

MIL-C-87230A
31 October 1989
 SUPERSEDING
 MIL-C-87230
 20 September 1985

MILITARY SPECIFICATION

COVERALLS, FLYER'S, CWU-64/P

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 a one piece, fire resistant coverall to be worn in extreme cold weather.

1.2 Classification. The coveralls shall be furnished in the following lengths and sizes, as specified (see 6.2):

Schedule of lengths and sizes

Short	32	34	36	38	40	42	44	46	
Regular	32	34	36	38	40	42	44	46	48
Long			36	38	40	42	44	46	48.

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 shall 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 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENES, Wright-Patterson AFB OH 45433-6503 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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SPECIFICATIONS

FEDERAL

V-F-106	Fastener, Slide, Interlocking
NN-P-71	Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way (Partial)
DDD-L-20	Label: For Clothing, Equipage, and Tentage, (General Use)

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MIL-P-116	Preservation, Methods of
MIL-W-4088	Webbing, Textile, Woven Nylon
MIL-C-5040	Cord, Fibrous, Nylon
MIL-F-10884	Fasteners, Snap
MIL-P-15011	Pallets, Material Handling, Wood Post Construction, 4-Way Entry
MIL-G-16491	Grommet, Metallic
MIL-B-17757	Boxes, Shipping, Fiberboard (Modular Sizes)
MIL-F-21840	Fastener Tapes, Hook and Loop, Synthetic
MIL-T-44100	Thread, Para-Aramid, Spun, Intermediate Modulus
MIL-B-81813	Batting, Aramid or Novoloid Fiber, Quilted
MIL-C-81814	Cloth, Twill, Aramid, High Temperature Resistant
MIL-T-83193	Thread, Aramid, Spun Staple
MIL-C-83429	Cloth, Plain and Basket Weave, Aramid
MIL-C-85101	Cloth, Warp Knit, Aramid, High Temperature Resistant

STANDARDS

FEDERAL

FED-STD-751	Stitches, Seams, and Stitchings
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MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized Unit Loads
MIL-STD-1668	Provisions for Evaluating Quality of Cloth Coveralls
MIL-STD-2073-1	DoD Materiel Procedures for Development and Application of Packaging Requirements
MS27980	Fasteners, Snap, Style 2 (Regular Wire Spring Clamp Type)

* (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 Ave., 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 shall be those cited in the solicitation.

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DRAWINGS

AIR FORCE

8563830	Coveralls, Pattern, Flyer's, CWU-64/P - 32S
8563831	Coveralls, Pattern, Flyer's, CWU-64/P - 32R
8563832	Coveralls, Pattern, Flyer's, CWU-64/P - 34S
8563833	Coveralls, Pattern, Flyer's, CWU-64/P - 34R
8563834	Coveralls, Pattern, Flyer's, CWU-64/P - 36S
8563835	Coveralls, Pattern, Flyer's, CWU-64/P - 36R
8563836	Coveralls, Pattern, Flyer's, CWU-64/P - 36L
8563837	Coveralls, Pattern, Flyer's, CWU-64/P - 38S
8563838	Coveralls, Pattern, Flyer's, CWU-64/P - 38R
8563839	Coveralls, Pattern, Flyer's, CWU-64/P - 38L
8563840	Coveralls, Pattern, Flyer's, CWU-64/P - 40S
8563841	Coveralls, Pattern, Flyer's, CWU-64/P - 40R
8563842	Coveralls, Pattern, Flyer's, CWU-64/P - 40L
8563843	Coveralls, Pattern, Flyer's, CWU-64/P - 42S
8563844	Coveralls, Pattern, Flyer's, CWU-64/P - 42R
8563845	Coveralls, Pattern, Flyer's, CWU-64/P - 42L
8563846	Coveralls, Pattern, Flyer's, CWU-64/P - 44S
8563847	Coveralls, Pattern, Flyer's, CWU-64/P - 44R
8563848	Coveralls, Pattern, Flyer's, CWU-64/P - 44L
8563849	Coveralls, Pattern, Flyer's, CWU-64/P - 46S
8563850	Coveralls, Pattern, Flyer's, CWU-64/P - 46R
8563851	Coveralls, Pattern, Flyer's, CWU-64/P - 46L
8563852	Coveralls, Pattern, Flyer's, CWU-64/P - 48R
8563853	Coveralls, Pattern, Flyer's, CWU-64/P - 48L

LAWS AND REGULATIONS

Rules and Regulations Under the Textile Fiber Products Identification Act

(Application for copies should be addressed to the Federal Trade Commission, Washington DC 20508-0001.)

(Copies of other Government documents, drawings, and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

* 2.2 Non-Government publications. The following documents form 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)

ASTM D 3951 Standard Practice for Commercial Packaging (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race St., Philadelphia PA 19103-1187.)

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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 shall take 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 4.4.

3.2 Guide samples. Guide samples, when furnished (see 6.4), are solely for guidance and information to the contractor. Variations from the document may appear in the samples, in which case the document shall govern.

3.3 Material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document.

3.3.1 Basic material. The material for the outershell, the collar, the hood, protective flys, the hanger, the pockets, the lower back of the lining, the sleeve adjustment tabs, the thong for the front slide fastener, the facings, the flaps, and the slide fastener coverings shall be Sage Green, USAF Shade 1565 conforming to MIL-C-81814.

* 3.3.2 Lining. The material for the lining shall be Sage Green, USAF Shade 1565 conforming to MIL-B-81813, or as an alternate, Thinsulate, Insulation Type CS-200, or equal, may be used (see 6.5). If the Thinsulate material is used, it shall be covered on both sides with material conforming to type II of MIL-C-83429 and shall be Sage Green, USAF Shade 1565. As an option, the quilted lining material may be Sage Green, USAF Shade 1565 on one side and natural color on the other side. When used, the natural side of the lining shall face the outershell.

3.3.3 Outershell back. The material for covering the expandable back cover on the outershell shall conform to MIL-C-85101, except that the color shall be Sage Green, USAF Shade 1565.

3.3.4 Thread. The thread for all sewing operations shall conform to MIL-T-83193 and the color shall approximately match Sage Green, USAF Shade 1565 for the loose fabric, or as an alternate, thread conforming to MIL-T-44100 may be used and the color shall approximately match the color of the basic fabric.

3.3.5 Snap fastener. The snap fastener for the knife pocket shall conform to style 2, finish 2 of MIL-F-10884 and MS27980-1B (button), MS27980-6B (socket), MS27980-7B (stud) and MS27980-8B (eyelet).

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3.3.6 Slide fasteners. The slide fasteners shall conform to the requirements of V-F-106 and to tables I, II, and III. The chain and any other metal components except the latch and the spring of the automatic lock shall be brass with a black chemical finish. The tape of the slide fasteners shall be 3/4 inch wide, shall be high-temperature-resistant polyamide and shall approximately match the color of the basic fabric. The slide fastener for the front opening shall have a thong made of a double thickness of the basic fabric.

TABLE I. Slide fasteners.

Location	Qty	Type	Style	Size	Sliders <u>1/</u>	Top and bottom tape extensions (inches)
Front opening	1	I	15	MHS	2	<u>2/</u>
Inside leg openings	2	I	3	M	1	1 to 1-1/4
Side pass throughs	2	I	7	M	1	1 to 1-1/4
Thigh pockets	2	I	7	M	1	1 to 1-1/4
Lower leg pockets	2	I	7	M	1	1 to 1-1/4
Left sleeve pocket	1	I	7	M	1	1 to 1-1/4
Collar	1	I	7	M	1	1 to 1-1/4

1/ The sliders shall have a short tab pull.

2/ The top tape extension shall be 1 to 1-1/4 inches. The bottom tape extension shall be 1-1/2 to 1-3/4 inches.

3.3.7 Hook and loop fastener tape. The hook and loop nylon fastener tape shall approximately match Sage Green, USAF Shade 1565 of the basic fabric and shall conform to type I, class 1 of MIL-F-21840. The hook for the sleeve tab shall be 1-1/2 by 2 inches; the loop tape for the sleeve cuff shall be 1-1/2 by 6 inches; the hook and loop tape for the nameplate shall be 2 by 4 inches; and the hook and loop tape for the hood shall be 1 by 3 inches for all sizes.

3.3.8 Metallic grommet. The metallic grommet for the knife pocket shall conform to type I, class 3, size No. Ø of MIL-G-16491.

3.3.9 Nylon cord. The nylon cord for the lanyard that is attached to the knife pocket and for the cord beading in the edges of the slide fasteners shall be natural color and shall conform to type 1A of MIL-C-5040.

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TABLE II. Length of slide fasteners (inches).

