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INCH-POUND
MIL-DTL-27546E
July 26, 2000
SUPERSEDING
MIL-L-27546D(USAF)

DETAIL SPECIFICATION

LINER: FLYER'S JACKET, AND FLYERS TROUSERS, CWU-9/P

The General Services Administration has authorized the use of this specification for all Federal agencies.

1. SCOPE

1.1 Scope. This Specification covers the requirements for liners to be worn under the CWU-9/P jacket and trousers.

1.2 Classification. The jacket and trouser liners are furnished in the following sizes:

Small	34 - 36
Medium	38 - 40
Large	42 - 44
Extra-Large	46 - 48

Beneficial comments, (recommendations, additions, deletions) and any data which may be of use in approving this document should be addressed to: Defense Supply Center Philadelphia, Clothing and Textiles Directorate, Attn: DSCP-COCT, building 6-1-D, 700 Robbins Ave, Philadelphia, PA 19111-5096 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 8415

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2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4. This section does not include documents cited in other sections 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 and documents cited in sections 3 and 4, whether or not they are listed.

2.2 Government Documents

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 will be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.1).

SPECIFICATIONS

FEDERAL

A-A-55634	Fastener, Slide, Interlocking
A-A-52094	Thread, Cotton

MILITARY

MIL-F-10884	Fasteners, Snap
MIL-B-41826	Batting, Synthetic Fibers, Polyester (Unquilted and Quilted).

(Unless otherwise indicated, copies of Federal and military specifications, standards and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5096.)

2.3 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 specification.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) / AMERICAN SOCIETY for QUALITY (AS0)

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection of Attributes.

Application for copies should be addressed to American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATION

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ASTM-D-3776 Mass Per Unit Area (Weight) of Fabric
(Application for copies should be addressed to American Society for Testing and Materials, 100 Barr Harbour Drive, West Conshohocken, PA 19428)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC-61 Colorfastness to Laundry, Home and Commercial: Accelerated

(Applications for copies should be addressed to American Association of Textile Chemists and Colorists (AATCC) PO Box 12215, Triangle Park, NC 27709-2215)

2.4 Order of precedence. In the event of 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 specified 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 4.2.

3.2 Recycled recovered or environmentally preferable materials. Recycled, recovered, or environmentally preferable material 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 Description.

3.3.1 Jacket liner. The jacket liner shall have a center front opening with slide fastener and four snaps concealed by an outside flap, knit collarette and cuffs, and a patch pocket on the outside left breast measuring 5 inches wide and 5-5/8 inches deep. The hanger loop, 1/2 inch by 3 inches long, shall be caught in the seaming of the collar to the neck and secured with a bartack.

3.3.2 Trouser liner. The trouser liner shall have an elastic waistband, snap fly closure, knit anklets and back hip patch pockets measuring 6-1/4 inches wide and 6 inches deep. The hangers for the trousers shall be centered on the seat seam with a bartack 1/4 inch below the bottom edge of the waistband.

3.3.3 Seams and stitching. All raw edges including the pocket shall be overedge stitched (6-10 stitches per inch). Top corners of all pocket openings and the bottom of the fly shall be bartacked. All seams shall be lock or chain stitched (10-14 stitches per inch) with the edges overedged together. In addition, the seat seam shall be raise stitched with a double needle machine with the right overlapping the left. The waistband shall be 2 inches wide with four rows evenly spaced stitching. The top edge of the slide fastener tape (without teeth) shall be exposed

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approximately 3/4 inch (to make room for the snap) and shall be caught in the collar seaming on the jacket liner.

3.4 Materials.

3.4.1 Basic material. The quilted material with a nylon taffeta cover shall conform to Type VIII, cover D, Style a and Class 9 of MIL-B-41826. The color shall be USAF Sage Green USAF color shade 1511.

3.4.2 Knit cloth for the Anklets wristlets, and collarette**.** The color of the knit cloth shall be constructed to have not less than 14 wales per inch and not less than 18 courses per inch. Three courses of single, cotton shall alternate with one course of 2-ply spun nylon yarn. The knit cloth shall be a good match to the basic material. The finished cloth shall show colorfastness to laundering (after 3 test cycles) equal to or better than the standard sample, or a rating of "3-4" or better on the AATCC Gray scale for Color Change when compared to the unlaundered sample when tested in accordance with paragraph 4.5. The anklets and wristlets shall conform to the characteristics outlined in Table I.

3.4.2.1 Anklets and wristlets. The cloth shall be made on a circular knitting machine with one end of yarn per feed using a 1 by 1 rib stitch, The ends shall have a tuck or expanding stitch (1/2 inch minimum when folded and finished).

