

MIL-A-83406B(USAF)

3 September 1975

SUPERSEDING

MIL-A-83406A(USAF)

29 August 1974

## MILITARY SPECIFICATION

## ANTI-G GARMENT, CUTAWAY, CSU-13B/P

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

## 1. SCOPE

1.1 This specification covers one type of anti-g garment that is designated CSU-13B/P and is furnished in the following sizes as specified (see 6.2).

Small regular	Medium regular	Large regular	Large extra long
Small long	Medium long	Large long	

## 2. APPLICABLE DOCUMENTS

- \* 2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONSFederal

L-P-378	Plastic Sheet and Strip, Thin Gauge, Polyolefin
V-F-106	Fasteners, Slide, Interlocking
V-T-295	Thread, Nylon
HH-I-595	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic, General Purpose
QQ-W-423	Wire, Steel, Corrosion-Resisting
DDD-L-20	Label; for Clothing, Equipage, and Tentage, (General Use)
PPP-B-636	Boxes, Shipping, Fiberboard

Military

MIL-C-3953	Cloth, Duck, Nylon
MIL-W-4088	Webbing, Textile, Woven Nylon
MIL-R-6855	Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes
MIL-F-10884	Fasteners, Snap
MIL-F-21840	Fastener Tapes, Hook and Pile, Synthetic
MIL-T-38328	Tape, Textile, Nylon, Aromatic, Nonmelting, Reinforcing
MIL-T-43115	Tape, Pressure-Sensitive, Adhesive, for Packaging and Sealing
MIL-L-43283	Leather, Calfskin and Kip, for Footwear Uppers, Chrome Tanned
MIL-C-43600	Cloth, Twill, Nylon, High Temperature Resistant

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MIL-T-43636 Thread, Nylon, Non-Melting  
 MIL-W-81116 Webbing, Textile, Polyamide, High Temperature Resistant, Loop  
 MIL-C-83242 Cord, Aromatic Polyamide, Nonmelting  
 MIL-C-83390 Connector, Hose, Quick-Acting, Male, Anti-g Garment

**STANDARDS****Federal**

FED-STD-4 Glossary of Fabric Imperfections  
 FED-STD-191 Textile Test Methods  
 FED-STD-751 Stitches, Seams, and Stitchings

**Military**

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes  
 MIL-STD-129 Marking for Shipment and Storage  
 MIL-STD-143 Standards and Specifications, Order of Precedence for the Selection of  
 MIL-STD-831 Test Reports, Preparation of  
 MS20230 Grommets, Metallic, Plain and Spur, With Washers, Type I and Type III  
 MS27755 Connectors, Hose Quick Disconnect, Female, Anti "G" Suit  
 MS27982 Fasteners, Snap, Style 3 (Pronged Ring Head Type)  
 MS27983 Fasteners, Snap, Style 4 (Three Way Locking Type)

**DRAWINGS****Air Force**

71380 Patterns, CSU-13B/P Anti-g Garment, Size Small Regular  
 71381 Patterns, CSU-13B/P Anti-g Garment, Size Small Long  
 71382 Patterns, CSU-13B/P Anti-g Garment, Size Medium Regular  
 71383 Patterns, CSU-13B/P Anti-g Garment, Size Medium Long  
 71384 Patterns, CSU-13B/P Anti-g Garment, Size Large Regular  
 71385 Patterns, CSU-13B/P Anti-g Garment, Size Large Long  
 71386 Patterns, CSU-13B/P Anti-g Garment, Miscellaneous All Sizes  
 74204 Spacer, Tube - Anti-g Garment  
 74206 Pattern, Anti-g Garment, CSU-13B/P, Size Large Extra Long

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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2.2 Other publication. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of invitation for bids or request for proposal shall apply.

National Aerospace Standards (NAS)

NAS 397                      Clamp - Ratchet, One Piece

(Copies of this document can be obtained from the National Standards Association, Incorporated; 1321 Fourteenth Street, N.W.; Washington, D. C. 20005.)

(Technical society and technical association specifications and standards are generally available for reference from libraries and are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

- 3.1 Qualification. The anti-g garment furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.6).
- \* 3.2 First article. Unless otherwise specified by the procuring activity (see 4.5 and 6.2), this specification provides for first article inspection.
- \* 3.3 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.
- \* 3.4 Materials and parts. Except for the metallic materials and parts, the materials and parts of the anti-g garment shall have been manufactured not more than 12 months prior to the date of delivery of the anti-g garment.
- \* 3.4.1 Basic materials
- \* 3.4.1.1 High temperature resistant cloth. Except for the bladder, the basic fabric for the anti-g garment shall conform to type II of MIL-C-43600 and shall be sage green, USAF color shade No. 1565 (see 6.3).
- \* 3.4.1.2 Poyyurethane coated nylon taffeta cloth. The material for the bladder (including the attachment patches) shall be a nylon taffeta cloth that has been coated on one side with polyurethane. The nylon taffeta cloth (base cloth) shall conform to table I. After the nylon taffeta cloth has been coated with polyurethane, the coated cloth shall conform to table II.

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TABLE I. Uncoated Nylon Taffeta Cloth

Characteristic	Requirement
Material identification	Nylon taffeta cloth
Weight	1.7 to 1.9 ounces per square yard
Yarns	
Warp	108 yarns per inch, minimum
Filling	88 yarns per inch, minimum
Breaking strength	
Warp	140 pounds, minimum
Filling	120 pounds, minimum
Tearing strength	
Warp	6 pounds, minimum
Filling	5 pounds, minimum
Color	Optional

TABLE II. Coated Nylon Taffeta Cloth

Characteristic	Requirement
Material identification	
Base cloth	Nylon taffeta cloth (see table I)
Coating	Polyurethane
Weight	4 to 4.5 ounces per square yard
Breaking strength	
Warp	90 pounds, minimum
Filling	80 pounds, minimum
Air leakage	No leakage
Adhesion	20 pounds per inch width, minimum
Color	Optional

3.4.2 Reinforcements and bindings. Unless otherwise specified herein, the reinforcements shall be made of the basic fabric specified in 3.4.1.1. The 5/16-inch-wide (finished), centerfold, bias binding shall be 45 degrees bias cut 1-1/4 inches to 1-3/8 inches wide from the basic fabric specified in 3.4.1.1.

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- \* 3.4.3 Seam tape. The seam (hinge) tape for the bladder shall be 1/2-inch-wide tape bias cut from the coated cloth specified in 3.4.1.2.
- \* 3.4.4 Spacer material. The spacer material for the bladder shall be 3/32 inch (plus or minus 1/64 inch) thick and shall be Trilok, style No. 6001-1-1 (manufactured by Uniroyal, Inc., New York, New York) or may be an equally suitable material provided the material has been approved by the procuring activity before the material is used for the bladder.
- \* 3.4.5 Adjustment laces and lanyard. The cord for the lanyard and for the adjustment laces shall conform to type I of MIL-C-83242 and shall be sage green, USAF color shade No. 1521 (see 6.3).
- \* 3.4.6 Slide fasteners. The slide fasteners shall be brass with a short tab pull. The slide fasteners shall conform to tables III and IV of this specification and to V-F-106 except as otherwise specified herein. The slide fasteners for the body opening and for the leg openings shall be Size 9 slide fasteners with S-25 retainer and pin assembly, metal 0308 with a black oxidized finish. The slide fasteners for the thigh take-ups shall be Size 6 slide fasteners. (These Size 6 and Size 9 slide fasteners are manufactured by Talon, Inc., Meadville, Pennsylvania.) A substitute slide fastener for the body opening, the leg openings, and the thigh take-ups shall be used only when specifically approved by the contracting officer. The tape and the bead of all slide fasteners (including the body opening) shall be a high temperature resistant polyamide material that has been dyed to match the color of the basic fabric specified in 3.4.1.1. The finish of the chain and the other metal components shall be dark oxidized. All automatic-locking sliders shall have a pin-type locking device. A pull tape (see 3.4.8) shall be permanently fastened to each short tab pull with two bartacks.

TABLE III. Slide Fasteners

Location of Slide Fastener	Quantity	Specification V-F-106		
		Type	Style	Size
Body opening	1	IV	7	MHS
Leg openings	<u>1/</u>	IV	7 and 8	MHS
Thigh take-ups	2	I	3	MS
Pockets	2	I	7	MS

1/ One of each style.

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TABLE IV. Length of Slide Fasteners

Size of Anti-g Garment	Length (Inches) of Slide Fasteners			
	Body Opening <sup>1/</sup>	Leg Openings	Thigh Take-ups	Pockets
Small regular	8-1/2	26	10-1/2	8
Small long	8-1/2	28	11-1/2	8
Medium regular	8-1/2	26-1/2	11	8
Medium long	8-1/2	28-1/2	11-1/2	8
Large regular	8-1/2	27	11	8
Large long	8-1/2	29	11-1/2	8
Large extra long	8-1/2	33	11-1/2	8

<sup>1/</sup> The tolerance for the length of the slide fastener for the body opening shall be plus or minus 1/8 inch.

- \* 3.4.7 Stiffeners. The stiffeners for the slide fasteners shall be natural-color cloth conforming to class 2 of MIL-C-3953.
- \* 3.4.8 Aromatic polyamide webbing. The webbing for the pull tape for the slide fasteners, the loops for the slide fasteners, and the hanger shall be 5/16 inch wide, shall conform to type VI of MIL-T-38328, and shall approximately match the color of the basic fabric specified in 3.4.1.1.
- \* 3.4.9 Nylon webbing. The webbing for the knife pocket reinforcement shall be untreated, shall conform to type XII of MIL-W-4088, and shall be either USAF color shade No. 1531 (see 6.3) or natural. The webbing for the steel strip protector shall conform to type I of MIL-W-4088.
- \* 3.4.10 Hook and loop assembly. The hook and loop assembly shall conform to part No. 166 (manufactured by Adjusta Co., New York, New York), or equal. The tape for the hook and loop assembly shall conform to type IV of MIL-T-38328.
- \* 3.4.11 Steel strips. The steel strips shall be high carbon spring steel with the ends rounded to 5/32-inch radius. The ends of the steel strips shall be painted and dipped, or the steel strips shall be completely encased in a heat shrink polyvinyl chloride casing. The dimensions of the steel strips shall conform to table V.