Coverall size	Front opening	Inside leg openings	Side pass throughs	Thigh pockets	Lower leg pockets	Left sleeve pocket	Collar
32S	25	17	8-1/2	7	8-1/2	4-3/4	16
32R	26	18	8-1/2	7	8-1/2	4-3/4	16
34S	25-1/2	17	8-1/2	7	8-1/2	4-3/4	16
34R	26-1/2	18	8-1/2	7	8-1/2	4-3/4	16
36S	26	17	8-1/2	7	8-1/2	4-3/4	16
36R	27	18	8-1/2	7	8-1/2	4-3/4	16
36L	28	19	8-1/2	7	8-1/2	4-3/4	16
38S	26-1/2	17	8-1/2	7	8-1/2	4-3/4	16
38R	27-1/2	18	8-1/2	7	8-1/2	4-3/4	16
38L	28-1/2	19	8-1/2	7	8-1/2	4-3/4	16
40S	27	17	8-1/2	7	8-1/2	4-3/4	16
40R	28	18	8-1/2	7	8-1/2	4-3/4	16
40L	29	19	8-1/2	7	8-1/2	4-3/4	16
42S	27-1/2	17	8-1/2	7	8-1/2	4-3/4	16
42R	28	18	8-1/2	7	8-1/2	4-3/4	16
42L	29-1/2	19	8-1/2	7	8-1/2	4-3/4	16
44S	28	17	8-1/2	7	8-1/2	4-3/4	16
44R	29	18	8-1/2	7	8-1/2	4-3/4	16
44L	30	19	8-1/2	7	8-1/2	4-3/4	16
46S	28-1/2	17	8-1/2	7	8-1/2	4-3/4	16
46R	29-1/2	18	8-1/2	7	8-1/2	4-3/4	16
46L	30-1/2	19	8-1/2	7	8-1/2	4-3/4	16
48R	30	18	8-1/2	7	8-1/2	4-3/4	16
48L	31	19	8-1/2	7	8-1/2	4-3/4	16
Tolerance	+3/16 -3/8	+3/16	+3/16	+0 -3/16	+3/16	+3/16	+3/16

TABLE III. Direction of slide fastener closure.

Location	Direction of slider closure
Front opening	Top slider upward and bottom slider downward
Inside leg openings	Downward
Side pass throughs	Up
Thigh pockets	Right in direction of inseam and left downward
Lower leg pockets	Direction of outseam
Left sleeve pocket	Upward
Collar	Right side

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3.3.10 Binding tape. The strip for binding the edges of the knife pocket shall be bias-cut, 1-1/8 inches wide, from the basic fabric.

3.3.11 Webbing reinforcement. The webbing used for the reinforcement piece on the knife pocket shall conform to type XII of MIL-W-4088. The color may be natural white.

* 3.3.12 Fusible interlining. The fusible interlining used on the upper back undercollar and pocket welts for stabilizing during the sewing operation shall be style No. SF 134 or equal (see 6.5).

3.3.13 Labels. Each coverall shall have a combination size and identification label and an instruction label or a combination size, identification and instruction label conforming to the requirements of DDD-L-20. The labels shall show colorfastness to laundering and dry cleaning in accordance with the requirements of DDD-L-20.

3.3.13.1 Combination size and identification label. The combination size and identification label shall conform to type VI, classes 1 and 2 and shall contain the following information:

Size: 32S 1/
 Stock No.: 8415-00-000-0000 (Example) 2/
 Coveralls, Flyer's, CWU-64/P
 Contract No.: DLA-100-00-0-0000 (Example) 2/
 Fiber Products Act information as applicable 2/
 Contractor's Name: 2/

- 1/ The lengths (short, regular, or long) may be abbreviated as follows: S, R, or L.
- 2/ The contractor shall include the applicable information.

3.3.13.2 Instruction label. The instruction label shall conform to type VI, class 3. The label shall be centered below the combination size and identification label and stitched on all four sides and shall contain the following instructions:

INSTRUCTIONS

Wear as outer garment.

WARNING. Launder with slide fasteners and hook and loop tape fasteners engaged. Do not press hook and loop tape fasteners.

Pockets are designed to accommodate operational equipment and personal effects. Lubricate slide fasteners with lead pencil, graphite, or wax.

For thorough cleaning, return coveralls for machine washing in accordance with established laundry procedures. Coveralls may be hand laundered using mild soap and warm water.

All soap should be thoroughly rinsed out.

DO NOT STARCH OR USE BLEACH. This process will deteriorate the flame resistant material.

DO NOT REMOVE THIS LABEL

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3.3.13.3 Combination size, identification and instruction label. The combination size, identification and instruction label shall conform to type VI, class 14 and shall include the instructions specified in 3.3.13.2.

3.4 Design. The coveralls shall be a one-piece, lined garment with a slide fastener front closure, bias cut back with expandable section, hook and loop fastener tape adjustments for the sleeves, and a slide fastener on each leg inseam. The coveralls shall have two welt type pockets at the chest area, a concealed hood in the collar, one combination cigarette pack and multiple pencil compartment pocket on the upper front left sleeve, two thigh patch pockets, a knife pocket with a lanyard on the left thigh, two lower leg patch pockets and a multiple pencil compartment pocket on the right lower leg patch pocket. Except for the knife pocket on the left thigh and single welt pockets, all patch pockets shall have butted-beaded covered slide fasteners.

3.5 Patterns. Standard patterns that show size, seam allowances, directional lines for cutting and are marked or notched for proper placement and assembly of the component parts will be furnished by the Government (see 6.6). Unless otherwise specified herein, the standard patterns will provide a seam allowance of 3/8 inch for single-needle seams and 1/2 inch for double-needle seams. The standard patterns shall not be altered in any way, and are to be used as a guide for cutting the contractor's working patterns. The working patterns shall be identical to the standard patterns.

3.5.1 Pattern parts. The components of the coveralls shall be cut from the materials as specified in accordance with the pattern parts indicated in table IV.

3.6 Construction. The construction of the coveralls shall conform in all respects to the requirements specified in table V and herein. Figures 1 and 2 show the general style of the coveralls and are furnished for information purposes only. Should any inconsistencies exist between the requirements of this specification and the figures, the requirements of this specification shall govern.

3.6.1 Sewing tolerances. The sewing tolerances for 1/4 and 5/16 inch gages of stitching shall be $\pm 1/16$ inch. The sewing tolerances for 3/8 inch gage of stitching shall be $+0$ or $-1/8$ inch. The sewing tolerances for 1/16 inch from the edge shall be -0 or $+1/32$ inch.

3.6.2 Stitches, seams, and stitching. Stitches, seams, and stitching types specified in table V shall conform to FED-STD-751. Whenever two or more methods of seams or stitch types are specified for the same operation, any one of them may be used. Where stitch type 401 is used, the looper (underthread) shall be on the inside of the coveralls.

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TABLE IV. List of pattern parts.

Material	Pattern nomenclature	Cut parts
Basic material (3.3.1)	Front	2
	Upper back	1
	Lower back	4
	Top sleeve	2
	Under sleeve	2
	Top collar	2
	Under collar	1
	Collar stand	2
	Protective fly	2
	Breast pocket	4
	Lower leg pocket	2
	Lower leg pocket cover	2
	*Lower leg zipper cover	4
	*Lower leg protective fly	2
	Pencil pocket (right lower leg pocket only)	1
	Right thigh pocket	1
	Right thigh pocket cover	1
	Left thigh pocket	1
	Left thigh pocket cover	1
	Knife pocket	1
	Knife pocket reinforcement	1
	*Side zipper protective fly	2
	*Side zipper pass-through covers	4
	Flap reinforcement	1
	Cigarette pocket (left sleeve only)	1
	Cigarette pocket pencil compartment	1
	*Cigarette pocket cover	1
	Shoulder patch	2
	Sleeve tab	2
	Thong	1
	Hanger	1
	Hood (center panel)	1
	Hood (side panel)	2
	Hood reinforcement	2
Lining, quilted material (3.3.2)	Front	2
	Upper back	1
	Lower back	2
	Top sleeve	2
	Under sleeve	2
Lining, plain weave aramid cloth (3.3.2)	Front	4
	Upper back	2
	Lower back	4
	Top sleeve	4
	Under sleeve	4

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TABLE IV. List of pattern parts. - Continued

Material	Pattern nomenclature	Cut parts
Interlining, thinsulate (3.3.2)	Front	2
	Upper back	1
	Lower back	2
	Top sleeve	2
	Under sleeve	2
Warp knit (3.3.3)	Expandable back cover	1
Fusible interlining (3.3.12)	Under collar	1
	Under collar stand	1
	Back strips:	
	Neck	1
	Shoulder	2
	Bottom	2
	Side	2
	*Pocket welts (1" wide by 10-1/4" long)	2

3.6.2.1 Type 301 stitching. Ends of seams and stitches that are not caught in other seams or stitchings shall be securely tacked, backstitched not less than 1/2 inch. When stitch type 401 is permitted as an option, the ends of stitch type 401 shall be caught in other seams or rows of stitchings. Thread breaks (all stitch types) shall be secured by stitching back of break not less than 1/2 inch. Thread tension shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread or excessively tight stitching resulting in puckering of the materials sewn. The lock shall be imbedded in the materials sewn.