TABLE I Anklets and Wristlets

Weight	Folded width (per dozen pairs)	Open length (inches)	(inches)
Anklets	12 ounces	3	9
Wristlets	9 ounces	2-1.2 (+/- 1/4 inch)	9 (+/- 1/4 inch)

3.4.2.2 Collarettes. The cloth shall be made on a circular knitting machine or on a flat-bed knitting machine using 1 by 1 rib stitch with one end per feed. Three courses of single, cotton yarn shall alternate with one course of 2 ply spun nylon yarn. The weight of the cloth shall be not less than 12 ounces per square yard.

3.4.3 Stitching thread. The sewing thread shall be a good match to the basic material and shall conform to A-A-55094, type III, 3 ply, ticket number A**,** for all seaming and safety stitching.

3.4.4 Slide fastener (jacket liner). The slide fastener for the front opening shall be separating, nonreversible, automatic, size light medium special with a short tab pull and single slider arrangement conforming to Type IV, style 6 of A-A-55634. The components shall be dark oxidized or natural brass. The length for all jacket sizes shall be 20 inches with a minimum tape extension of 1-1/4 inches on the top end.

3.4.5 Snap fasteners. The snap fasteners for the jacket and trouser liner shall conform to style 2A, finish 2, of MIL-F-10884. The color of the exposed surface of the cap shall match the color

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of the outershell material or shall be black. The placement of the snaps shall be as indicated on the pattern.

3.4.5.1 Jacket Liner Front opening. The top snap shall be placed 1/2 inch down from the collar and the last snap 1 inch above the finished bottom hem with the remaining snaps evenly spaced in between according to the marks on the pattern.

3.4.5.2 Jacket liner and trouser liner. Two female portion snaps shall be located on each inseam to be used to attach the liners together. The first snap shall be 1-1/2 inches upward from the finished bottom hem. The second shall be 1-1/2 inches upward from the first snap fastener and in vertical alignment. One corresponding male portion of the snap shall be located on each trouser outseam approximately 3 inches (± 1/4 inch) from the top edge of the trouser.

3.4.6 Elastic webbing (trouser liner). The 1-3/4 inch wide elastic webbing shall have a thickness of .048 inches minimum and a maximum weight of .95 oz. per linear yard when tested in accordance with paragraph 4.4.

3.5 Labels. Each liner shall have a combination identification/size label, and a laundering label stitched on all sides approximately 1/2 to 1 inch below the collar seam on the jacket liner and stitched on all sides below the lower row of waistband stitching on the inside back above the right patch hip pocket on the trouser liner. The inscription shall have a minimum font size of 10. The inscription legibility, label, and label attachment shall last the expected life of the coveralls.

3.5.1 Identification/size label. The identification/size label shall contain the following information:

Liner, flyer's CWU 9/P (jacket or trousers)
Contract number
Textile Fiber Products Act Information
Contractor's name
Size
Stock number

3.5.2 Laundering instruction label. The laundering instruction label shall contain the following information:

1. Machine washing. Use Permanent Press Cycle. Wash in warm water with mild detergent.

2. Hand washing. Wash in warm water using mild detergent. DO NOT WRING OR TWIST. Rinse in clean warm water.

3. DO NOT USE CHLORINE BLEACH OR STARCH.

4. Dry at low heat (do not exceed 130^0 F). After drying, tumble at room temperature for 10 minutes. Remove immediately from dryer. To drip dry, remove from water and place on rust-proof hanger.

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DO NOT REMOVE THIS LABEL

3.5.3 Garment instruction label. A paper instruction label measuring not less than 3-1/2 inches by 3-1/2 inches shall be included inside the sealed polyethylene bag with the jacket and trouser. The label shall contain the following information.

"The garment shall be unpacked and shaken out,
at a room temperature of approximately 70 degrees Fahrenheit,
before fitting to insure your correct size".

3.5.4 Barcode tag. Each item shall be individually bar-coded, clearly legible and readable by scanner. The bar-coding element shall be a 13 digit national stock number (NSN). The barcode type shall be medium to high code density, and shall be attached so that it is completely visible on the item when it is folded and /or packaged as specified. The label shall be attached without using adhesive or without piercing the fabric to prevent damage to the item.

3.5.5 Patterns. The government shall furnish a complete set of patterns or a master pattern with grade rules, to maintain uniformity and consistency in manufacturing. The government patterns shall be used to create the contractor's working patterns. Minor modifications are permitted to accommodate manufacturing procedures, however the design and finished measurements shall be maintained.