TABLE V. Dimensions of Steel Strips

Size of Anti-g Garment	Dimensions in Inches <u>1/</u>	
	Width	Length
Small regular	5/16	8
Small long	5/16	8
Medium regular	5/16	8-1/2
Medium long	5/16	8-1/2
Large regular	5/16	8-1/2
Large long	5/16	8-1/2
Large extra long	5/16	8-1/2

1/ The tolerance shall be plus or minus 1/32 inch for the width and plus or minus 1/16 inch for the length.

- \* 3.4.11.1 Painted and dipped ends. The ends of the steel strips shall be roller coated with white baked enamel on both sides and edges. The end enamel thickness on each side of each steel strip shall be a minimum of 0.015 inch. Each end of each steel strip shall be dipped coated a minimum of 0.040 inch thickness (approximately 0.02 inch thickness on each side). The coating shall extend a minimum of 1/2 inch from the end of steel strip. The rounded edge shall be completely covered with coating with a minimum thickness of the rounded edge of 0.01 inch. The coating shall consist of Instl-X Part No. E-33 (manufactured by the Instl-X Company, Inc., Ossining, New York) or an equally suitable dipping provided the dipping has been approved by the procuring activity before the dipping is used for the ends.
- \* 3.4.11.2 Encased ends. Each steel strip shall be completely encased in a heat shrink polyvinyl chloride casing that is 0.020 inch thick. The ends of the casing shall be sealed and rounded to conform to the rounded ends of the steel strip. The total thickness (heat shrink polyvinyl chloride and steel strip) shall be 0.060 (plus or minus 0.008) inch.
- \* 3.4.12 Wrapping for anti-g hose assembly. The tape for wrapping the anti-g hose assembly shall be black, 1-inch-wide tape conforming to HH-I-595.
- \* 3.4.13 Lacer loops. The tape for the lacer loops shall conform to MFL-W-81116 except that the color of the tape shall match the color of the basic fabric specified in 3.4.1.1.

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- 3.4.14 Thread. Unless otherwise specified herein, the thread for all sewing operations shall conform to type I or II, size E of MIL-T-43636 and shall be sage green USAF color shade No. 1565 (see 6.3). (Note: This thread may be used to sew the nylon mesh cloth (see 3.4.24) in lieu of the thread conforming to type I, class 1, size E of V-T-295 which is specified on Drawing 74204.)
- 3.4.15 Snap fasteners. Except for the knife pocket, the snap fasteners shall conform to style 3, finish 2 of MIL-F-10884 (pronged ring MS27982-1B, socket MS27982-2B, stud MS27982-4B, and eyelet MS27982-5B). The snap fastener for the knife pocket shall conform to style 4, construction A of MIL-F-10884 (socket MS27983-2, button MS27983-1, stud MS27983-3, and eyelet MS27983-4)
- 3.4.16 Grommet. The grommet shall be size 00 conforming to MS2020B20 and shall be oxidized a black color.
- 3.4.17 Fastener tape. The hook fastener tape shall conform to type I, class 2 of MIL-F-21840 except for the color. The pile fastener tape shall conform to class 2 of MIL-F-21840 except for the color. The color of the pile fastener tape and the hook fastener tape shall approximately match the color of the basic fabric specified in 3.4.1.1 or shall be of OG 106 (see 6.3). Except for the pile fastener tape for the hose retainer and the checklist retainer, the fastener tape shall be 1 inch wide. The pile fastener tape for the hose retainer and the checklist retainer shall be 2 inches wide.
- 3.4.18 Adhesive. The adhesive for cementing the spacer material to the coated bladder material shall be (2-part) Bostick Adhesive No. 7074 A and B (manufactured by the USM Chemical Company, Middleton, Massachusetts), or equal.
- 3.4.19 Connector. The connector shall conform to MIL-C-83390.
- 3.4.20 Rubber sleeve. The rubber sleeve for the connector shall be tubing conforming to class 2, grade 40 or 60 of MIL-R-6855, shall be 3 inches (plus or minus 1/16 inch) long, shall have an outer diameter of 3/4 (plus or minus 1/16) inch, and shall have a wall thickness of 1/8 (plus or minus 1/32) inch. No silicone or any other lubricant shall be applied to either the rubber sleeve or the connector prior to assembling the rubber sleeve to the connector.
- 3.4.21 Clamps. The clamps for securing the connector to the external tube shall conform to NAS 397-14 and NAS 397-16.
- 3.4.22 Leather reinforcement. The leather for the reinforcement patch over the inflation sleeve opening shall be black and shall conform to type I of MIL-L-43283 except that the thickness (ounces) shall be 2 to 2-1/2 ounces.

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- \* 3.4.23 Springs for tube spacer. The material for the springs of the tube spacer shall be 0.016-inch-diameter wire that conforms to form II, composition 304, condition B of QQ-W-423.
- \* 3.4.24 Cloth for the tube spacer. The cloth for the tube spacer shall be nylon mesh cloth that conforms to Part No. 952-03-02-840 (manufactured by Chicopee Manufacturing Co., Lumite Division, Cornelia, Georgia), or equal.
- \* 3.4.25 Pressure-sensitive-adhesive tape. The pressure-sensitive-adhesive tape for wrapping the lacing shall conform to MIL-T-43115.
- \* 3.5 Design. The anti-g garment shall be a wrap-around garment that extends from the waist to over the calves of the wearer. It shall have an inflatable bladder that will cover the waist and the leg areas of the wearer and a connector that will provide normal and emergency connection and disconnection of the bladder of the anti-g garment to and from the air pressure source. Both sides of the anti-g garment shall have external adjustment laces in the waist, thigh, and calf areas; however, the adjustment laces shall have covers that can be unfastened for easy accessibility. The anti-g garment shall have a pocket on the calf of each leg and a knife pocket on the front of the left thigh.
- \* 3.6 Construction. The anti-g garment shall be constructed as specified in table VI; however, the manufacturer will not be required to follow the exact sequence of operations as listed therein.
- \* 3.6.1 Stitches, seams, and stitchings. Stitches, seams, and stitchings specified in table VI shall conform to FED-STD-751. The looper (under) thread of stitch type 401 shall be on the inside of the anti-g garment. Thread breaks and ends of all seams and stitchings, if not caught in other seams or stitchings, shall be securely backstitched by reversing the stitching direction and sewing a continuous row of stitching superimposed on the original row of stitching for a distance of 1/2 inch. A stitching shall be considered caught in another stitching or seam if the two stitchings are in opposite directions and superimposed directly on each other for at least 1 inch. The bartacks joining the spacer material and attaching the patches as specified in figures 1 and 2 shall be 3/4 inch long, centered, and shall contain approximately 32 stitches.

\*  
TABLE VI. Sewing Operations

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
1	<p><u>Cut parts (see 3.11.1)</u></p> <p>(a) Cut the parts (including the bladders) of the anti-g garment in accordance with the patterns which show shape, size, directional lines, and marking for the proper assembly of the parts.</p> <p>Note: Trimming of the body lacer covers, the thigh lacer covers, and the calf lacer covers will be permitted as specified in No. 5(b), 6(b), and 6(e).</p>			
2	<p><u>Shade mark</u></p> <p>(a) Mark all parts to insure a uniform shade throughout the anti-g garment.</p>			
3	<p><u>Sear raw edges</u></p> <p>(a) Sear the raw edges of all parts made of nylon material except for parts made of high temperature resistant nylon material.</p>			
4	<p><u>Sew loops of lacer loop tape</u></p> <p>(a) Sew one row of stitching along each length of the lacer loop tape, through the base of each loop to prevent the loops from slipping.</p>	301	SSa-1	10-12
5	<p><u>Make body lacer covers</u></p> <p>(a) Select the fastener tapes for the body lacer covers in accordance with table VII.</p>			