3.6.2.2 Repairs of type 301 stitching. Repairs of type 301 stitching shall be as follows:

a. When thread breaks, skipped stitches, run-offs, or bobbin runouts occur during sewing, the stitching shall be repaired by restarting the stitching a minimum of 1/4 inch back of the end of the stitching. 1/

b. Except for prestitching, thread breaks, or two or more consecutive skipped stitches or run-off stitches noted during inspection of the item (in process or end item) shall be repaired by overstitching. The stitching shall start a minimum of 1/4 inch in back of the defective area and continue over the defective area a minimum of 1/4 inch beyond the defective area onto the existing stitching. Loose or excessively tight stitching shall be repaired by removing the defective stitching without damaging the materials and restitching in the required manner. 1/

1/ When making the above repairs, the ends of the stitching are not required to be backstitched.

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3.6.2.3 Repairs of types 401, 502, 503, 504, and 515 stitching. Thread tension shall be maintained so that there will be no loose or excessively tight stitching resulting in puckering of the materials sewn. Type 301 stitching may be used to repair type 401 stitching.

3.6.3 Stitches per inch. The minimum and maximum number of stitches per inch shall be as specified in table V.

3.6.4 Bartacks. The bartacks shall measure 3/8 to 1/2 inch in length and be free from thread breaks and loose stitching.

3.6.5 Automatic stitching. Automatic machines may be used to perform any of the stitching patterns provided the requirements of the stitch pattern, stitches per inch, size and type of thread are met, and at least three or more tying, overlapping, or backstitches are used to secure the ends of the stitching.

3.6.6 Cord beading in edges of slide fastener coverings. All slide fastener closures for the pockets, the leg terminals, and the front opening shall have a cord beading in the edges of the slide fastener coverings. The outer beaded cloth edges of all slide fastener closures shall be flush with the slide fastener scoops. The scoops, when locked together, shall be completely concealed by the beaded coverings.

3.6.7 Hook part of fastener tape for nameplate. An identical size of the hook fastener tape shall be affixed to the loop fastener tape for use as a mounting for the wearer's nameplate (see table V, Operation 18).

3.6.8 Thread ends. All thread ends that are visible on the finished coveralls shall be trimmed to 1/4 inch maximum length.

3.7 Manufacturing operations requirements. The coveralls shall be made in accordance with operation requirements specified in table V. The contractor is not required to follow the exact sequence of operations listed unless otherwise specified. Any additional basting or holding stitches used to facilitate manufacture are permissible provided the thread is removed or does not show on the finished coveralls.

3.7.1 Shade and size marking. The component parts of the coveralls shall be marked or ticketed to insure a uniform shade and size throughout the coveralls. Any method of shade marking may be used except:

- a. Corrosive metal fastening devices. (Metal devices shall not be used on the lining material).
- b. Sew-on type tickets.
- c. Adhesive type tickets which show discoloration and the adhesive mass which adheres to the material upon removal of the ticket.
- d. Any marking medium which would tend to leave a permanent mark.

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TABLE V. Manufacturing operations requirements.

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
1.	<p><u>Cutting.</u></p> <p>a. Cut the coveralls in strict accordance with the patterns which show size, shape, placement of pockets, and notches for proper assembling of all parts. The directional line may vary from the warp direction by not more than 1 inch on the trouser parts. The measurements shall be taken at the top and bottom edges of the pattern from the directional line to the selvage edges of the fabric, and the difference between the two measurements shall not exceed 1 inch.</p> <p>b. Place the patterns on the material with the directional line coinciding with the warp threads.</p> <p>c. Except for the sleeve tabs, the under collar, the inside lower back, the hanger, and the protective fly which may be cut from ends, cut all parts from one piece of material.</p>			
2.	<p><u>Replacement of damaged parts.</u></p> <p>a. Replace at time of cutting any part containing a hole, or weakening defects such as a smash, multiple float, loose or weakening slubs; shade bar, dye streak or unsightly slub.</p> <p>b. Replace any part damaged during the manufacturing process by a needle chew, cut, tear, hole, mend, or burn.</p>			
3.	<p><u>Shade marking.</u></p> <p>Mark or ticket all component parts (see 3.7.1) cut from one piece of basic material, except those parts cut from ends as indicated in Operation 1.c, to insure uniform shade and size throughout the coveralls. Parts cut from ends shall be identified for size.</p>			

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
4.	<u>Overedging.</u>			
*	Overedge all the coveralls parts, protective flys for side pass through, back edge of sleeve tabs, neck opening, bottom edge of collar, all zipper covers, and raw edges that are not selvaged.	502 or 503 or 504	SSa-1	8
5.	<u>Make collar</u>			
	The collar consists of a top and an under collar, each with a stand, and a concealed hood. The collar shall be constructed of outershell material. The under collar and the stand shall be interlined with a fusible interlining (see 3.3.12).			
	a. Position the fusible interlining on the under collar and the stand. Press the interlining strips in accordance with the recommendations of the manufacturer of the fusible material.			
	b. Join the under collar stand piece to the leaf with a 1/4 inch seam.	301	LSq-2(a)	12
	c. Turn and raise with a single row of stitching 1/16 inch from edge, with the stand overlapping the under collar.	301 or 401	LSq-2(b)	12
	d. Slit the under collar through the outershell, in accordance with marks, for insertion of the slide fastener. Tongue notch the ends.			
	e. Turn the sides and the ends of the slitted opening under 3/8 inch, and sew the slide fastener in the under collar opening 1/16 inch from the edge all around. Approximately 1/4 inch of the slide fastener tape shall be exposed on each side of the scoops. The slider shall be at the right side of the collar when the fastener is closed, or the slide fastener may be stitched, turned, and raised stitched.	301 301	LSb-1 or LSq-2	12 12

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
5.	<u>Make collar.</u> - Contd			
	f. Bartack the ends of slide fastener tape, and slit with a 1/2-inch long vertical bartack.	Bartack		28 per bartack
	g. Join the top collar stand to the top collar leaf with a 1/4 inch seam.	301	LSq-2(a)	12
	h. Turn and raise 1/16 inch with the stand overlapping the top collar.	301 or 401	LSq-2(b)	12
6.	<u>Make hood.</u>			
	a. Join the side panels to the back panel on each side with a 1/4 inch seam.	515	SSa-1	12
	b. Overedge the outer edges of the hood.	508	LSbm-3 (similar to)	8
	c. Join the fastener tape to the hood at marks with the hook on the right outside and loop on left inside on all four sides with a single row of stitching 1/16 inch from edge.	301	SSa-1	12
	d. Locate the hood at each end of the slide fastener chain, and sew the hood to the bottom of the slide fastener tape on the inside of the under collar, with a single row of stitching 3/16 to 1/4 inch from the edge.	301	SSa-1	12
	e. Sew a second row of stitching to the under collar all around the slide fastener opening, 1/4 inch from the first row of stitching, catching the bottom of the hood in the operation.	301	SSa-1	12
	f. Join the top and the under collar with a single row of stitching, 3/8 inch from the edge.	301	SSe-2(a)	12
	g. Trim, turn collar, work out edges.			

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
7.	<p><u>Sleeve tabs.</u></p> <p>a. Fold the piece of the basic material on the two long sides, the pointed end of the sleeve tabs and stitch with a single row of stitching 1/4 inch from the edge.</p> <p>b. Turn, work out edges, and raise stitch with a single row of stitching 1/4 inch from the edge.</p> <p>c. Join the hook part of the fastener tape to the sleeve tabs at the drill marks and stitch on all four edges with a single row of stitching 1/16 inch from the edge.</p>	<p>301 or 401</p> <p>301</p> <p>301</p>	<p>SSe-2(a)</p> <p>SSe-2(b)</p> <p>SSa-1</p>	<p>11-13</p> <p>11-13</p> <p>11-13</p>
8.	<p><u>Corded beading in edges of slide fastener coverings.</u></p> <p>Fold the material to the inside at the pattern marks. Insert the cord in the fold and stitch close to the cord with a single row of stitching. The beaded edges shall be flush with each other when the slide fastener is closed.</p> <p>NOTE: All slide fastener closures for the pockets, the inside leg terminals, side pass throughs, and the front opening, shall have corded beading in the edges of the slide fastener coverings.</p>			
9.	<p><u>Combination cigarette pack and multiple pencil compartment.</u></p> <p>Finished appearance. The pocket shall be a bellows-style cigarette pack compartment with a covered vertical slide fastener closure, on the forward side, the full length of the pocket and a four openings pencil compartment, two upper and two lower. The front opening and the rear openings shall be 7/8 +1/8 inch wide. The finished pocket shall be approximately 5-3/4 inches long by 3-1/2 inches wide,</p>			