TABLE II. List of pattern parts

Jacket liner	Cut pieces	Trouser liner	Cut pieces
Right front	1	Front	2
Left front	1	Back	2
Back	1	Trouser pocket	2
Left sleeve	2		
Right sleeve	2		
Pocket	1		

3.6 Finished measurements. The finished liners shall conform to measurements as shown in Table III and IV.

TABLE III. Jacket Liner finished measurements (inches)

	Small	**Medium**	**Large**	**X-Large**	**Tolerance**
Back length 1/	26	26-1/2	26-1/2	27	+ 1 -3/4
1/2 Chest circ. 2/	22	24	26	28	+ 1/2 -3/8

TABLE III. Jacket Liner finished measurements (continued)

	Small	**Medium**	**Large**	**X-Large**	**Tolerance**

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Sleeve outseam 3/	35	35-1/2	36-1/4	37	+ 1 -3/4
1/2 Sleeve bottom 4/ circ. (top of knit)	6	6-1/4	6-1/2	6-3/4	± 1/4
Sweep 5/	19-1/2	21-1/2	24-1/2	25-1/2	+1/2, -3/8

1/ The measurement of the back length shall be taken, at the center of the back, from the undercollar seam to the bottom of the jacket.

2/ The measurement of the chest shall be taken with the liner buttoned, from folded edge to folded edge in line with the armhole.

3/ The measurement of the sleeve outseam shall be taken at the center back at the collar seam, diagonally across the back, down the sleeve to the edge of the knit cuff.

4/ The measurement of the sleeve bottom shall be taken across the top of the knit cuff, with the bottom stretched taut, using manual tension.

5/ The measurement of the sweep shall be taken, at the bottom of the jacket liner, from the folded edge to folded edge of the jacket fully buttoned.

TABLE IV. Trouser Liner finished measurements (inches)

	Small	**Medium**	**Large**	**X-Large**	**Tolerance**
½ Relaxed waist 1/ circ.	12	14-1/2	17	19-1/2	+ 1/2 -1/4
Outseam 2/	38-1/4	39-3/4	41-1/4	42-3/4	± 3/4
Inseam 3/	26-3/4	27-1/4	27-3/4	28-1/4	± 1/4
½ Bottom circ. 4/	6	6-1/2	7	7-1/2	± 1/4

1/ The measurement of the relaxed waist shall be taken with the fly front fastened in the largest position. Measure along the top edge of the waistband from folded edge to folded edge.

2/ The measurement of the outseam shall be taken from the top edge of the waistband down the outseam to the top of the knit anklet.

3/ The measurement of the inseam shall be taken from the crotch down the inseam to the top of the knit anklet.

4/ The measurement of the bottom shall be taken across the bottom of the leg at the top of the knit cuff, with the bottom stretched taut, using manual tension.

4. VERIFICATION

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

1. First article inspection (see 4.2)
2. Conformance inspection (see 4.3)

4.2 First article inspection. The first article, when applicable, shall be inspected for compliance with design, configuration, workmanship and dimensional requirements. The presence of any defect (see 4.5) or failure to pass any test shall be cause for rejection of the first article.

4.3 Conformance inspection. Sampling for inspection shall be performed in accordance with ANSI/ASQC Z1.4, except where otherwise indicated.

4.4 Elastic webbing. The elastic webbing shall be tested in accordance with ASTM-D-3776, option D. The drift of the load on the webbing, elongated and maintained at 50% elongation using a 4 to 7.5 pound weight for 4 hours, shall be not more than 20% (the webbing shall be elongated to 50% of its total elongation, held in that position for 4 hours and the amount of change shall be recorded). After the webbing has been elongated and maintained at 50% elongation for 10 minutes and then allowed to relax 10 minutes, the webbing tension (change in length of sample) shall not be more than 5%.

4.5 Colorfastness to laundering (knit cloth). The knit cloth shall be tested for colorfastness to laundering in accordance with AATCC-61, test 3a, to meet the requirement in paragraph 3.4.2.

4.6 Visual examination. Liners shall be examined for the defects listed below.

TABLE V.

Defects	Major	Minor
Material defects		
Outside-Any hole, cut, tear, mend, burn, smash, misweave, missing yarn, or weakening defect such as smash, multiple float needle chews, loose slub, Shade part/bar, fabric cut on wrong side, stamping marks, color not as Specified.	101	
Inside- Defects listed above not affecting the performance serviceability and Appearance.		201
- Cloth stiffened, hardened or seared by heat	102	
Cutting and marking		
-Any component part not cut in accordance with patterns	103	
-Corrosive metal fastening device or sewn on ticket	104	

TABLE V. (continued)