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TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
6	<p>(b) Trim the fastener tape, if necessary, to fit the body lacer covers at the top and the bottom. Turn each body lacer cover under 3/8 inch. Sew the hook fastener tape to each body lacer cover, at the pattern location, with a single row of stitching 1/16 inch from the edge on all four sides.</p> <p>Note: No. 5(b) shall be performed before No. 5(c) so that the fastener tape will be sewn to the body lacer covers before the body lacer covers are bound.</p>	301	LSd-1	10-12
	<p>(c) Bind each body lacer cover at each end with 5/16-inch-wide (finished) bias binding 1/16 (plus or minus 1/32) inch from the edge.</p>	301	BSc-1	10-12
	<p><u>Make leg (thigh and calf) lacer covers</u></p>			
	<p>(a) Select the fastener tapes for the thigh lacer covers in accordance with table VII.</p> <p>(b) Trim the fastener tape, if necessary, to fit the thigh lacer covers at the top and the bottom. Turn each thigh lacer cover under 3/8 inch. Sew the hook fastener tape to each thigh lacer cover, at the pattern location, with a single row of stitching 1/16 inch from the edge on all four sides.</p> <p>Note: No. 6(b) shall be performed before No. 6(c) so that the fastener tape will be sewn to the thigh lacer covers before the thigh lacer covers are bound.</p> <p>(c) Bind each thigh lacer cover at each end with 5/16-inch-wide (finished) bias binding 1/16 (plus or minus 1/32) inch from the edge.</p> <p>(d) Select the fastener tapes for the calf lacer covers in accordance with table VII.</p>	301	LSd-1	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	<p>(e) Trim the fastener tape, if necessary, to fit the calf lacer covers at the top and the bottom. Turn each calf lacer cover under 3/8 inch. Sew the hook fastener tape to each calf lacer cover, at the pattern location, with a single row of stitching 1/16 inch from the edge on all four sides.</p> <p>Note: No. 6(e) shall be performed before No. 6(f) so that the fastener tape will be sewn to the calf lacer covers before the calf lacer covers are bound.</p>	301	LSd-1	10-12
	<p>(f) Bind each calf lacer cover at each end with 5/16-inch-wide (finished) bias binding 1/16 (plus or minus 1/32) inch from the edge.</p>	301	BSc-1	10-12
7	<p><u>Hem body bladder cover</u></p> <p>(a) Hem the upper edge of the separate leg extension to the inside, 1/4 inch, with a single row of stitching 1/16 from the edge.</p> <p>(b) Fold the end of the body bladder cover leg, to which the separate leg extension is to be attached, to the inside 1/4 inch, and hem with a single row of stitching 1/16 inch from the edge.</p> <p>(c) Lap the hemmed end of the separate leg extension up under the body bladder cover leg end until the lower edge is even with the opposite leg end, and sew at the sides with a single row of stitching 1/8 inch from the edge.</p> <p>(d) Position a 1-1/2-inch-wide, 4-1/2-inch-long reinforcement of the bladder material on the inside of the front body</p>	301	EFa-1	10-12
		301	EFa-1	10-12
		301	SSa-1	10-12
		301	LSa-1	10-12

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TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	bladder cover at the position marked for the hook fastener tape; sew with a single row of stitching 1/8 inch from the edge.			
	(e) Sew the hook fastener tape on the outside of the body bladder cover, at the marked position, with a single row of stitching 1/16 inch from the edge on all four sides.	301	SSa-1	10-12
8	<u>Join bladder case</u>			
	(a) Join the front and the back body bladder case, material face to face, with a single row of stitching 1/4 inch from the edge, leaving the legs, the bladder inflation sleeve, and 1 inch at tab locations (top, bottom, and right side) open.	301	SSe-2(a)	10-12
	(b) Turn and raise with a single row of stitching 1/16 inch from the edge.	301	SSe-2(b)	10-12
9	<u>Hem leg bladder covers</u>			
	(a) Hem the leg bladder covers to the inside, 1/4 inch, down the sides and around the bottom and the top, with a single row of stitching 1/16 inch from the edge.	301	EFa-1	10-12
10	<u>Make thigh take-ups</u>			
	(a) Select the slide fasteners for the thigh take-ups in accordance with tables III and IV. Zigzag stitch the tapes of the slide fasteners together from the bottom stop to the ends of the tapes.	301 or 401	SSa-1	20-26

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TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	(b) Sew the 3/4-inch-wide stiffener to the inside of the thigh take-up fly, right and left, on the long center line from end to end with a single row of stitching.	301	SSa-1	10-12
	(c) With the open end of the slide fastener at the top, center the top and the bottom stops between the top and the bottom of the thigh take-ups. Match the edges of the slide fastener tape with the edges of the thigh take-ups fly. Cut the ends of the slide fastener tapes off even with the cover, and sew all around with a single row of stitching 1/8 (plus or minus 1/16) inch from the edge.	301	SSa-1	4-6
	(d) Bind all around the leg take-ups, catching the ends of the slide fastener tapes in the binding, with 5/16-inch-wide (finished) bias binding 1/16 (plus or minus 1/32) inch from the edge.	301	BSc-1	10-12
	(e) Thread a 5-inch length of the 5/16-inch-wide webbing for the pull tape through the pull of each slide fastener. Fold the webbing in the center, and bartack at the ends and close to the pull.	bartack		21-23 stitches per bartack
11	<u>Prepare slide fasteners for body and leg openings</u>			
	(a) Select the slide fasteners for the body and the leg openings in accordance with tables III and IV.			
	(b) Prefold the slide fastener tapes for the leg openings at the open ends with a triangular fold so that the beaded edge of the tape is across the end and the fold is to the inside. Sew with a single row of stitching 3/32 (plus 1/32 or minus 1/16) inch from the edge. Prefold and sew the slide fastener	301	EFa-1	10-12

\* TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	<p>tape for the body opening in the same manner as for the leg openings, making certain that the fold is placed so that the length of the slide fastener tape will be 8-5/8 inches (plus or minus 1/8 inch).</p> <p>(c) Thread a 5-inch length of the 5/16-inch-wide webbing for the pull tape through the pull of each slide fastener. Fold the webbing in the center, and bartack at the ends and close to the pulls.</p> <p>(d) Cut three 6-inch-long tapes from the 5/16-inch-wide webbing. Fold the tapes in the center to form a loop; join, forming a box and X with a single row of stitching 1/16 inch from the edge, to the separating end of the slide fastener opposite the sliders, with the ends of the tape down 5/8 inch from the end of the slide fastener tape. Sew the tape to the inside of the anti-g garment.</p> <p>(e) Sew the loops of the two tapes on the leg opening slide fasteners closed by sewing both sides of the loops with a single row of stitching 1/16 inch from the edges.</p>	<p>bartack</p> <p>301</p> <p>301</p>	<p>SSa-1</p>	<p>21-23 stitches per bartack</p> <p>10-12</p> <p>10-12</p>
12	<p><u>Make body protective cover</u></p> <p>(a) Place a 1-inch-square reinforcement of the basic fabric as marked on the pattern so that the center of the reinforcement will be 3/4 inch down from the top of the finished fly and on the inside, and sew with a single row of stitching 1/8 inch from the edge. Place another 1-inch-square reinforcement of the basic fabric so that the center of the reinforcement will be 5-1/2 inches below the center of the upper reinforcement and equally distant from the edge of the protective fly cover.</p>	301	SSa-1	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	<p>(b) Secure the hooks (part No. 166 or equal) on the reinforcements at the center so that the washers are inside the fly and the hooks are to the outside, pointed away from the center of the body protective fly cover approximately 1/2 inch down from the top of the finished edge of the fly and the lower hook (center line) approximately 5-1/2 inches below the center line of the upper hook.</p> <p>(c) Fold the body protective fly cover lengthwise on the fold line, the material face to face; sew across the bottom and the top with a single row of stitching 3/8 inch from the edge.</p> <p>(d) Turn and insert the stiffener, folding the raw edge to the inside enclosing the stiffener. Sew all around the top, the bottom, and the two sides with a single row of stitching 1/8 inch from the edge. Sew four additional rows of stitching, evenly spaced end to end.</p> <p>(e) Box in the hooks 1/8 inch from the edge of the reinforcement with a single row of stitching.</p> <p>(f) Attach the slide fastener tape (with the slider attached) to the back edge of the body protective fly, the open end at the top; sew with a single row of stitching 1/8 inch from the edge. The slide fastener will extend below the bottom edge of the body protective fly by 5/8 (plus or minus 1/8) inch.</p>	301	SSe-2(a)	10-12
13	<p><u>Make leg protective cover</u></p> <p>(a) Position a 1-inch-square reinforcement of the basic fabric as marked on the patterns so that the center of the reinforcement will be 2-5/8 inches down from the top of the</p>	301	SSa-1	10-12

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TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	leg protective fly finished edge and on the inside. Sew with a single row of stitching 1/8 inch from the edge.			
	(b) Secure the hook (part No. 166 or equal) on the reinforcement at the center so that the washer is inside the fly and the hook is to the outside, pointed away from the center of the leg protective fly cover, approximately 2-3/8 inches down from the top of the leg protective fly finished edge.			
	(c) Fold the leg protective fly cover lengthwise on the fold line, the face sides of the material together; sew across the bottom and the top with a single row of stitching 3/8 inch from the edge.	301	SSe-2(a)	10-12
	(d) Turn and insert the stiffener, folding the raw edges to the inside enclosing the stiffener; sew all around the top, the bottom, and the two sides with a single row of stitching 1/8 inch from the edge. Sew four additional single rows of stitching, evenly spaced from end to end.	301	SSe-2(b)	10-12
	(e) Box in the hook 1/8 inch from the edge of the reinforcement with a single row of stitching.	301	SSa-1	10-12
	(f) Attach the slide fastener tape (with the slider attached) to the back edge of the leg protective fly, the open end at the bottom; sew with a single row of stitching 1/8 inch from the edge.	301	SSa-1	10-12
14	<u>Assemble pockets</u>			
	(a) Bind the side edges of the pockets with 5/16-inch-wide (finished) bias tape with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge.	301	BSc-1	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	(b) Place the slide fastener at the marked location on the pocket to the inside; join with a single row of stitching 1/16 inch from the edge all around. (The bridge end shall be at the lowest point on the pocket opening.)	301	SSa-1	10-12
	(c) Slit through the center and diagonally at the ends. Turn the fabric under approximately 1/4 inch; sew with a single row of stitching 1/16 inch from the folded edge.	301	LSd-1	10-12
	(d) Sew the bottom corners, the face sides of the material together, with a single row of stitching 3/8 inch from the edge.	301	SSa-1	10-12
	(e) Raise the sides and the bottom edge of the pockets, at the pattern marks, with a single row of stitching 1/16 inch from the folded edge.	301	OSf-1	10-12
	(f) Thread a 5-inch length of the 5/16-inch-wide webbing for the pull tape through the pull of each slide fastener. Fold the webbing in the center, and bartack at the ends and close to the pulls.	bartack		21-23 stitches per bartack
15	<u>Make leg loop tab assembly</u>  (a) Cut two pieces of nylon tape in accordance with the patterns. Install the loop (part No. 166 or equal) 1/4 inch from the center, equally distant from the selvage edges. Fold at the center, with the loop to the outside of the tab; sew around the loops, close to the loop washer, with a single row of stitching.	301	OSf-1	10-12

\* TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
16	<p><u>Make body loop tab assemblies</u></p> <p>(a) Cut two pieces of nylon tape in accordance with the patterns. Install the loops (part No. 166 or equal) equally distant from the selvage edges, as marked on the patterns, approximately 1/4 inch from the fold line on the longer end.</p> <p>(b) Fold on the line, the loop to the outside of the tab. Sew around the loop, up close to the loop washer, with a single row of stitching.</p> <p>(c) Fold the 3/8-inch extended end over the short end. Sew all around the tab with a single row of stitching 1/16 inch from the edge.</p>	301	OSf-1	10-12
17	<p><u>Construct bladder</u></p> <p>(a) Construct the bladder as specified in 3.6.2.</p>			
18	<p><u>Make body section</u></p> <p>(a) Join the left side of the body front to the left side of the body back with a double row of stitching, 1/16 inch from the edges, 1/4-inch gage.</p> <p>(b) Sew a 1-1/8-inch-wide, bias-cut piece of the basic fabric over the center of the body front and back body seam (inside) with a single row of stitching, 1/16 inch from the edge, each side of the binding.</p> <p>(c) Insert two pieces of the nylon webbing into a length of bias binding (see figure 4); sew over the back panel, making</p>	301	(see figure 3)	8-10
		301	LSd-1	8-10
		301	(see figure 4)	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	a 5/8-inch-wide strip at the pattern locations for the steel strips with a single row of stitching each side of the binding 1/16 inch from the edge.			
	(d) Place the four lacer loop tapes on the body back, in accordance with the pattern marks, the ends even with the top and bottom edges of the body back, loops facing loops, and join with a double row of stitching 1/16 inch from the edge 3/16-inch gage.	301	SSa-2	10-12
	(e) Place the pile fastener tape on the lacer loop tape on the body back, 1/8 inch from the loops, and join with a single row of stitching 1/16 inch from the edge.	301	SSa-1	10-12
	(f) Bind across the top, catching the seam tape and the lacer loop tape in the binding, with the 5/16-inch-wide (finished) bias binding with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge.	301	BSc-1	10-12
	(g) Insert a 5/16-inch-wide steel strip into each of the two back seam bindings between the two pieces of the nylon webbing.			
	(h) Bind across the bottom of the body front and body back with a 5/16-inch-wide (finished) bias tape with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge.	301	BSc-1	10-12
	(i) Place the size label either vertically or horizontally on the inside of the center back just below the lower edge of the binding and centered between the two side seams, and sew with a single row of stitching 1/8 (plus or minus 1/16) inch	301	SSa-1	10-12

\* TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
19	<p>from the edge on all four sides. Place the contractor's label below the size label on the center back, and sew with a single row of stitching 1/8 (plus or minus 1/16) inch from the edge on all four sides. Place the instruction label below the contractor's label on the center back, and sew with a single row of stitching 1/8 (plus or minus 1/16) inch from the edge on all four sides.</p>			
	<p>(j) Cut a 4-inch length of the 5/16-inch-wide webbing. Bartack one end 3/4 inch down from the top of the edge binding-on-binding strip over the seam joining the body front to the side back. Fold the webbing to the inside; bartack the other end 1-3/4 inches from the top edge binding.</p>	bartack		21-23 stitches per bartack
	<p>(k) Turn the body lacer cover under 3/8 inch. Place the finished edge of the body lacer cover on the inner row of lacer loop tape, edge to edge; join with a double row of stitching 1/16 inch from the edge 3/16-inch gage.</p>	301	LSa-2	10-12
	<p><u>Attach inflation sleeve opening reinforcement</u></p> <p>(a) Lay the 3-5/16-inch-square reinforcement piece of the basic fabric at the marked location on the outside of the body front, evenly spaced over the hole position. Sew around the hole marking, approximately 1-1/8-inch diameter, with a single row of stitching.</p> <p>(b) Trim the 1/4 inch inside stitching; and make approximately six small cuts around the edge of the hole but not closer than 1/16 inch from the stitching. Turn the reinforcement piece through the opening; raise with a single row of stitching 1/16 inch from the raised edge.</p>	301	.SSe-2(a)	10-12
301	SSe-2(b)	10-12		

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	(c) Turn the outside edge of the reinforcement under 1/2 inch all around; sew to the body front with a single row of stitching 1/16 inch from the folded edge.	301	LSd-1	10-12
	(d) Lay the octagon-shaped leather reinforcement piece evenly spaced over the hole position, on the inside of the body front, and sew around the hole 3/32 inch from the edge (on the inside). Sew around the outside edge of the leather patch 3/32 inch from the edge (on the inside).	301	LSa-2	9-11
20	<u>Attach body bladder cover.</u>			
	(a) Place the assembled body bladder cover on the body front to the inside at the marked location with the bladder inflation sleeve on the left side; join with a double row of stitching 1/16 inch from the edge 1/16-inch gage. Leave open the inflation sleeve, the leg openings, and 1 inch at the tab location, top, bottom and right side.	301	SSa-2	10-12
21	<u>Attach assembled body protective fly</u>			
	(a) Turn the edge of the cloth under 3/8 inch on the body front. Sew the slide fastener tape side with the protective fly attached, with 1/4 inch of the slide fastener tape exposed, with a double row of stitching 1/16 inch from the folded edge 1/4-inch gage. The slide fastener shall be on the inside with the opening on the top and the closed end extending below the body panel by 1 (plus or minus 1/8) inch.	301	LSd-2	10-12
	(b) Sew the upper body loop tab to the inside of the side-back (front) on the right-hand side of the slide fastener edge as marked on the patterns, forming a box and "X" stitch,	301	LSd-1	10-12

\* TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
22	<p data-bbox="431 395 1410 555">3/8 inch by 1-3/8 inches, 1/16 inch from the edge. The upper loop shall match the hook on the body protective fly. Sew the lower body loop tab 5-1/2 inches (center line to center line) below the upper loop tab. The lower loop shall match the lower hook on the body protective fly.</p> <p data-bbox="431 595 708 627"><u>Make leg sections</u></p> <p data-bbox="431 659 1410 818">(a) Sew a 5/8-inch-wide, bias-cut piece of the basic fabric on the inside of the legs, at the positions marked at the sides of the pocket and at the leg take-ups, with a single row of stitching 1/16 inch from the edge each side of the binding, right and left.</p> <p data-bbox="431 858 1410 1018">(b) Turn the neck of the pockets inside 1/4 inch; sew across the knees at the marked locations with a double row of stitching 1/16 inch from the edge 1/16-inch gage, leaving 1/2 inch at each edge open, the pocket to the outside, the slide fastener closing to the inside.</p> <p data-bbox="431 1058 1410 1185">(c) Sew a 2-1/2-inch-wide, 4-1/2-inch-long reinforcement made of the bladder material, on the inside of the left leg at the position marked for the pile fastener tape, with a single row of stitching 1/8 inch from the edge.</p> <p data-bbox="431 1217 1410 1313">(d) Sew the pile fastener tape on the outside of the left leg, at the marked position, with a single row of stitching 1/16 inch from the edge on all four sides.</p> <p data-bbox="431 1345 1410 1409">(e) Place the webbing, with the loop assembly (part No. 166 or equal) attached to the webbing, on the inside of the</p>			
		301	LSd-1	10-12
		301	LSd-2	10-12
		301	LSa-1	10-12
		301	SSa-1	10-12
		301	LSd-1	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
23	<p>legs. The top edge of the webbing shall be parallel with, and down from the top, 1-3/4 inches. Sew across the back end of the webbing, following the contour of the bladder cover locations, with a single row of stitching. The loop shall face the body and shall match the hook on the leg protective fly.</p> <p><u>Make and attach knife pocket</u></p> <p>(a) Lay the knife pocket reinforcement piece on the pocket fabric, face up, in accordance with the notches and the drill marks. Sew the knife pocket reinforcement piece to the pocket with a single row of stitching 1/16 to 1/8 inch from the edge on all four sides.</p> <p>(b) Fold the pocket fabric lengthwise with the raw edges even. Bind the square end with a 5/16-inch-wide (finished) bias binding with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge. The knife pocket reinforcement shall be on the outside after folding.</p> <p>(c) Bind the straight edge of the small flap reinforcement piece for the top of the pocket with 5/16-inch-wide (finished) bias binding with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge.</p> <p>(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 two top plies of the pocket fabric with a single row of stitching 1/8 (plus or minus 1/16) inch from the edge.</p>	301	SSa-1	10-12
		301	BSc-1	10-12
		301	BSc-1	10-12
		301	SSa-1	10-12