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
9.	<u>Combination cigarette pack and multiple pencil compartment.</u> - Contd			
	including the slide fastener tape. The width measurement shall be taken across the top of the pocket.			
	a. Hem the top opening of the pencil compartment, in accordance with the notches, with a double row of stitching, with the first row of stitching 1/4 inch gage, 1/16 to 1/8 inch from the top edge.	301	EFa-2	11-13
	b. Fold the pencil pocket at the notches to form the two lower openings, and sew with a double row of stitching 1/4 inch gage, 1/16 to 1/8 inch from the edge.	301	OSf-2	11-13
	c. Fold the opening to the center notch, tacking each side edge with a single row of stitching (optional).	301	SSa-1	11-13
	d. Slit the fold through the center to make the pencil pass-through, or the pencil pocket may be in two pieces.			
	e. Join the pencil compartment to the cigarette pack compartment with a double row of stitching 1/4 inch gage, 1/16 to 1/8 inch from the edge along both sides, in accordance with the notches and the drill marks, with the bottom edges even.	301	LSd-2	11-13
	f. Place a single row of stitching centered between the front and the back edge of entire length of the pencil compartment to separate the openings.	301	SSv-1	11-13
	g. Bartack the ends of all pencil compartment openings with the bartack superimposed on the inner row of double stitching and on the center row of stitching. The bartack shall be 3/8 to 1/2 inch long.	Bartack		28 per bartack

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
9.	<u>Combination cigarette pack and multiple pencil compartment.</u> - Contd			
	h. Form a 3/4 inch bellows by joining the two bottom corners with a single row of stitching 1/4 inch from the edge.	301	SSa-1	11-13
	i. Sew the slide fastener tape to the forward side of the pocket with a double row of stitching, 1/8 to 1/4 inch gage, 1/4 inch from the edge of the scoops with the beaded edge covering the scoops.	301	LSb-2	11-13
	j. Position the slide fastener cover on the opposite slide fastener tape with the beaded edge covering the scoops, and join with a single row of stitching 1/4 inch from the edge of the scoops.	301	SSa-1	11-13
	k. Position the pocket to the left sleeve at the drill marks. Turn the raw edges under 3/8 inch, and sew with a single row of stitching 1/16 inch from the folded edge.	301	LSd-1	11-13
	l. Place a second row of stitching 1/4 inch from the front edge and across the top of the pocket.	301	SSv-1	11-13
	m. Bartack across each end of the slide fastener on the inner bartack row of stitching.	Bartack		28 per bartack
10.	<u>Right thigh pocket.</u>			
	a. Sew the slide fastener tape to the top of the pocket with a double row of stitching, 1/8 to 1/4 inch gage, 1/4 inch from the edge of the scoops with the beaded edge covering the scoops.	301	LSb-2	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
10.	<p><u>Right thigh pocket.</u> - Contd</p> <p>b. Position the slide fastener cover on the opposite slide fastener tape with the beaded edges covering the scoops, and join with a single row of stitching 1/4 inch from the edge of the scoops. Place a stay-stitch on the ends of the slide fastener to hold in place to eliminate separation when Operation 43 is performed.</p> <p>c. Position the pocket on the right front panel at the drill marks. Turn all raw edges under 3/8 inch, except the side seam edge, and sew with a single row of stitching 1/16 inch from the folded edge.</p> <p>d. Place a second row of stitching 1/4 inch from the edge at the top, the bottom, and front.</p> <p>NOTE: A double-needle machine may be used to accomplish Operations 10.c and 10.d.</p>	301	SSa-1	11-13
		301	LSd-1	11-13
		301	SSv-1	11-13
11.	<p><u>Left thigh pocket.</u></p> <p>a. Sew the slide fastener tape to the forward side of the pocket with a double row of stitching, 1/8 to 1/4 inch gage, 1/4 inch from the edges of the scoops with the beaded edge covering the scoops.</p> <p>b. Position the slide fastener cover on the opposite slide fastener tape with the beaded edge covering the scoops, and join with a single row of stitching 1/4 inch from the edge of the scoops.</p> <p>c. Position the pocket on the left front panel at the drill marks. Turn all raw edges under 3/8 inch, except the side seam edges, and sew with a single row of stitching 1/16 inch from the folded edge.</p>	301	LSb-2	11-13
		301	SSa-1	11-13
		301	LSd-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
11.	<u>Left thigh pocket.</u> - Contd			
	d. Place a second row of stitching 1/4 inch from the edge at the top, the bottom, the front, and the slide fastener.	301	SSv-1	11-13
	NOTE: A double-needle machine may be used to accomplish Operations 11.c and 11.d.			
12.	<u>Fabrication of lower leg pockets.</u>			
	a. Sew the slide fastener tapes to the top of the pockets with a double row of stitching, 1/8 to 1/4 inch gage, 1/4 inch from the edge of the scoops with the beaded edge covering the scoops.	301	LSb-2	11-13
	b. Position the slide fastener cover on the opposite slide fastener tape with the beaded edge covering the scoops, and join with a single row of stitching 1/4 inch from the edge of the scoops.	301	SSa-1	11-13
13.	<u>Leg pencil compartment pocket.</u>			
	a. Hem the top opening of the pencil compartment, in accordance with the pattern marks, and sew with a double row of stitching 1/4 inch gage, 1/16 inch from the folded edge.	301	EFa-2	11-13
	b. Fold the pencil pocket at the lower pattern marks to form the two lower openings, and sew with a double row of stitching 1/4 inch gage, 1/16 inch from the folded edge.	301	OSf-2	11-13
	c. Fold the opening to the center pattern marks, tacking each side edge with a single row of stitching (optional).	301	SSa-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
13.	<p><u>Leg pencil compartment pocket.</u> - Cont</p> <p>d. Slit the fold through the center to make the pencil pass-through or the pencil compartment pocket may be made in two pieces.</p> <p>e. Place a single row of stitching, centered between the front and back edge, the entire length of the pencil compartment to separate the openings.</p> <p>f. Sew the pencil compartment pocket to the right lower leg pocket, at the pattern marks, with a double row of stitching 1/4 inch gage, 1/16 inch from the edge, at the sides and bottom. Fold the raw edges under 3/8 inch.</p> <p>g. Bartack the ends of all pencil compartment openings with the bartack superimposed on the inner row of double stitching and on the center row of stitching.</p>	<p>301</p> <p>301</p> <p>Bartack</p>	<p>SSv-1</p> <p>LSd-2</p> <p></p>	<p>11-13</p> <p>11-13</p> <p>28 per bartack</p>
14.	<p><u>Knife pocket.</u></p> <p>a. Lay the webbing reinforcement piece on the pocket material, wrong side up, in accordance with the notches and the drill marks. Sew the reinforcement piece to the pocket with a single row of stitching 1/16 to 1/8 inch from the edge across the top and the bottom.</p> <p>b. Fold the pocket material lengthwise with the raw edges even; fold a pleat in accordance with the notches, and bind the square end with 1-1/8 inch wide, bias-cut binding of the basic material.</p>	<p>301</p> <p>301</p>	<p>SSa-1</p> <p>BSc-1</p>	<p>11-13</p> <p>11-13</p>

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
14.	<u>Knife pocket.</u> - Contd			
	c. Bind the straight edge of the small flap reinforcement piece for the top of the pocket, with 1-1/8 inch wide bias-cut binding of the basic material.	301	BSc-1	11-13
	d. Position the flap reinforcement piece, in accordance with the notch and the drill marks; at the round end of the pocket with the flap piece on the same side as the webbing piece. Sew the flap piece to the top two plies of the pocket material with a single row of stitching 1/8 inch from the edge, or the flap reinforcement piece may be joined to the top of the knife pocket in the binding specified in Operation 14.e.	301	SSa-1	11-13
	e. Fold the pocket material on the center notch, and bind the pocket, with a 1-1/8 inch wide, bias-cut binding of basic material, starting at the bottom folded end and sewing the binding around the sides and the top. The reinforcement webbing piece shall be on the inside. The binding shall extend 1/2 inch beyond the end on each side for turning under.	301	BSc-2	11-13
	f. Place a single row of stitching across the flap through both plies at the round end of the flap, approximately 1 inch from the open bound end.	301	SSa-1	11-13
	g. Install a size No. 8 grommet on the pocket, below the bottom edge of the flap reinforcement piece, at the drill marks.			