Defects	Major	Minor

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Seams and stitching		
-End of stitching not caught in other seams or not securely backstitched	105	
-Stitch breakage due to tight tension	106	
-Thread breaks not securely overstitched for a 1/2 inch distance	107	
-Seams which are twisted, puckered and pleated		202
-Open seam more than 1 inch	108	
-Open seam less than 1 inch		203
-Any loose, missing or misplaced bartacks	109	
-Thread ends not trimmed or removed		204
-Gage of stitching or stitches per inch irregular	110	
-One or more rows of stitching omitted in the quilting	111	
-Loose tension, resulting in loose seam	112	
Note: Nylon taffeta fabric has a tendency to pucker at joining seams and The puckering when not so excessive as seriously affecting appearance shall not be classified as a defect		
-Stitches per inch, more or less than permitted	113	
Metal components		
-Not specified type, size, or style; part of assembly omitted, bent or broken	114	
-Snap fastener distorted cracked, sharp edges, nicks, burrs or metal slivers	115	
-Interference with movement of slide fastener	116	
-Any slide fastener not entirely covered by respective flap		205
-Snaps not opening and closing with normal pressure	117	
-Slide fastener buckling, causing rippling effect	118	

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 materials is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points packaging activity within the Military Departments System s Command. Packaging data retrieval is available from the managing Military Department 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 it is not mandatory.)

6.1 Intended use. The liners are intended to be used during cold weather, for warmth, by flight personnel of the Department of Defense.

6.2 Acquisition requirements. Acquisition documents must specify the following:

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a. Title, number and date of this document
b. Sizes required
c. Issue of DoDISS to be cited in the solicitation
d. When first article is required see 4.2 and 6.2.
e. Packaging Requirements (see 5.1)
f. AQL and sampling provisions

6.3 First article. When a first article is required, it will be inspected and approved under the appropriate provisions of FAR 52.209-4. The first article will be a preproduction sample. The contracting officer will specify the appropriate type of first article and the number of units to be furnished. The contracting officer will include specific instruction in all acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Subject term (key word) listing.

Underclothing
Undergarment
Protective
Warmth
Cold weather
Winter

MILITARY INTERESTS:

Custodians:
Air Force - 99

Review activity:
AF- 82, 11.6

Preparing activity:
DLA – CT

(Project no. 8415-0169)

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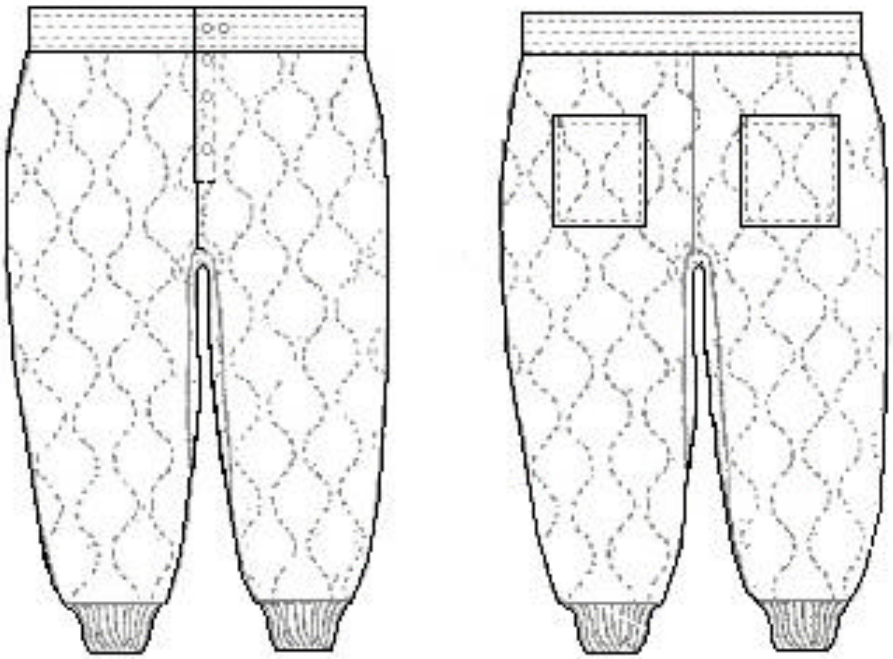
LINER, FLYERS JACKET



LINER, FLYERS TROUSERS

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-DTL-27546E	**2. DOCUMENT DATE *(YYYYMMDD)*** 2000/07/26

3. DOCUMENT TITLE

Liner: Flyer's Jacket, and Flyer's Trousers, CWU-9/P

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN *(If applicable)*	7. DATE SUBMITTED *(YYYYMMDD)*

8. PREPARING ACTIVITY

a. NAME DEFENSE SUPPLY CENTER PHILADELPHIA DSCP-C	b. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN (215) 737- 444-
c. ADDRESS *(Include Zip Code)* 700 Robbins Ave (Bldg 6, C&T) PHILADELPHIA, PA 19111-5092	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888