\*

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	(e) Fold the pocket fabric on the center notch. Bind the pocket with 5/16-inch-wide (finished) bias binding, starting at the bottom folded end and sewing the binding around the sides and the top with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge. The reinforcement piece shall be on the inside. The tape shall extend 1/2 inch beyond the end on each side for turning under.	301	BSc-1	10-12
	(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	10-12
	(g) Install a size 00 grommet on the pocket, between the square end and the round end of the flap reinforcement piece, in accordance with the drill marks.			
	(h) Position the reinforcement patch on the left thigh front so that the knife pocket is just inside the bladder case stitch line at the front, bottom and top corners and so that the side of the pocket is parallel to the leg opening slide fastener. Turn the raw edges under 3/8 inch at the bottom and the sides; join with a double row of stitching 1/16 inch from the folded edge 1/4-inch gage. Trim the top even with the top of the thigh.	301	LSd-2	10-12
	(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. Start at the bound opening, and sew down the side, across the bottom, and up to the bound opening, turning the bias end of the tape under on each side and backstitching 1/2 inch on each side, with a double row of stitching 1/16 inch from the edge 1/4-inch gage. The distance	301	LSd-2	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	<p>between the inside longitudinal stitch lines (pocket width) shall be a minimum of 1-3/4 inches.</p> <p>(j) Sew across the bound square end at the top of the pocket opening, securely tacking the top of the pocket to the patch and the anti-g garment, with a single row of stitching.</p> <p>(k) Stamp one snap fastener socket and button to the center of the flap so that the dot on the snap fastener will be at the top of the flap in accordance with the drill marks at the rounded end.</p> <p>(l) Stamp one snap fastener stud and eyelet, reinforced with bladder material on the inside, in the anti-g garment to correspond to the snap fastener socket. If the stud and eyelet location is on top of the binding around the thigh opening, relocate position just below the binding.</p> <p>(m) Thread a 64-inch-long lanyard through the grommet. Tie the lanyard with a square knot. Sear both ends of the lanyard. Fold the lanyard in layers that are approximately 4 inches long. Position the folded lanyard in the pocket, parallel with the pocket, with all of the folds within the pocket. Close the snap fastener.</p> <p>(n) Sew the pile fastener tape for the checklist fastener to the outside of the left leg, at the location shown on figure 5, with a single row of stitching 1/16 inch from the edge on all four sides.</p> <p>(o) Using figure 5 as a guide, sew the pile fastener tape for the checklist fastener to the right leg with a single row of stitching 1/16 inch from the edge of all four sides.</p>	301	SSa-1	10-12
		301	SSa-1	10-12
		301	SSa-1	10-12

\*  
TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
24	<p><u>Attach leg bladder covers</u></p> <p>(a) Place the leg bladder covers on the legs at the marked locations on the patterns. Join down each side, leaving the top and 1 inch at the marked position for the tabs open, with a double row of stitching 1/16 inch from the edge 1/16-inch gage. Fold back 1/4 inch at the neck of the pocket left loose so that the pocket is not stitched through in this operation.</p>	301	LSd-2	10-12
25	<p><u>Attach pockets</u></p> <p>(a) Sew the pockets to the lower legs on the center of the basic fabric bias binding, down each side, with a single row of stitching 1/16 inch from the edge of the pocket binding.</p> <p>(b) Join the pockets at the bottom and the upper edges at the knee opening to the legs with a single row of stitching 1/8 inch from the edge.</p>	301	LSd-1	10-12
		301	SSa-1	10-12
26	<p><u>Bind knee openings and bottom of legs</u></p> <p>(a) Bind the knee openings (including the pockets) and the bottom of the legs (including the pockets) with 5/16-inch-wide (finished) bias binding with a single row of stitching 1/16 (plus or minus 1/32) inch from the edge.</p>	301	BSc-1	10-12
27	<p><u>Join lacer loop tapes to thighs and calves</u></p> <p>(a) Place the eight lacer loop tapes the length of each thigh and each calf, in accordance with the marks on the</p>	301	SSa-2	9-11

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	patterns, with the ends even with the top and the bottom edge, with loops facing loops. Join the lacer loop tapes to each thigh and each calf with a double row of stitching 1/16 inch from the edge 3/16-inch gage.			
28	<p><u>Join pile fastener tape to thighs and calves</u></p> <p>(a) Place the pile fastener tape on the lacer loop tape on each thigh and each calf, 1/8 inch from the loops, and join with a single row of stitching 1/16 inch from the edge.</p>	301	SSa-1	10-12
29	<p><u>Attach assembled leg (thigh and calf) lacer covers</u></p> <p>(a) Turn the raw edge of each assembled leg (thigh and calf) lacer cover under 3/8 inch; place the finished edge of each leg lacer cover on the inner row of the lacer loop tape, edge to edge. Join with a double row of stitching 1/16 inch from the edge 3/16-inch gage.</p>	301	LSa-2	10-12
30	<p><u>Join leg take-ups</u></p> <p>(a) Join the assembled right and left take-ups to the outside at the thigh, in accordance with the pattern marks, down the sides and across the top, with a double row of stitching 1/16 inch from the edge 3/16-inch gage. The slide fasteners shall close at the top.</p> <p>Note: Use proper thread tension and fabric tension to avoid waviness (chain flatness of slide fastener).</p>	301	LSa-2	10
31	<p><u>Sew around reinforcement</u></p> <p>(a) Sew around the edges of the reinforcement inside of the</p>	301	SSa-1	10-12

\* TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
32	<p>leg take-ups with a single row of stitching 1/16 inch from the edge.</p> <p><u>Attach assembled leg protective flies</u></p> <p>(a) Turn the edge of the cloth under 3/8 inch. Place the edge of the cloth down the legs on the slide fastener tapes so that the separating ends of the slide fastener will be at the top, the protective fly will open to the back, the corners at the knee holes will be spaced 3/4 (plus or minus 1/8) inch apart on the slide fastener tapes, and 1/4 inch of the slide fastener tape will be exposed. Join with a double row of stitching 1/16 inch from the edge 1/4-inch gage.</p>	301	LSd-2	10-12
33	<p><u>Install snap fasteners</u></p> <p>(a) Install the snap fastener cap and socket through the lower edge of the legs to the side opposite the protective fly, 7/8 inch from the bottom edge and 5/8 inch from the edge of the slide fastener teeth edge to the center of the snap fastener, with the cap on the face side of the cloth.</p> <p>(b) Install the snap fastener stud and post, to match the snap fastener cap and socket, through the protective flies at the bottom of the legs, approximately 5/8 inch from the edge of the protective fly and 1 inch up from the bottom edge of the legs to the center of the snap fasteners, with the stud to the outside.</p>			
34	<p><u>Join upper ends of legs to body front</u></p> <p>(a) Join the upper ends of the legs to the body front, with</p>	301	LSq-2(a)	10-12

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	<p>the face sides of the material together, in accordance with the marks on the patterns, with a single row of stitching 3/8 inch from the edge.</p> <p>(b) Turn and raise with a single row of stitching 1/16 inch from the folded edge.</p> <p>(c) Sew an additional row of stitching 5/16 inch from the folded edge.</p>	301	LSq-2(b)	10-12
35	<p><u>Insert adjustment laces in take-ups</u></p> <p>(a) Select the adjustment laces in accordance with table VIII.</p> <p>(b) Insert the adjustment laces into the lacer loops for the body take-ups as follows: Start lacing from the bottom similar to lacing shoes. Route the adjustment laces through each lacer loop on each side (loose ends exiting from the top lacer loops). Draw the lacing up so that approximately one-half of the adjustment will be taken up with the lacing. Fold the excess lacing into a hank that is approximately 3 inches long. Wrap the hank with one turn of 2-inch wide tape that conforms to MIL-T-43115.</p> <p>(c) Insert the adjustment laces into the lacer loops for the thigh take-ups in the same manner as specified for the body take-ups in No. 35(b), except that the lacing shall start from the top lacer loops and exit from the bottom lacer loops. Draw the lacing up so that approximately one-half of the adjustment will be taken up with the lacing. Fold the</p>	301	SSa-1	10-12

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TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
36	<p>excess lacing into a hank that is approximately 3 inches long. Wrap the hank with one turn of 2-inch-wide tape that conforms to MIL-T-43115.</p> <p>(d) Insert the adjustment laces into the lacer loops for the calf take-ups in the same manner as specified for the body take-ups in No. 35(b), except that the lacing shall be pulled tight (minimum ankle circumference shall be 12 inches for all sizes except that the minimum ankle circumference for the size large extra long shall be 13-3/4 inches).</p> <p><u>Final assembly</u></p> <p>(a) Install the bladder through the openings at the top of the legs left open for this purpose and into the bladder covers. Insert the bladder tabs through the 1-inch-wide openings; sew with a double row of stitching 1/16 inch from the edge 1/16-inch gage.</p>	301	SSa-2	10-12
37	<p><u>Attach spacer tube to connector</u></p> <p>(a) Wrap the folded end (the end with section A-A of Drawing 74204) with 3-1/2 turns of the wrapping tape. When putting the first turn of wrapping on, compress the end to a width of approximately 3/4 to 7/8 inch forming a gap between the folded section and the main spacer tube. Start wrapping approximately 1/2 inch past the end of the spacer tube, and end up with the last wrap even with the folded up section. Attach a spacer tube that conforms to Drawing 74204 to a connector that conforms to MIL-C-83390 as indicated in section U-U of figure 6.</p>			

TABLE VI. Sewing Operations (Cont)

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
38	<p><u>Attach connector</u></p> <p>(a) Make an insertion tool from a coat hanger or any other suitable wire by clipping and filing the end round.</p> <p>(b) Insert the insertion tool into the turned end of the spacer tube (see -10 on Drawing 74204). Hold the bladder extension and the Trilok (plastic) spacer material with one hand while inserting the spacer tube with the other. Work the spacer tube in slowly so that it lies adjacent to the existing Trilok spacer and so that the spacer extends approximately 4 inches into the body bladder. When spacer tube is completely inserted, hold on to the taped end of the spacer tube from the outside of the body bladder and pull the insertion tool out.</p> <p>(c) Assemble the bladder extension (external tube) and external tube covering the connector (see section U-U of figure 6).</p>			

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TABLE VII. Dimensions of Fastener Tape

Size of Anti-g Garment	Dimensions of Fastener Tape (Inches)				
	Body Lacer Covers <u>1/</u> <u>2/</u>	Thigh Lacer Covers <u>1/</u> <u>2/</u>	Hose Retainers <u>3/</u>	Checklist Retainers <u>4/</u>	Calf Lacer Covers <u>1/</u> <u>2/</u>
Small regular	1 by 9-1/2	1 by 10-5/8	4	2 by 4	1 by 12-1/2
Small long	1 by 9-1/2	1 by 11-1/2	4	2 by 4	1 by 13-1/8
Medium regular	1 by 10	1 by 10-7/8	4	2 by 4	1 by 12-1/2
Medium long	1 by 10	1 by 11-3/8	4	2 by 4	1 by 13-1/8
Large regular	1 by 10	1 by 10-7/8	4	2 by 4	1 by 12-1/2
Large long	1 by 10	1 by 11-1/4	4	2 by 4	1 by 13-1/4
Large extra long	1 by 10	1 by 11-1/4	4	2 by 4	1 by 17-1/4

1/ Since the requirements of table VI specify that the fastener tape for the lacer covers shall be trimmed, if necessary, so that the fastener tape will be even with the top and the bottom edges of the flap, these dimensions are approximate.