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
14.	<u>Knife pocket.</u> - Contd			
	h. Position the reinforcement patch on the left front leg, with the raw edges even, matching the notches of the pocket and the leg inseam. Turn the raw edges under 1/2 inch on the top, the side, and the bottom. Sew the patch to the coveralls, with a double row of stitching, 1/4 to 5/16 inch gage, 1/16 inch from the edge.	301	LSd-2	11-13
	i. Position the knife pocket on the reinforcement patch, with the round end up and the opening on the inside in accordance with the drill marks. Starting at the bound opening, sew with a double row of stitching, 1/8 to 3/16 inch gage, 1/16 inch from the edge, down the side, across the bottom and up the side to the bound opening, turning the bias end of the tape under on each side and catching same in the stitching. The ends of stitching shall be backstitched 1/2 inch on each side.	301	LSd-2	11-13
	j. Sew across the bound square end at the top of the pocket opening, with a single row of stitching, securely tacking the top of the pocket to the patch and the coveralls.	301	SSa-1	11-13
	k. Stamp one snap fastener socket to the center of the pocket flap, in accordance with the drill marks, at the rounded end.			
	l. Stamp one snap fastener stud, reinforced on the inside with the basic material, on the coveralls to correspond with the snap fastener socket.			

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
14.	<u>Knife pocket.</u> - Contd m. Pull the nylon cord (lanyard), which shall be 60 \pm 1 inches long, through the grommet. Tie the lanyard with a square knot. Sear both ends of the nylon cord, or the ends of the nylon cord may be dipped in a suitable resin. Fold the loose cord in layers approximately 4 inches long, and position the folded cord in the pocket parallel with the pocket with all the folds within the pocket. Snap the flap closed.			
*15.	<u>Side pass through, inside leg and front protective flys.</u> a. Join the outer edges of the two plies of material with a single row of stitching 3/8 inch from the edges on the top, along one side and the bottom.	301	SSe-2(a)	11-13
	b. Turn the fly. Work out the edges and sew with a single row of stitching 1/4 inch from the folded edge.	301	SSe-2(b)	11-13
16.	<u>Thong for front slide fastener.</u> Fabricate the thong to finish 1/2 inch wide by 3 inches long.	301	EFp-2	11-13
17.	<u>Front slash pockets.</u> Finished appearance and 1 inch wide fusible to welts in the front slash pockets. The two front slash pockets shall be 7/8 \pm 1/8 inch welt type, with a 7-1/2 \pm 1/4, -1/2 inch opening on all sizes.			
	a. Stitch the pocketing on the fronts, at the drill marks, with a double row of stitching.	301	SSa-2	12

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
17.	<u>Front slash pockets.</u> - Contd			
	b. Cut the openings for the pockets. Tongue notch each end.			
	c. Turn the pocketing through the slit, double over at the front edge to form a 7/8 inch welt. Raise stitch the seam at the base of the welt through the front pocketing, joining seam allowances and folded pocketing piece with a single row of stitching 1/16 inch from the seam line.	301	SSbe-2(b) (shows finished seam)	12
	d. Seam the tongue at the ends on the inside, through all plies of both pocketing pieces, with a single row of stitching.	301	SSa-1	12
	e. Raise stitch the seams at the ends and the back of the pocket opening with a single row of stitching 1/16 inch gage from the seam line through the front and the seam allowances.	301	LSq-2(b)	12
	f. Sew around the pocketing with a single row of stitching 1/2 inch from the edge.	301	SSa-1 or LSbm-3	12
	g. Bartack each end of the pocket openings, with a 7/8 inch bartack located on the seam line at the ends of the welt.	Bartack		28 per bartack
*18.	<u>Wearer's nameplate.</u>			
	Position the loop fastener tape nameplate at the drill holes, which shall be located 4-1/2 inches from the raw edge of collar and 2-1/2 inches from corded front. Join on all four sides with a single row of stitching 1/16 inch from the edge (see 3.6.4).	301	LSbj-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
19.	<u>Expandable back feature.</u> a. Fold the cut out section on the back in half, with the inside fold toward the shoulder seam and the outside fold toward the waist seam, and mark across the back. b. Stitch the outside fold from side seam to side seam 1/8 inch from edge. c. Stitch the cut-out section on both sides 1/2 inch from each edge starting at the side seam and tapering off at each cut out to 1/8 inch across the folded back.	301 301	SSa-1 SSa-1	11-13 11-13
*20.	<u>Join fusible strips to back.</u> Position the fusible interlining strips on the back (basic fabric). Press the interlining strips in accordance with the recommendations of the fusible material (see 3.3.12).			
21.	<u>Join warp knit material to back outershell.</u> With the expandable back section flat and smooth, place the warp knit on top at the notches and stitch 1/8 inch from the top and bottom folded edges.	301	SSa-1	11-13
22.	<u>Side pass through openings (lower back) and seat seam.</u> a. Cut the slide fastener opening. Turn the raw edges (side and bottom) to the inside and stitch around the side and bottom with a single row of stitching 1/4 inch from the folded edge. b. Join seat seam with a double-lapped, double-stitched seam, 1/4 to 5/16 inch gage, 1/16 inch from the folded edge, the right panel overlapping the left panel.	301 301 or 401	LSd-1 LSc-2	11-13 11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
23.	<u>Join upper back to lower back.</u>			
*	a. Join the upper back to the lower back with a 1/2 inch seam.	301 or 401	SSa-2 or LSbm-3	11-13
	b. Turn and raise with a single row of stitching 1/4 inch from the folded edge. The upper back shall overlap the lower back.	301	LSbm-3	11-13
24.	<u>Shoulder seams.</u>			
	Join with double-lapped, double-stitched seams, 1/4 to 5/16 inch gage, 1/16 inch from the folded edge, upper back overlapping the lower back.	301 or 401	LSc-2	11-13
25.	<u>Sleeves.</u>			
	a. Join the elbow seam of the sleeves, the top sleeve overlapping the undersleeve, with a double-lapped, double-stitched seam, 1/4 to 5/16 inch gage, 1/16 inch from the folded edge.	301 or 401	LSc-2	11-13
	b. Sew the sleeves to the armholes, the front and the back panels overlapping the sleeve, with a double-lapped, double-stitched seam, 1/4 to 5/16 inch gage, 1/16 inch from the folded edge.	301 or 401	LSc-2	11-13
26.	<u>Shoulder reinforcement patch.</u>			
	a. Fold or form the edge of the reinforcement patch with a 3/8 inch turn-under on four sides.			
	b. Position the curved edge of the reinforcement patch on the edge of the armhole seam, the notch matching the shoulder seam, and sew with a double row of stitching 1/4 inch gage, 1/16 inch from the folded edge.	301	LSd-2	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
26.	<u>Shoulder reinforcement patch.</u> - Contd			
	c. Fold or form the edge of the reinforcement patch with a 1/2 inch turn-under on three sides, leaving the curved portion free. Position the curved edge of the reinforcement patch on the armhole with the center notch matching the shoulder seam. Sew the curved edge to the armhole with a single row of stitching 1/2 inch from the raw edge.	301	SSa-1	11-13
	d. Stitch the folded edges of the patch to the coveralls with a double row of stitching 5/16 inch gage, 1/16 inch from the edge. The curved edge of the reinforcement patch will be caught in the armhole seam with setting in the sleeve.	301 or 401	LSd-2	11-13
	NOTE: As an option, Operations 26.c and 26.d may be performed in lieu of Operations 26.a and 26.b.			
27.	<u>Side seams.</u>			
	a. Join the side seams of the coveralls from the sleeve terminals to the leg terminals with a 1/2 inch seam.	301 301 or 401	LSq-2(a) or LSbm-3 or LSc-2	11-13
	b. Turn and raise with a single row of stitching 1/4 inch from the edge, the front overlapping the back.	301	LSq-2(b)	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
28.	<u>Sleeve tabs.</u> Fold the raw end under 1/4 inch. Position the tab on the sleeve inseam at the pattern marks, the pointed end toward the loop fastener tape. Sew with a double row of stitching 1/16 inch from the folded edge, 1/4 inch gage, forming a box and "X" type stitch. The "X" type stitch shall start and terminate at the four corners of the box stitching.	301	LSd-2	11-13
29.	<u>Side seams and sleeve tabs.</u> As an option to Operations 27 and 28, position each tab on the sleeve raw edge at the pattern marks, and stitch with a row of stitching 1/8 inch from the edge. Join the side seams as specified in Operation 28, catching the tab raw edge in the side seam.	301 and 401	SSa-1	11-13
30.	<u>Joining of lower leg pocket.</u> Sew the pockets to the lower legs, in accordance with the drill marks, with a double row of stitching 1/4 inch gage, 1/16 inch from the folded edge. Turn under 3/8 inch at the top, the bottom, and the sides.	301	LSd-2	11-13
31.	<u>Join inseam.</u> a. Join the inseam of the coverall from notch to notch of the inside leg openings with a 1/2 inch seam. b. Turn and raise with a single row of stitching 1/4 inch from the edge, the back overlapping the front.	301 301 or 401 301	LSq-2(a) or LSbm-3 or LSc-2 LSq-2(b)	11-13 11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
32.	<u>Inside leg opening.</u> Cut the opening for the leg slide fasteners. Tongue notch the top of each end. Turn the raw edges (sides and top) to the inside 1/2 inch and stitch around the sides and top with a single row of stitching 1/4 inch from the folded edges.	301	EFa-1	11-13
33.	<u>Prepare linings (thinsulate).</u> Sew all thinsulate pieces and the respective lining pieces together all around edges, with a single row of stitching, 1/4 inch from the edge, in accordance with the notches (see 3.3.2).	301 or 401 or 502	SSa-1	6-8
34.	<u>Hanger.</u> a. Fabricate the hanger to finish 1/2 inch wide by 4 inches long. b. Position the hanger at the center of the back of the neck, approximately 1-1/2 +1/4 inches below the neckline and sew with a double row of stitching 1/4 inch gage, 1/16 inch from the edge. In lieu of stitching the ends, each end may be bartacked.	301 301 Bartack	EFp-2 LSd-2	11-13 11-13 28 per bartack
35.	<u>Labels.</u> Position the labels centered directly below the hanger, on the inside back of the liner. Sew the labels securely along all four edges to the liner with a single row of stitching 1/16 inch from the edge.	301	SSa-1	11-13
36.	<u>Lining.</u> The lower back only, on the inside, shall have the basic fabric panel attached. Sew the panel to the back all around the edges, with a single row of stitching 1/4 inch from the raw edge.	301 or 401 or 502	SSa-1	6-12

