roll examined. The sample size shall be the applicable number of rolls indicated in table VI. Each roll in the sample shall be examined over its entire length. The lot shall be rejected if the total number of defects in the sample exceeds the applicable acceptance number specified in table VI.

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| Quilted and unquilted batting types | <ul style="list-style-type: none"> - Overall uncleanness. - Objectionable odor. - Edges of bonded batting not evenly trimmed. |
| Unquilted type | <ul style="list-style-type: none"> - Overall unevenness. - Width edge to edge less than minimum specified. - Lapping or otherwise joining ends to make a continuous length for material purchased directly by the Government. |

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- Quilted type
- One edge not straight.
 - Batting recessed or extends more than 1/4 inch on straight edge or batting on opposite side extends more than 1 inch from cloth selvages.
 - Constructed batting exhibits overall unevenness containing cloth distortion or bulges.
 - Minimum width as measured on basis of cover cloths, less than specified.
 - Lapping or otherwise joining of ends of batting or splicing (joining of ends of cover cloths) to make a continuous length.
 - Gaps or bare area in polyester batting material.

TABLE VI. Sampling and acceptance criteria for overall and length examinations

Lot size in yards	Sample size in rolls	Acceptance number
Up to and including 1,300 <u>1</u> /	3	0
1,301 up to and including 3,200	5	0
3,201 up to and including 8,000	7	0
8,001 up to and including 22,000	10	0
22,001 up to and including 110,000	15	0
110,001 and over	25	1

1/ If a lot contains fewer than three rolls, each roll in the lot shall be examined.

4.4.6 Length examination. During the overall examination, each roll in the sample shall be examined for continuous length. Any failure to conform to the applicable continuous length specified in 3.6 shall be scored as a defect. If the total number of defects in the sample rolls exceeds the applicable acceptance number specified in table VI or if the total of the actual lengths of the rolls in the sample is less than the total of the lengths marked on the roll tickets, the lot shall be rejected.

4.4.7 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of PPP-P-1133.

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4.5 Methods of inspection.

4.5.1 Thickness test. Six specimens with a minimum area of 20 square inches shall be cut from each of the initial and laundered batting samples and allowed to relax on a flat surface without pressure for a minimum of 24 hours until equilibrium with standard conditions has been reached. The laundered batting thickness specimens shall be cut from the launderability test specimens after completing the launderability rating evaluation (see 4.5.5). Two specimens shall be sampled from each of the three laundered batting panels, with cover fabrics removed and sampled from areas to avoid the stitching lines in the 20 square inch test area. The thickness of each specimen shall be measured to the nearest 0.01 inch under a 0.01 pound per square inch (psi) pressure using the thickness measuring device specified in 4.5.1.1.

4.5.1.1 Thickness measuring device. The device shall consist of a base plate and a circular pressure plate with a bearing surface of 20 square inches, and a means of applying 0.01 and 5.0 psi pressure on the specimen. This pressure shall be evenly distributed over the entire bearing surface area. The thickness measuring device shall be capable of measuring the thickness of the specimen (distance between base and pressure plate) to an accuracy of 0.01 inch.

4.5.2 Compressional recovery test. Six specimens shall each be measured for initial thickness as specified in 4.5.1. Immediately after determining the initial thickness of the specimen, the pressure applied to the specimen by the device specified in 4.5.1.1 shall be increased to 5 psi and maintained for 1 minute. The pressure shall then be completely removed and the specimen allowed to relax for 5 minutes undisturbed. At the end of the 5-minute period, the test area shall be immediately remeasured for thickness as specified in 4.5.1. The reading shall be recorded as the thickness after compression. The percent compressional recovery of each specimen shall be calculated as follows:

$$\text{Percent compressional recovery} = \frac{\text{Thickness after compression}}{\text{Initial thickness}} \times 100$$

4.5.3 Laundering procedure. Three 26 by 26 inch squares of batting shall be cut from the sample unit as specified in 4.4.3. The specimens shall be prepared as specified in Method 5556 of FED-STD-191 except that the type III cloth of MIL-C-21852 shall be allowed as an alternate to MIL-C-332, Cloth, Balloon, Cotton batting cover fabric. The prepared specimens shall be marked for dimensional stability as specified for woven fabrics on one of the sewn-on cover cloths for each prepared specimen. The three prepared and marked specimens shall then be subjected to three cycles of Method 5556: Cotton Procedure, except that the maximum load shall be 10 pounds consisting of a 5 pound maximum load of batting specimens and utilizing a medium weight cotton ballast cloth, the drying temperature shall be 130° to 150°F, and the specimens shall not be moistened or pressed after drying. The laundered specimens shall be used to determine dimensional stability, launderability, thickness, and compressional recovery after laundering.