2/ Two for each anti-g garment shall be required.

3/ One for each anti-g garment shall be required. The width shall be 1 inch for the hook fastener tape and 2 inches for the pile fastener tape.

4/ Two of the pile fastener tape shall be required.

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TABLE VIII. Adjustment Laces

Size of Anti-g Garment	Length of Adjustment Laces (Feet) <u>1/</u>		
	Waist Area <u>2/</u>	Thigh Area <u>2/</u>	Calf Area <u>2/</u>
Small regular	12	12	14
Small long	12	13	16
Medium regular	12	13	16
Medium long	12	14	17
Large regular	13	14	17
Large long	13	16	19
Large extra long	13	16	19

1/ The dimensions specified in this table are approximate and shall be governed by the following requirement: Both ends of each adjustment lace shall extend at least 6 inches beyond the open end of the lacing tape when the adjustment laces are completely extended. Both ends of each adjustment lace shall be dipped in a hot solution of 50 percent beeswax and 50 percent paraffin.

2/ Two per anti-g garment shall be required.

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3.6.2 Bladder. The bladder shall be constructed as follows: The polyurethane coated nylon taffeta cloth specified for the bladder in 3.4.1.2 shall be cut in accordance with the applicable patterns. The bottom half of the bladder, with the coated surface face up, shall be laid on a clear flat surface. Four strips of the spacer material specified in 3.4.4 shall be cut in lengths required by the applicable pattern except that the horizontal spacer extending across the inside of the abdominal bladder shall have approximately 2 to 3 inches of slack (the length of spacer between the two patches in the abdominal bladder shall be 2 to 3 inches longer than the distance, in the flat, between the two patches). The width of the spacer in the bladder extension and the abdominal bladder shall be  $3/4$  inch. The width of the leg spacers shall be 1 inch. The ends of the legs and abdominal spacer material shall be overlapped and joined to patches that are made of the polyurethane coated nylon taffeta cloth specified in 3.4.1.2 and that are approximately 1 inch by  $1-3/4$  inches by bartacking as shown in figures 1 and 2. Two additional pieces of spacer material 1 inch wide by 10 inches long shall be sewn to the upper portion of the leg spacer material (one length per leg). The upper end of the piece of spacer material that is 1 inch by 10 inches shall be placed approximately 1 inch below the patch joining the leg spacer to the abdominal spacer and shall be sewn to the leg spacer with two rows of stitching  $1/4$  inch from each edge of the leg spacer with the thread specified in 3.4.14, seam type L<sub>S</sub>a-2 of FED-STD-751, 8 stitches per inch, and all ends backstitched a minimum of 1 inch. The bladder extension spacer material shall be overlapped on the abdominal spacer material approximately  $2-1/2$  inches from the joint between the leg and abdominal spacer material and shall be similarly bartacked (no patch). The spacer material (anti-block system) shall be positioned on the coated side of the bottom half of the bladder as indicated on the applicable pattern and then secured by cementing patches to the bottom of the bladder as shown in figure 1. The top half of the bladder shall be superimposed and aligned on the bottom half of the bladder. The width of the seam tape shall be folded in half. The folded seam tape shall be inserted along the entire inside of the bladder perimeter so that the coated side of the seam tape will be in contact with the coated side of the bottom and the top halves of the bladder. The seam tape and the bladder shall be positioned and thermally bonded together so that the bonded area will be  $1/8$  (plus or minus  $1/32$ ) inch wide,  $3/8$  (plus or minus  $1/16$ ) inch from the edge of the bladder, and  $1/16$  inch from each side of the seam tape. The bonded seam shall be straight, continuous, and parallel to the edge of the bladder. No part of the spacer material or of the attachment patches shall be caught in any portion of the bonded seam. If splicing of the seam tape is necessary to obtain the required length, the ends shall be butt seamed and joined together with seam tape  $1/2$  inch by 1 (plus or minus  $1/16$ ) inch, coated on both sides. The completed bladder shall then be inflated to 2 pounds per square inch

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(psi). The seams of the inflated bladder shall be inspected for proper joining and adhesion. The inflatable area of the completed bladder shall be not more than 5/8 inch nor less than 1/4 inch from the edge of the patterns. The inflatable area of the completed bladder shall in no case be more than 3 percent smaller than the area of the patterns. The upper tab of the finished bladder shall be stamped for identification with the abbreviated anti-g garment size.

\* 3.7 Performance

- \* 3.7.1 Leakage. When the bladder in the anti-g garment is inflated to a pressure of 12 psi, the bladder shall not lose more than 0.5 psi of air pressure in 60 seconds.
- \* 3.7.2 Endurance. When the anti-g garment is inflated 1,000 times to a pressure of 15 psi, the anti-g garment shall not develop any structural defects. Structural defects shall include, but not be limited to, material torn, seam separation, slide fastener slider lock broken, slide fastener chain separated, or clamps loosened or broken. After the anti-g garment has been inflated 1,000 times to a pressure of 15 psi, the anti-g garment shall meet the requirements in 3.7.1.
- \* 3.7.3 Inflation time. With a free air flow of 10 cubic feet per minute and with a back pressure of 9 to 12 psi applied from the pressure source, the anti-g garment shall inflate to a pressure of 8 psi in not more than 3 seconds.
- \* 3.7.4 Low temperature storage. The anti-g garment shall not be adversely affected by storage at a temperature of minus 60 degrees Fahrenheit.
- \* 3.7.5 High temperature storage. The anti-g garment shall not be adversely affected by storage at a temperature of plus 160 degrees Fahrenheit.
- \* 3.7.6 Low temperature operation. The anti-g garment shall operate satisfactorily at a temperature of minus 30 degrees Fahrenheit.
- \* 3.7.7 Bond strength (bladder). The force required to separate the bonded tape from the bladder shall be not less than 40 pounds.

- \* 3.8 Finished measurements. The finished measurements of the length of the sleeve assembly for all sizes of the anti-g garment shall be 17 inches (plus or minus 1/4 inch). Except for the sleeve assembly, the finished measurements of the anti-g garment shall be as specified in table IX. The minimum finished measurements specified in table IX shall be the measurements of the finished anti-g garment when its adjustment laces are tight. The maximum finished measurements specified in table IX shall be the measurements of the finished anti-g garment when its adjustment laces are loose and the fabric is stretched to the limit of the solid fabric with the lacer cover closed. The finished measurements (see figure 7) shall be taken with the body slide fastener and the leg slide fasteners open and as follows: Measure the waist circumference straight across the top edge of the waist. Measure the thigh circumference straight across the top edge of the cut out. Measure the leg length at the slide fastener location from the top to the bottom of the slide fastener of the leg opening. Measure the ankle circumference straight across the leg terminal. Measure the length of the sleeve assembly from the end of the nose piece of the connector (see the figure entitled "Connector" of MIL-C-83390) to the end of the stitching of the bladder cover to the body (front) at the bladder neck opening (see body (front) pattern).

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TABLE IX. Finished Measurements

Size of Anti-g Garment	Finished Measurements in Inches							
	Waist Circumference <u>1/</u>		Thigh Circumference <u>2/</u>		Leg Length at Fastener Location <u>3/</u>		Ankle Circumference	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum <u>4/</u>	Maximum <u>5/</u>
Small regular	29-1/2	34-1/2	21	26	26	26	12	15
Small long	29	34-1/4	20-3/4	25-1/2	28	28	12	15
Medium regular	32-1/4	38-1/4	22-1/4	27-1/4	26-1/2	26-1/2	12	15
Medium long	32	38	22-1/2	27-1/2	28-1/2	28-1/2	12	15
Large regular	35-1/4	41	23-1/2	28-3/4	27	27	12	15
Large long	35-1/2	41-1/4	24	29	29	29	12	15
Large extra long	35-1/2	41-1/4	24	29	33	33	13-3/4	16-3/4

1/ The tolerance shall be plus 3/4 or minus 1/2 inch.

2/ The tolerance shall be plus 1/2 or minus 3/8 inch.

3/ The tolerance shall be plus or minus 1/2 inch.

4/ The tolerance shall be plus 0 or minus 1/2 inch.

5/ The tolerance shall be plus or minus 1/4 inch.

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- 3.9 Color. The color of the materials of the anti-g garment shall be as specified herein. Materials for which color requirements have not been specified and which are hidden by the construction may be used in natural or colored form. The color of all exposed sewing threads shall approximately match the color of the basic fabric specified in 3.4.1.1.
- 3.10 Identification of product
- 3.10.1 Labels. Each anti-g garment shall have a contractor's label, a size label, and an instruction label. The anti-g garment is intended to be laundered.
- 3.10.1.1 Contractor's label. The contractor's label shall conform to type I, class 1 of DDD-L-20 and shall be approximately 2-1/2 inches by 1-1/2 inches. The label shall contain the following information:

Anti-g Garment, Cutaway, CSU-13B/P  
 Specification 1/  
 Manufacturer's Identification 1/  
 Contract or Order No. 1/

1/ The manufacturer shall insert the applicable information.