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
37.	<u>Front slide fastener to front opening of lining.</u>			
	a. Turn the top edge of the slide fastener cover piece under 1/4 inch. Stitch to slide fastener with a single row of stitching 1/16 inch from the edge, with the folded edge close to the bottom stop.	301	LSd-1	11-13
	b. Attach the slide fastener to the right and the left front edges of the liner, from the collar gorge to the crotch, with a 3/8 inch seam catching the protective fly in the right front. The slide fastener and tape shall be exposed approximately 5/16 to 3/8 inch.	301	SSa-1	11-13
	c. Pull the thong through the hole in the top slider with the raw edges even. Bartack at the bottom, the center and up close to the slider across the 1/2 inch width.	Bartack		28 per bartack
	NOTE: The slide fastener scoops shall start 1/2 \pm 1/4 inch from the collar gorge and extend to within 1-1/4 inches of the crotch.			
38.	<u>Join shoulder seam of lining.</u>			
	a. Join the shoulder seams with a single row of stitching 1/2 inch from the edge.	301	LSq-2(a)	11-13
	b. Turn the seam and raise stitch with a single row of stitching, 1/4 inch from the edge, the front overlapping the back.	301	LSq-2(b)	11-13
39.	<u>Join sleeves of lining.</u>			
	a. Join the top sleeves to the under sleeves at the elbow seam of the lining with a single row of stitching 1/2 inch from the edge.	301	LSq-2(a)	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
39.	<u>Join sleeves of lining.</u> - Contd			
	b. Turn the seam joining the top sleeve to the under sleeve at the elbow of the quilted lining, and raise stitch 1/4 inch from each edge, the under sleeve overlapping the top sleeve.	301	LSq-2(b)	11-13
	c. Join the sleeves of the quilted lining to the armholes of the quilted lining with a single row of stitching 1/2 inch from the edge.	301	LSq-2(a)	11-13
	d. Turn the seams and raise stitch with a single row of stitching 1/4 inch from the edge with the coveralls overlapping the sleeve.	301	LSq-2(b)	11-13
40.	<u>Seat seam (lining).</u>			
	a. Join the seat seam of the quilted lining with a single row of stitching 1/2 inch from the edge.	301 or 401	LSq-2(a)	11-13
	b. Turn the seam and raise stitch with a single row of stitching 1/4 inch from the edge.	301 or 401	LSq-2(b)	11-13
41.	<u>Attach slide fastener to side back lining.</u>			
	With the lining material, turn under at the side and bottom. Sew the covered slide fastener to the side back of the coverall, at the cutout indicated on the back with a single row of stitching, 1/8 inch from lining folded edge at the side and bottom with the lock-type slider at the top. The top and bottom chain stop shall be 1/2 inch from the finished seam.	301	SSa-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
42.	<u>Joining of upper back to lower back (lining).</u>			
	a. Join the upper back to lower back with a single row of stitching 1/2 inch from the edge.	301 or 401	LSq-2(a)	11-13
	b. Turn the seam and raise stitch with a single row of stitching 1/4 inch from the edge, upper back overlapping the lower back.	301 or 401	LSq-2(b)	11-13
43.	<u>Join side seams.</u>			
	a. Join the side seams of the lining from the sleeve terminals to the leg terminals with a single row of stitching 1/2 inch from the edge catching the slide fasteners at each side seam.	301 or 401	LSq-2(a)	11-13
	b. Turn and raise stitch with a single row of stitching 1/4 inch from the edge. The front shall overlap the back.	301 or 401	LSq-2(b)	11-13
44.	<u>Join inseam.</u>			
	a. Join the inseam from the top of each leg opening notches with a single row of stitching 1/2 inch from the edge.	301 or 401	LSq-2(a)	11-13
	b. Turn and raise stitch with a single row of stitching 1/4 inch from the edge. The back shall overlap the front.	301 or 401	LSq-2(b)	11-13
*45.	<u>Attach slide fastener and protective fly to liner inseam.</u>			
	a. Tongue notch at the top of the liner at the inseam. Turn under the lining at the top and sides 1/2 inch and stitch 1/4 inch from folded edges.	301	EFa-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
45.	<u>Attach slide fastener and protective fly to liner inseam.</u> - Contd			
*	(1) Attach the protective fly to the zipper tape of the covered slide fastener 1/4 inch from edge. The side of the protective fly facing toward the back of the coverall shall be left free.			
	b. Place the covered slide fastener at the inseam and stitch on the lining 1/8 inch from folded edge catching the slide fastener at the sides and top. The top and bottom stop shall be 1/2 inch from the finished seam.	301	SSa-1	11-13
46.	<u>Hem bottom of leg.</u>			
	Hem the bottom of the legs with the raw edges of outershell turned under 3/8 inch and sew with a single row of stitching, 1/16 inch from the edge, through the outershell and the lining. The hem shall measure 1-1/4 \pm 1/8 inches wide finished. The lining shall extend to the bottom of the leg terminal and shall be caught in the bottom stitching. Both the side seams and inseams shall meet (see NOTE, Operation 48).	301	EFb-1	11-13
47.	<u>Hem bottom of sleeve and attach loop tape.</u>			
	a. Hem the bottom of the sleeves with the raw edges of outershell turned under 3/8 inch and sew with a single row of stitching 1/16 inch from the edge, through the outershell and the lining. The hem shall measure 1-1/4 \pm 1/8 inches wide finished.	301	EFb-1	11-13
*	b. Position the loop fastener tape at the pattern marks on the top sleeve end; sew with a single row of stitching on all four sides 1/16 inch from the edge. As an option, attach loop fastener tape before Operation 47.a (see NOTE, Operation 48).	301	SSa-1	11-13

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
48.	<p><u>Join fronts.</u></p> <p>Join the outershell to the lining at the front opening, from the neck to the crotch seam, with a single row of stitching 3/8 inch from the edge, catching the lining.</p> <p>NOTE: For Operations 46 and 47, place the lining inside of the outershell.</p>	301	SSb-1	11-13
49.	<p><u>Attach protective fly to side pass-through opening (lining).</u></p> <p>Place the protective fly on the back at the opening 1-1/4 inches from the center of the slide fastener evenly spaced at the opening and sew the side edge with a single row of stitching 1/8 inch from the edge. The ends shall be backstitched. The side of the protective fly facing toward the front of the coverall shall be left free.</p>	301	LSq-1 (similar to)	11-13
50.	<p><u>Bartack.</u></p> <p>The bartack shall be 3/8 to 1/2 inch in length and positioned as follows:</p> <p>a. Two on each breast pocket.</p> <p>b. Two on each thigh pocket; one at each end of the slide fastener on the inside row of stitching.</p> <p>c. Two on each lower leg pocket; one at each end of the slide fastener on the inside row of stitching.</p> <p>d. Two on the knife pocket; at the top end, between the inner rows of stitching.</p> <p>NOTE: The above bartacks shall be put on the outershell of the coverall prior to joining the liner.</p>	Bartack		28 per bartack