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4.5.4 Dimensional stability test. Three specimens prepared, marked, and laundered as specified in 4.5.3 shall be measured for dimensional change. The percent changes for both length and width directions shall be calculated for each specimen.

4.5.5 Launderability test. After completion of laundering (see 4.5.3) and determination of dimensional stability (see 4.5.4), remove the batting cloth coverings from the two middle channels of the three laundered specimens. Individually, the exposed batting area of each specimen shall be placed on a flat surface over a black background and under an overhead light to evaluate launderability by visual examination and comparison to the Photographic Rating Standards for Fiberfill Durability of ASTM D 4770. Only the photographic standard portion of the ASTM D 4770 methodology shall be utilized in this evaluation. To evaluate launderability, a trained observer shall stand directly in front and within three feet of the test specimen and visually inspect the exposed laundered batting for fiber migration, batting separation, and fiber roping, and compare these characteristics to the photographic standards which are placed next to the specimen. To rate the specimen, record the photographic standard rating number that most closely matches the test specimen's exposed batting area. The highest rating "5" allows slight change in batting appearance after laundering. Moreover, launderability characteristics which appear to fall between the numerical values of the photographic standards may be rated 1.5, 2.5, 3.5, and 4.5 as appropriate. The rating value assigned for each of the three specimens shall be recorded and the average rating value reported. A minimum averaged "4" rating is required for all batting classes to achieve a "Satisfactory" launderability rating. If the ratings among the three specimens differ by more than 1.0, launderability of the sample unit will be rated "Unsatisfactory".

5. PACKAGING

5.1 Put-up and preservation. Put-up and preservation shall be level A or Commercial as specified (see 6.2).

5.1.1 Levels A and Commercial. The batting shall be put-up and preserved in accordance with the applicable requirements of PPP-P-1133.

5.2 Packing. Packing shall be level A, B or Commercial as specified (see 6.2).

5.2.1 Levels A, B and Commercial. Batting of one type, class and style only shall be packed in accordance with the applicable requirements of PPP-P-1133.

5.3 Marking. In addition to any special marking required by the contract or purchase order, shipments shall be marked in accordance with the applicable requirements of PPP-P-1133.

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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 quilted and unquilted batting is intended for use as insulation in clothing, sleeping bags, and equipage items.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Type, class, cover, and style required (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When a first article is required (see 3.1, 4.3, and 6.3).
- e. Distance in inches between stitch rows when "style b" is specified (see 3.5.1).
- f. When length of rolls is other than specified (see 3.6).
- g. Width required (see 3.6).
- h. Levels of preservation and packing (see 5.1 and 5.2).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 USAF color shades. A sample of USAF color shades may be obtained from the contracting activity.

6.5 Web construction. It is the intent of this document to allow the direct doffer web, air laying process and the cross-lapped web type of the cut staple batting so long as the cut staple batting meets the performance characteristics set forth herein.

6.6 Bonding agents. Approval of bonding agents for use in battings covered by this document is the responsibility of the U.S. Army Natick Research, Development and Engineering Center, Natick, MA 01760-5014. Approval is based on more extensive evaluations, including those for toxicity, which are not set forth in the document. Because of the time necessary to conduct a full evaluation (approximately 6 months), only those bonding agents already approved and so listed in the invitation for bids or request for proposal shall be considered acceptable for the related procurement.

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6.6.1 Submittal for approval. Request for approval should be submitted to the U.S. Army Natick Research, Development and Engineering Center, Natick, MA 01760-5014. It should be accompanied by approximately 5 linear yards of 2 oz./sq. yd. polyester batting manufactured with the proposed bonding agent and otherwise conforming to all requirements for bonded batting under this document together with applicable test data. Information is to be furnished regarding the commercial designation and chemical description of the bonding agent (Approved lists will indicate only the commercial designation). Chemical identification with products already approved should be made, if applicable, and any available data on skin irritancy or toxicity should be submitted. If applicable, a statement should be included that; as used, the resin is well cured and that no materials with known high toxicity have been used prior to cure.