- 3.10.1.2 Size label. The size label shall conform to type I, class 2 of DDD-L-20 and shall be approximately 2-1/2 inches by 1-1/2 inches. In addition to the adjective size, the size label shall contain the stature and the weight ranges (see 6.4) and the stock number of the anti-g garment in the following manner:

Size 1/  
 Stature 1/ Weight 1/  
 Stock No. 1/

1/ The manufacturer shall insert the applicable information.

- \* 3.10.1.3 Instruction label. The instruction label shall conform to type I, class 2 of DDD-L-20 and shall be approximately 2-1/2 inches by 1-1/2 inches. The instruction label shall contain the following information:

DO NOT IRON OR DRY CLEAN.  
 PLUG AIR INLET PORT SECURELY.  
 WASH WITH MILD SOAP AND WITH WATER NOT OVER 120° F.

THE MATERIAL OF THE OUTER SHELL OF THIS ANTI-G GARMENT IS AN INHERENT FIRE RESISTANT MATERIAL THAT WILL NOT MELT OR DRIP AND CAN BE LAUNDERED WITHOUT LOSING ITS FIRE RESISTANT PROPERTIES. NO RETREATMENT IS NECESSARY.

- \* 3.10.2 Special identification. The abdominal area of each anti-g garment that has been subjected to the endurance test described in 4.7.3 shall be marked, with waterproof ink, in letters that are at least 1 inch high. The marking shall be as follows: ENDURANCE TESTED - NOT TO BE USED IN FLIGHT.

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- \* 3.11 Patterns. The standard patterns referenced on Drawings 71380 through 71386 and on Drawing 74206 will be furnished by the Government (see 6.2). The standard patterns show size, directional lines, and notches for the proper assembly of the parts of the anti-g garment. The standard patterns shall be used by the manufacturer as a guide in cutting the manufacturer's working patterns. The manufacturer's working patterns shall be identical in size and shape to the standard patterns. Neither the standard patterns nor the manufacturer's working patterns shall be altered in any way.
- \* 3.11.1 Directional line. A straight line with an arrow at each end and the word straight affixed to the straight line marked on a pattern part indicates the straight of the material which is also defined as the warp or lengthwise direction of the cloth or fabric. The pattern part shall be laid on the cloth so that the straight line with the arrows indicating the straight of the fabric is parallel to the selvage edge (lengthwise) of the fabric. This shall be accomplished by placing the straight line on the lengthwise grain of the fabric as follows: Measure the distance, at two points, from the straight line to the selvage. Adjust the pattern part until the distance from the straight line to the selvage is the same from both points (see figure 8).
- \* 3.12 Government loaned property. A connector conforming to MS27755 to be used to test the anti-g garment will be loaned, upon request, by the Government (see 4.3.2 and 6.2).
- \* 3.13 Workmanship. Inasmuch as the correct functioning of the anti-g garment directly affects the safety of personnel, workmanship shall be equal to, or better than, the highest grade of manufacturing practices to insure a minimum opportunity for the development of defects in the anti-g garment while it is in service.

## 4. QUALITY ASSURANCE PROVISIONS

- 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.
- \* 4.2 Classification of inspection. The inspection of the anti-g garment shall be classified as follows:
  - (a) Qualification inspection
  - (b) First article inspection
  - (c) Quality conformance inspection.

#### 4.3 Test conditions

4.3.1 Atmospheric conditions. Unless otherwise specified herein, all tests required by this specification shall be made at an atmospheric pressure of 28 to 32 inches of mercury, at a temperature of 77 degrees (plus or minus 18 degrees) Fahrenheit, and at a relative humidity of 80 percent or less. Where tests are made with atmospheric pressure or temperature substantially different from these values, proper allowance shall be made for the change in instrument reading.

4.3.2 Connector. A connector conforming to MS27755 (see 3.12 and 6.2) shall be used to connect the anti-g garment to the air source for tests that require inflation and deflation cycling of the anti-g garment.

4.3.3 Air. The air used to test the anti-g garment as specified herein shall not contain any oil or liquid water.

4.4 Qualification inspection. The qualification samples described in 4.4.1 shall be subjected to the qualification inspection. The qualification inspection for the two anti-g garments shall consist of the test methods described in 4.7.1 through 4.7.7. The qualification inspection for the bladder shall consist of the test method described in 4.7.8. The qualification inspection for the uncoated and the coated cloth shall consist of the test methods listed in table X and table XI, respectively.

4.4.1 Qualification samples. The qualification samples shall consist of one anti-g garment in size large long, one anti-g garment in size medium regular, two complete bladders in size medium regular, one complete bladder in size large long, 1 linear yard of uncoated nylon taffeta cloth, and 1 linear yard of polyurethane coated nylon taffeta cloth. (Note: Although the qualification samples include three bladders, only one bladder shall be subjected to the qualification inspection.)

4.4.1.1 Samples for qualifying activity. Qualification samples consisting of the two anti-g garments tested as specified in 4.4 and of the two untested bladders shall be furnished to the qualifying activity (see 6.6).

4.4.2 Test report. A qualification test report prepared in the format specified in MIL-STD-831 shall be furnished to the qualifying activity (see 6.6).

4.5 First article inspection. The first article samples specified in 4.5.1.1 shall be subjected to the first article inspection. The first article inspection for the anti-g garment shall consist of the test methods described in 4.7.1 through 4.7.7. The first article inspection for the bladder shall consist of the test method described in 4.7.8. The first article inspection for the uncoated and the coated cloth shall consist of the test methods listed in tables X and XI, respectively.

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TABLE X. Testing of Uncoated Cloth

Characteristics (See Table I)	Test Methods <u>1/</u>
Material identification	<u>2/</u>
Weight	5041 of FED-STD-191
Yarns per inch	5050 of FED-STD-191
Breaking strength	5100 of FED-STD-191
Tearing strength	5134 of FED-STD-191

1/ Unless otherwise specified in the applicable test method, one determination shall be made.

2/ The manufacturer's certificate of compliance will be acceptable for this requirement.

TABLE XI. Testing of Coated Cloth

Characteristics (See Table II)	Test Methods <u>1/</u> <u>2/</u>	Inspection Levels of MIL-STD-105	Acceptable Quality Levels (Defects per 100 Units)
Material identification	<u>3/</u>	S-1	2.5
Weight	5040 or 5041 of FED-STD-191	S-1	2.5
Breaking strength	5100 of FED-STD-191	S-1	2.5
Air leakage	see 4.7.9.1	S-1	2.5
Adhesion	see 4.7.9.2	S-1	2.5

1/ The sample unit shall be 1 linear yard of the polyurethane coated nylon cloth. Unless otherwise specified in the applicable test method, one determination per sample unit shall be made.

2/ The inspection of the coated cloth shall be conducted at the contractor's or the subcontractor's plant.

3/ The manufacturer's certificate of compliance will be acceptable for this requirement.

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- \* 4.5.1 First article samples. The first article samples shall be manufactured after the award of the contract and before production of the anti-g garment is commenced. The first article samples shall consist of the items specified in 4.5.1.1 and 4.5.1.2 and shall be representative of the materials, the components, the construction, and the workmanship to be used in the production items. If a manufacturer is in continuous production of the anti-g garments from contract to contract, inspection and submission of further first article samples may be waived at the discretion of the procuring activity (see 6.2). Approval of the first article samples or the waiver of the first article inspection shall not preclude the requirements for the performance of the quality conformance inspection.
- \* 4.5.1.1 Tested samples. The manufacturer of the anti-g garments shall subject two anti-g garments in size medium long, 2 bladders in size medium long, 1 linear yard of uncoated nylon taffeta cloth, and 1 linear yard of polyurethane coated nylon taffeta cloth to the first article inspection described in 4.5.
- \* 4.5.1.2 Untested samples. The manufacturer of the anti-g garments shall furnish one anti-g garment in size medium long and one complete bladder in size medium long, which have not been tested, to the procuring activity (see 6.2).
- \* 4.5.2 First article test report. When specified by the procuring activity (see 6.2), the manufacturer shall furnish a first article test report that has been prepared in accordance with MIL-STD-831. If applicable, recommendations and comments pertinent for use in monitoring the production of the anti-g garments shall be forwarded with the first article test report.
- \* 4.6 Quality conformance inspection. Quality conformance inspection shall consist of the following:
  - (a) Individual inspection
  - (b) Sampling inspection.
- \* 4.6.1 Individual inspection. Each anti-g garment shall be subjected to the following test methods as described under 4.7:
  - (a) Examination of product
  - (b) Leakage.
- \* 4.6.2 Sampling inspection. Sampling inspection shall be conducted in accordance with plans A and B for the end items and components and in accordance with plan C for the materials.