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
50.	<p><u>Bartack.</u> - Contd</p> <p>e. One across the bottom stitching; on each side of the leg slide fastener tape at the leg terminals and one across the top closed end on the inside row of stitching.</p> <p>f. One at the crotch seam; catching the slide fastener tapes.</p> <p>(1) One centered between crotch seam approximately 1 inch below the protective fly.</p> <p>g. One across both slide fastener tapes; centered between the crotch seam and the bottom of the front opening slide fastener bottom stop, uniting the edges of both tapes, catching the protective fly.</p> <p>h. Bartack each end of side pass-through openings.</p>			
51.	<p><u>Finish leg slide fastener opening.</u></p> <p>Sew outershell to inside leg opening at the sides and top 1/16 inch from folded edge.</p>	301	EFa-1	11-13
52.	<p><u>Tack linings.</u></p> <p>Position the underarm seam of the lining and outershell, matching the side seams and securely tack across the seam 1/2 inch through and through; or a 1/2 inch bartack may be used. Tack shall be on the side seam 2-1/2 \pm 1/4 inches below the fold of the armhole seam through the outershell and the lining.</p>	301 or Bartack		11-13 28 per bartack

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TABLE V. Manufacturing operations requirements. - Continued

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
53.	<u>Joining of collar to neck.</u>			
	a. Sew the under collar to the neck with a single row of stitching $\frac{3}{8}$ inch from the edges.	301	SSa-1	11-13
	b. Turn under the raw edges and sew the top collar to the neck with a single row of stitching $\frac{1}{16}$ inch from the folded edges.	301	LSd-1	11-13
	c. Raise stitch the collar with a single row of stitching $\frac{1}{4}$ inch from the outer edge all around the collar.	301	SSe-2(b)	11-13
54.	<u>Cleaning.</u>			
	Trim all thread ends and remove all loose thread ends. Remove all spots, stains, and shade tickets without injury to the fabric.			

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3.8 Finished measurements. The finished coveralls shall conform to measurements shown in table VI.

TABLE VI. Finished measurements (inches).

		Sleeve inseam length			Leg inseam length		
Size	1/2 Breast	S	R	L	S	R	L
32	18-1/2	20-1/4	22		28	30	
34	19-3/4	20-3/4	22		28	30	
36	21	20-3/4	22	23	28	30	32
38	22-1/2	21	22	23	28	30	32
40	23-1/2	21-1/4	22-1/4	23-1/4	28	30	32
42	24-1/2	21-1/4	22-1/4	23-1/4	28	30	32
44	25-1/2	21-1/4	22-1/4	23-1/4	28	30	32
46	26-1/2	21-1/4	22-1/4	23-1/4	28	30	32
48	27-1/2		22-1/4	23-1/4		30	32
Tolerance	+1/2 -1	+1/2	+1/2	+1/2	+1/2	+1/2	+1/2

3.8.1 Methods of measuring. The coveralls shall be laid flat without tension on a smooth, flat surface so that creases and wrinkles shall not affect the measurement. The coveralls shall be closed, the hook and loop parts of the fastener tapes shall be engaged and the coveralls shall be measured as follows:

1/2 Breast - Measure across breast area, from folded edge to folded edge at the bottom of the armholes.

Sleeve inseam length - Measure along the inseam on the sleeve, from the base of the armhole to the bottom of the sleeve.

Leg inseam length - Measure along the inseam on the sleeve, from the center of the crotch seam to the bottom of the leg.

3.9 Workmanship. The finished coveralls shall conform to the quality of product established by this document. The occurrences of defects shall not exceed the acceptable quality level.

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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.

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

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with test conditions specified in this document.

4.4 First article inspection. When required (see 3.1 and 6.2), the first article shall be inspected as specified in 4.5.3 and 4.5.4 for compliance with design, construction, workmanship, and dimensional requirements. The presence of any defect shall be cause for rejection of the first article.

4.5 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-1668 and MIL-STD-105 and the acceptance criteria, as specified in the contract or purchase, shall be binding.

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

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4.5.2 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to determine whether construction details which cannot be examined in the finished product are in accordance with specified requirements. This inspection shall include verification that the working patterns conform to the Government patterns in all respects. Whenever nonconformance is noted, corrections shall be made to the items affected and lot in process. Items which cannot be corrected shall be removed from production.

4.5.3 Point count inspection. Sampling and inspection provisions for end item examination of coveralls, dimensional examination, and packaging examination shall be performed in accordance with MIL-STD-1668 and table VII. The lot shall be unacceptable if the occurrence of defects exceeds the applicable maximum acceptable point value limit specified.

TABLE VII. End item visual defects.

Defect	Major	Minor A	Minor B
<u>SLIDE FASTENER COVERINGS</u>			
a. Edges of slide fastener coverings overlapping more than 1/16 inch or gapped more than 1/16 inch, when slide fastener is closed.			201
b. Beading omitted in the slide fastener covering.		101	
c. Beading not sewn taut in slide fastener covering.			202

4.5.3.1 Palletization examination. An examination shall be made to determine that the palletization complies with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one palletized unit load fully packaged. The lot size shall be the number of palletized unit loads in the inspection lot. The inspection level shall be S-1 and the acceptable quality level shall be 6.5 defects per hundred units.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirement.
Palletization	Pallet patterns not as specified. Interlocking of loads not as specified. Load not bonded with the number of straps specified.
Weight	Exceeds maximum load limits.
Marking	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.

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5. PACKAGING

* 5.1 Preservation. In accordance with the requirements of MIL-STD-2073-1, preservation shall be level A, C, or Commercial, as specified (see 6.2).

* 5.1.1 Level A. Each coverall shall have all fastenings secured and shall be neatly folded, in accordance with normal practice, to an approximate size of 14-1/2 inches in length by 11-1/2 inches in width. The folded coverall shall then be individually packaged in a heat-sealed polyethylene film bag that is a flat size of approximately 20 inches in length by 24 inches in width and is 0.0015 (+20 percent tolerance) inch thick. A 1/4 inch diameter hole shall be made at one corner of the polyethylene bag to allow excess air to escape. As an alternative, the polyethylene bag may be of the tuck-in or reverse flap type, where heat seal closure and corner hole are not required.

* 5.1.2 Level C. The coveralls shall be preserved in accordance with MIL-STD-2073-1 requirements for this level.

5.1.3 Commercial. The coveralls shall be preserved in accordance with ASTM D 3951.

* 5.2 Packing. In accordance with the requirements of MIL-STD-2073-1, packing shall be level A, B, C, or Commercial, as specified (see 6.2).

* 5.2.1 Level A. Six coveralls, of one size only, preserved as specified in 5.1, shall be packed in a fiberboard shipping container assembled, closed, and reinforced conforming to type SF, class weather resistant, grade V2s, size 3A of MIL-B-17757. Level A packages shall be packed flat, two in length, one in width, and three in depth within the shipping container (see 5.4.2).

* 5.2.2 Level B. Six coveralls, of one size only, preserved as specified in 5.1, shall be packed in a fiberboard shipping container assembled and closed conforming to type CF, class domestic, variety DW, grade 275, size 3A of MIL-B-17757. Level B packages shall be packed flat, two in length, one in width, and three in depth within the shipping container (see 5.4.2).

* 5.2.3 Level C. Coveralls of one size only, preserved as specified in 5.1, shall be packed in accordance with MIL-STD-2073-1 requirements for this level (see 5.4.2).

5.2.4 Commercial. Coveralls of one size only, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951 (see 5.4.2).

5.3 Palletization. When specified (see 6.2), coveralls packed as specified in 5.2 shall be palletized on a 4-way entry pallet in accordance with load type Ia of MIL-STD-147. Each prepared load shall be bonded with primary and secondary straps in accordance with the bonding means C, K, and L, or film bonding means O or P. Pallet patterns shall be in accordance with the appendix of MIL-STD-147. The pallet shall be 4-way entry, type I, class 1, style 1, 1A, or 1B, size A, wood group I, II, III, or IV of MIL-P-15011, or 4-way entry, type IV, V, or VIII, class 1, style A, size 2, wood group I, II, III, or IV, grade A of NN-P-71.

Interlocking of loads shall be effected by reversing the pattern of each course.

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If the container is of a size which does not conform to any of the patterns specified in MIL-STD-147, the pallet pattern used shall first be approved by the contracting officer.

5.4 Marking. In addition to any special marking required by the contract or purchase order, unit packages, shipping containers, and palletized unit loads shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

5.4.1 Polyethylene packages. Polyethylene bagged unit packs shall have the required identification information legibly printed or stamped in black directly on the bag across the center face or on a white paper label inserted within the bag so as to permit ready identification.

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 coveralls covered by this specification are intended to be worn in extreme cold weather by aircrew personnel.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Size and length 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 and 2.2).
- d. When first article is required (see 3.1).
- e. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).
- f. When palletization is required (see 5.3).

* 6.3 First article. When first article inspection is required, the item should be a first article sample. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

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6.4 Samples. For access to samples of the end item and shade samples, address the contracting activity issuing the invitation for bids. The material specified in 3.3.3 should be obtained from Fabric Development, ATTN: Mr. John McGourner, 10 E. Main St., Quakertown PA 18951, (215) 536-1420.