6.7 Caution. End item documents which cite quilted batting covered by this specification should incorporate the following caution in instruction labels:

"DO NOT DRY CLEAN AND DO NOT PRESS"

6.8 Type VIII quilted batting put-up. To reduce the risk of stitch runback, type VIII quilted batting to be stored for periods greater than 2 weeks should be put-up in rolls no greater than the lengths indicated in 3.6.

6.9 Thermal resistance. Typical minimum thermal resistance (Clo values) for initial and laundered type VII unquilted batting are outlined below:

Thermal resistance $\frac{1}{\text{hr} \times \text{ft}^2 \times ^\circ\text{F} \times \text{Btu}^{-1}}$

<u>Class</u>	<u>Initial</u>	<u>After laundering</u>
6	1.0	0.6
7	1.2	1.0
8	-	-
9	2.0	1.8
10	2.6	2.4
11	3.7	3.5

1/ Tested in conformance to ASTM C 518, $T_h = 95^\circ\text{F}$, $T_c = 55^\circ\text{F}$ measured with a 0.002 PSI load on the specimen.

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6.10 Cross reference. The addition of a large number of new types and classes necessitated redesignation of classifications. MIL-B-41826E designations and corresponding new designations in MIL-B-41826F & G are shown below.

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Type I
Type II
Type III
Type IV
Type V
Type VI
Class 1.
Class 2
Class 3
Class 4
Class 5
Style a
Style b

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Type VIII, class 6
Type VIII, class 7
Type VIII, class 8
Type VIII, class 9
Type VII, class 10
Type VII, class 11
Type VIII, Cover A
Deleted
Type VIII, Cover B
Type VIII, Cover C
Type VIII, Cover D
Unchanged
Unchanged

6.11 Subject term (key word) listing.

Cold weather clothing liners
Equipage
Insulation
Nonwoven
Sleeping bag

6.12 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - GL
Air Force - 99

Preparing activity:

Army - GL

(Project 8320-0094)

Review activities:

Army - MD
Air Force - 11, 82
DLA - CT

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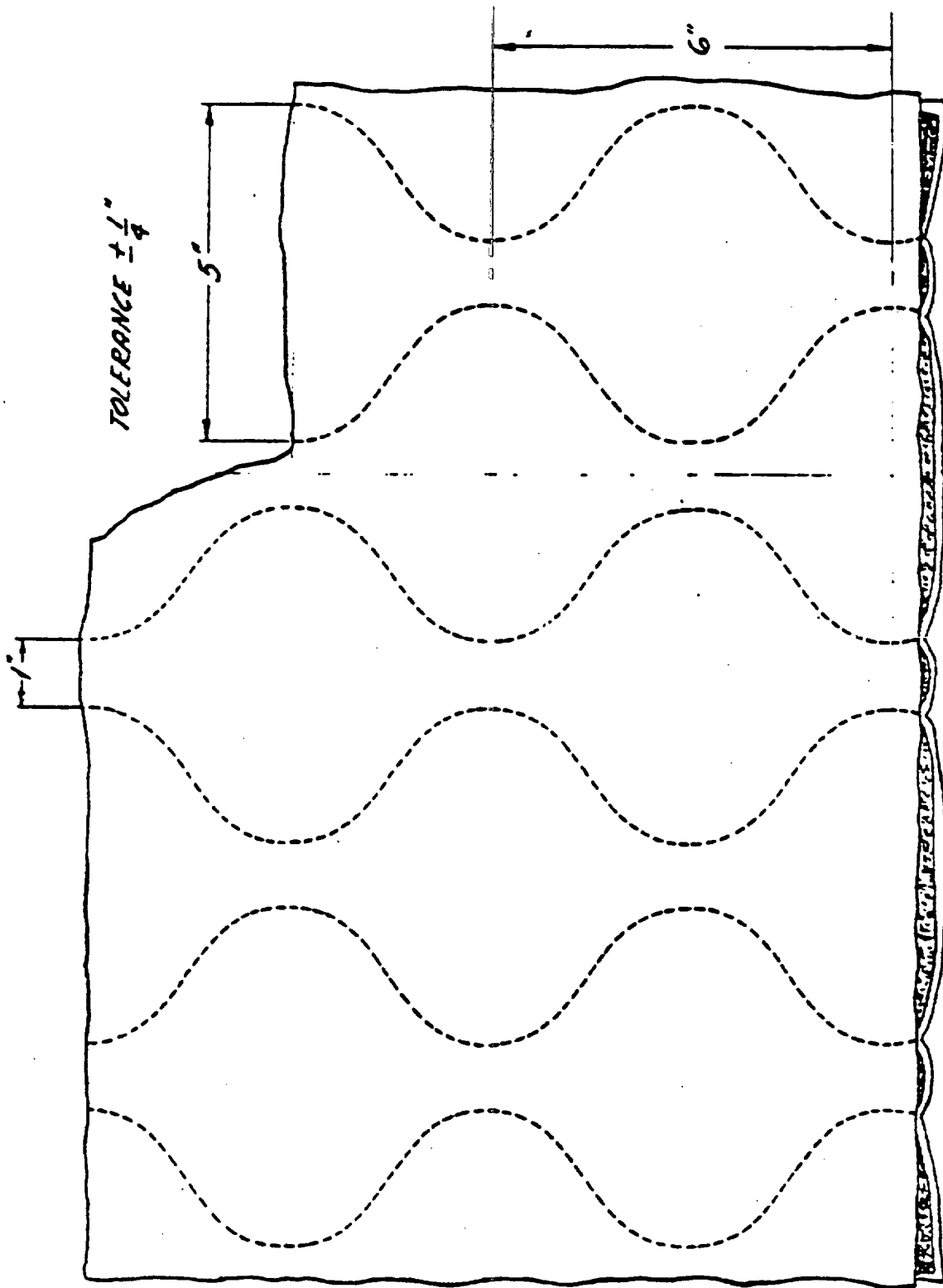