* 6.5 Manufacturer sources. The Thinsulate, Insulation Type CS-200 used for the lining (see 3.3.2) is manufactured by 3M Company, 3M Center, Building 223-65W, St. Paul MN 55101 and the fusible interlining, style No. SF 134 (see 3.3.12) is manufactured by the Pellon Corp., 119 West 40th St., New York NY 10018.

* 6.6 Government furnished patterns. The contracting officer should arrange to furnish the patterns listed in 3.5.

* 6.7 Subject term (key word) listing.

batting, quilted
cloth, high temperature resistant
clothing, aircrew
flight suit, winter
protection, extreme cold weather

6.8 Changes from previous issue. The margins of this document are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian:

Navy - NU
Air Force - 11
DLA - DP

Preparing activity:

Air Force - 11

Review activities:

Air Force - 82, 99
DLA - CT

(Project No. 8415-0710)

User activity:

Air Force - 45

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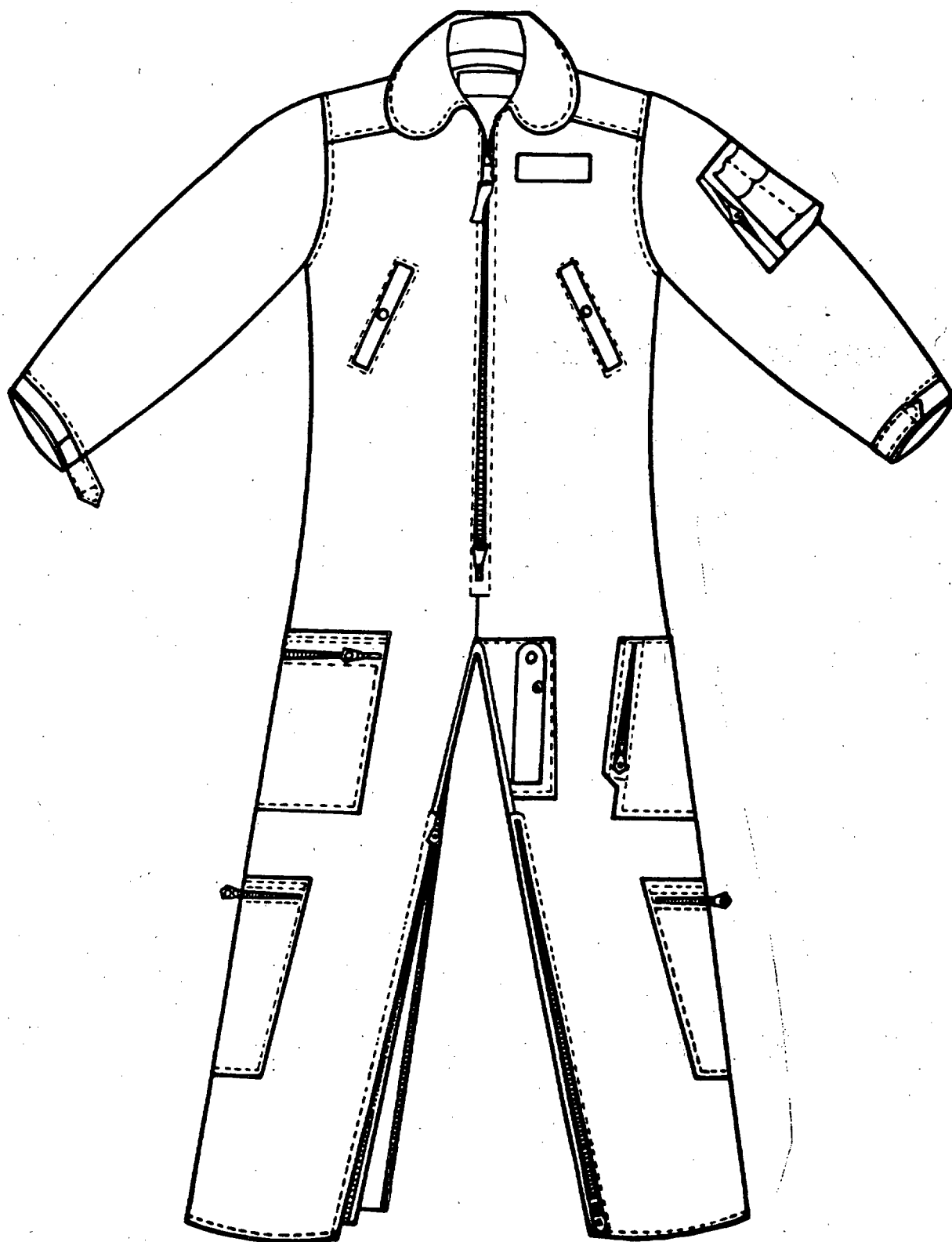


FIGURE 1. Coveralls, front view.

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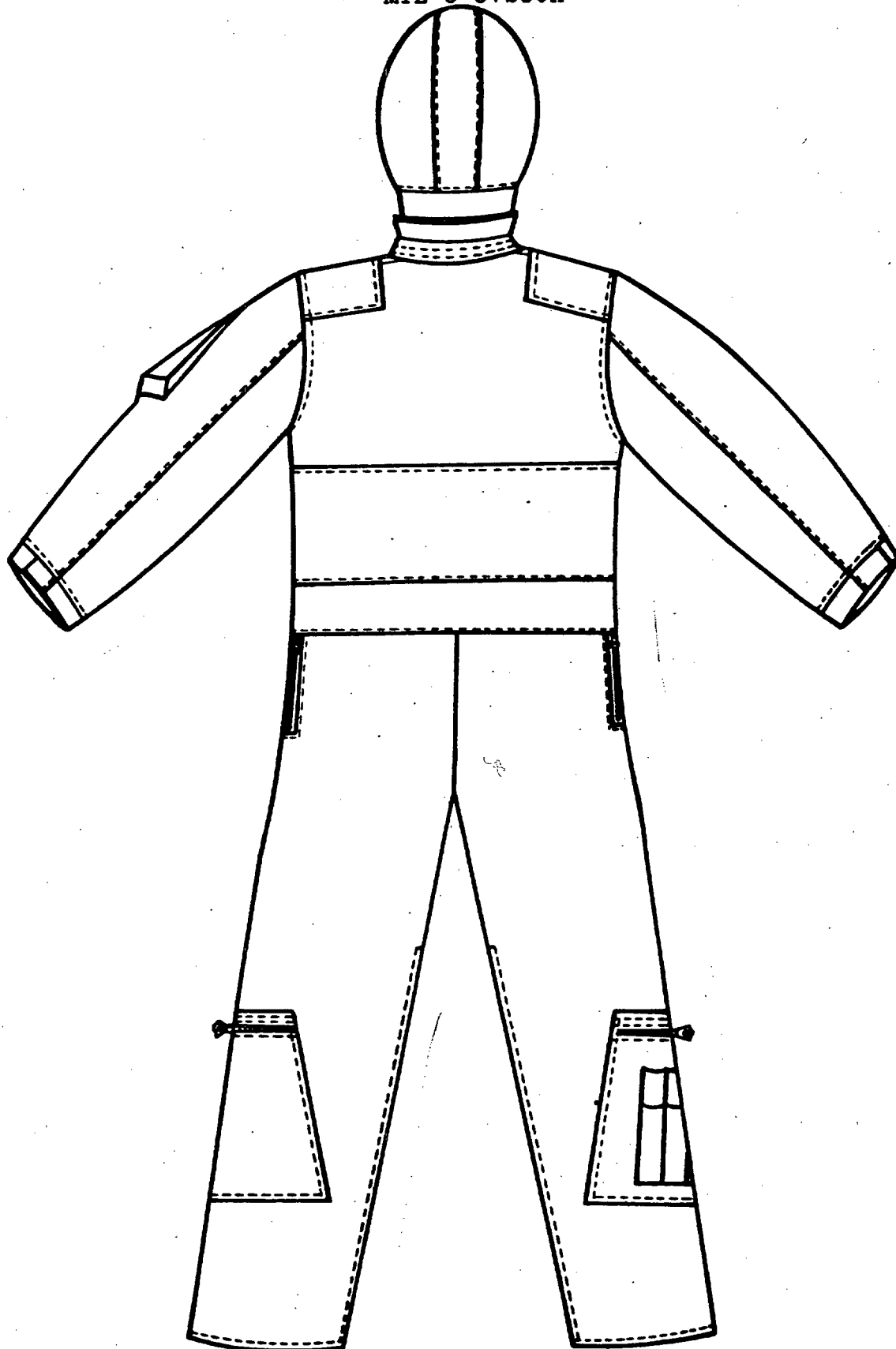


FIGURE 2. Coveralls, rear view.