FIG. 1, DUMBBELL PATTERN

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TOLERANCE $\pm \frac{1}{8}$ "

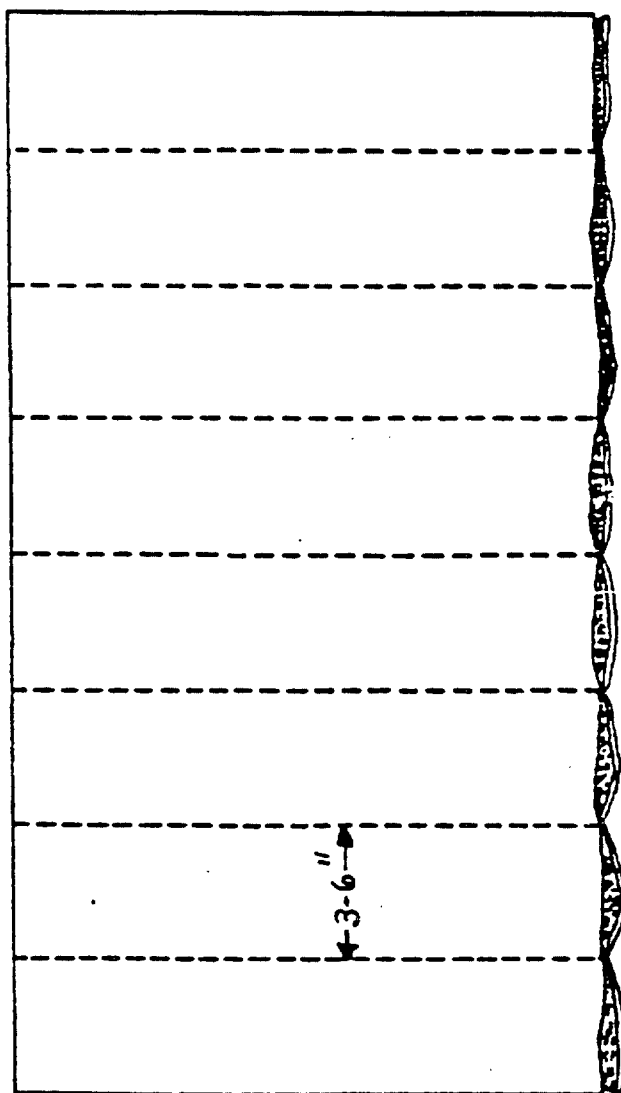


FIG 2, STRAIGHT PATTERN

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-B-41826G		2. DOCUMENT TITLE Batting, Synthetic Fibers, Polyester, (Unquilted and Quilted)	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	