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- \* 4.6.3 Plans for end items and components
- \* 4.6.3.1 Lot formation. Each lot for plan A shall consist of 500 anti-g garments that have been manufactured essentially under the same conditions and submitted for inspection at substantially the same time. Each lot for plan B shall consist of 501 bladders that have been manufactured essentially under the same conditions and submitted for inspection at substantially the same time. A fraction of a lot shall not be permitted for plan A unless the total quantity of the anti-g garments required to be delivered during a specified period under the contract is less than 500 anti-g garments.
- \* 4.6.3.2 Plan A. Two anti-g garments shall be selected at random from each lot of anti-g garments or fraction thereof provided a fraction of a lot is permitted. Each anti-g garment selected as a sample shall be subjected to the following test methods as described under 4.7:
  - (a) Endurance
  - (b) Inflation time.
- \* 4.6.3.3 Plan B. One bladder shall be selected at random from each lot of bladders or fraction thereof provided a fraction of a lot is permitted. The bladder selected as a sample shall be subjected to the test method described in 4.7.8.
- \* 4.6.3.4 Rejection and retest. When one or more items selected from a lot in accordance with plan A or B fail to meet the specification, acceptance of all items in the lot shall be withheld until the extent and cause of the failure have been determined. The contractor shall explain fully to the Government representative and notify the procuring activity in writing the cause of failure, the action taken to preclude recurrence, and the impact this failure may have in scheduled deliveries. After correction, all of the sampling tests shall be repeated.
- \* 4.6.3.5 Individual tests may continue. For production reasons, individual inspection or other sampling plans may be continued pending the investigation of a sampling test failure. Final acceptance of the entire lot or lots produced later shall not be made until it is determined that all items meet all the requirements of the specification.
- \* 4.6.3.6 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all defects likely to be found and the method of correcting them.
- \* 4.6.4 Plan C for materials. Samples of the polyurethane coated nylon taffeta cloth shall be selected and tested as specified in table XI to determine conformance to the requirements specified in table II.

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- \* 4.6.5 Examination of packing, packaging, and marking. Shipping containers fully prepared for delivery shall be examined, for the defects listed in table XII, to determine conformance of packaging, packing, and marking to the requirements specified herein. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 of MIL-STD-105. The acceptable quality level shall be 4.0 defects per 100 units. The sample unit shall be one shipping container fully prepared for delivery except that it need not be sealed.

TABLE XII. Packing, Packaging, and Marking

Examine	Defect
Marking (exterior and interior)	Marking omitted, incorrect; illegible; or improper size, location, sequence, or method of application
Materials	Any component missing Any component damaged, affecting serviceability
Workmanship	Inadequate application of components such as incomplete closure of case liners or container flaps, loose strapping, or inadequate stapling Bulging or distortion of containers
Contents	Number of intermediate packages more or less than required or gross or net weight exceeding requirement

\* 4.7 Test methods

- \* 4.7.1 Examination of product. The anti-g garment shall be examined to determine compliance with the requirements of this specification with respect to materials, finished measurements, identification marking, and workmanship. Defects found during this examination shall be classified as specified in table XIII. If the anti-g garment contains any major defect, the anti-g garment shall be rejected. If the anti-g garment contains two or more minor defects, the anti-g garment shall be rejected.

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TABLE XIII. Classification of Defects

Defect	Major Defect	Minor Defect
<u>Materials</u>		
Materials not conforming to specified requirements unless otherwise classified herein	X	
<u>Fabric imperfections</u>		
See FED-STD-4 1/		
<u>Slide fasteners</u>		
Fabric seam on tape catching in slider or slider not operating freely	X	
Slide fastener not specified type, style, or length	X	
Any part of slide fastener assembly omitted, bent, or broken	X	
Pull tabs missing	X	
Stiffeners missing	X	
Pull tabs not specified type		X
Stiffeners not specified type		X
<u>Color</u>		
Color not matching specified color shade		X
Any component not specified color	X	
<u>Snap fasteners</u>		
Insecurely clinched stud, damaged spring, or damaged or missing snap fastener	X	
Stud not aligned with the socket causing noticeable bulge or twist when snapped		X
Stud mismatched with socket	X	

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TABLE XIII. Classification of Defects (Cont)

Defect	Major Defect	Minor Defect
Snap fastener not holding together	X	
Snap fasteners not separating under normal pull <u>2</u> / <sub>1</sub>	X	
<u>Assembly</u>		
Incorrectly assembled, that is, reversed seams, not specified type of seam, not specified type of stitch, or misplaced or reversed components	X	
Incompletely assembled, that is, any component or required operation omitted	X	
<u>Identification of product</u>		
Any label missing, misplaced, illegible, or information on label incorrect or incomplete		X
<u>Workmanship</u>		
Holes, cuts, tears, or needle chews	X	
Darns or mends affecting serviceability	X	
Darns or mends affecting appearance		X
Stains, oil spots, or dirt over 1/4 inch in diameter	X	
Stains, oil spots, or dirt up to 1/4 inch in diameter in not more than two places		X
Stains, oil spots, or dirt up to 1/4 inch in diameter in three or more places	X	
<u>Measurements</u>		
Any finished measurement not within specified tolerance	X	
* Width of inside opening of knife pocket (distance between longitudinal stitch lines) less than 1-3/4 inches	X	

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TABLE XIII. Classification of Defects (Cont)

Defect	Major Defect	Minor Defect
<u>Hook assembly</u>		
Hook assembly not specified type	X	
Hook not aligned with loop (tolerance 1/8 inch) <u>3/</u> -more than 1/8 inch but less than 1/4 inch -more than 1/4 inch	X	X
<u>Stitches and seams</u>		
Open seam	X	
Stitching missing, broken, skipped, or cut	X	
Run-offs	X	
Stitching margins unless otherwise classified herein <u>4/</u> -up to 1/16 inch stitching margins not within tolerance of plus 1/32 or minus 0 inch	X	
-over 1/16 inch to 1/4 inch stitching margins (tolerance plus 1/32 or minus 0 inch) that exceed plus tolerance less than plus 1/16 inch		X
-over 1/16 inch to 1/4 inch stitching margins (tolerance plus 1/32 or minus 0 inch) that exceed tolerance more than plus 1/16 inch or more than minus 1/32 inch	X	
-over 1/4 inch to 1/2 inch stitching margins (tolerance plus 1/16 inch or minus 1/32 inch) that exceed tolerance by more than plus 1/16 inch or more than minus 1/32 inch	X	
-over 1/4 inch to 1/2 inch stitching margins (tolerance plus 1/16 inch or minus 1/32 inch) that exceed tolerance less than plus 1/16 inch or less than minus 1/32 inch		X

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TABLE XIII. Classification of Defects (Cont)

Defect	Major Defect	Minor Defect
Seams not within tolerance of plus or minus 1/32 inch		
-up to 1/4-inch seams that exceed tolerance up to plus 1/32 inch		X
-up to 1/4-inch seams that exceed tolerance more than plus or minus 1/32 inch	X	
-over 1/4-inch seams that exceed tolerance up to plus 1/16 inch		X
-over 1/4-inch seams that exceed tolerance more than plus 1/16 inch or minus 1/32 inch	X	

- 1/ Fabric imperfections that would affect the appearance or the function of the anti-g garment shall be considered major defects.
- 2/ The snap fastener shall be checked for proper function and attachment by snapping closed and unsnapping the snap fastener at least three times.
- 3/ The hook assembly shall be checked by attaching the hook to the loop and closing the slide fastener. Alignment of the hook assembly shall not interfere with the slide fastener operation.
- 4/ This classification of defects for stitching margins shall not apply to any stitching margins for which a tolerance has been specified in table VI. A stitching margin that is not within the tolerance specified in table VI shall be classified as a major defect.

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- \* 4.7.2 Leakage. The bladder in the anti-g garment shall be inflated to a pressure of 12 psi by means of a suitable connection arranged so that the pressure of the bladder will be indicated by a gage. The air supply shall be shut off securely. After a minimum of 60 seconds the pressure in the bladder shall be checked and readjusted, if necessary, to the original pressure of 12 psig. A minimum of 60 seconds after the pressure has been checked and readjusted, the pressure in the bladder shall be checked. If the pressure in the bladder is less than 11.5 psig, the anti-g garment shall be rejected. While the anti-g garment is still inflated, it shall be examined for material and constructional failure, separation of seams and components, change in location of slide fastener sliders, separation of slide fastener chains, and twisting and distortion of the anti-g garment. If the anti-g garment contains any of these defects, it shall be rejected. After this examination is completed, the bladder of the anti-g garment shall be completely deflated.
- \* 4.7.3 Endurance. The anti-g garment shall be fitted to the inanimate model specified in 4.8. The anti-g garment shall be inflated 1,000 times, in accordance with table XIV, to a pressure of not less than 15 psi and then examined for structural defects. If the anti-g garment contains any of the defects specified in 3.7.2, the anti-g garment shall be rejected. After the anti-g garment has been examined for defects, the anti-g garment shall be subjected to the leakage test described in 4.7.2.

TABLE XIV. Inflation of Anti-g Garment

Minimum Pressure (psi)	Maximum Seconds Permitted to Inflate Garment to Minimum Pressure	Minimum Seconds Permitted to Deflate Garment to Zero psi (Gage Pressure Reading)	Minimum Cycles
15	8	4	5 per minute
12	8	4	5 per minute
6	30	10	10 per hour

- \* 4.7.4 Inflation time. The anti-g garment shall be fitted to the inanimate model specified in 4.8. The anti-g garment shall be connected to a source of air with a free flow of 10 cubic feet per minute. The regulator shall be adjusted so that the pressure shall not exceed 12 psi. The bladder in the anti-g garment shall inflate to a pressure of 8 psi in not more than 3 seconds when the pressure is applied.
- \* 4.7.5 Low temperature storage. The anti-g garment shall be packaged in a corrugated box with maximum dimensions of 13-1/2 by 4-1/2 by 8-1/2 inches. The packaged anti-g garment shall be subjected to a temperature of minus 60 degrees Fahrenheit or colder for at least 48 hours. The packaged anti-g garment shall then be kept at room temperature for at least 24 hours. The anti-g garment shall be removed from the box, fitted to the inanimate model specified in 4.8, and inflated 500 times, in accordance with table XIV, to a pressure of not less than 12 psi. At the completion of this test, the anti-g garment shall be examined for failures or defects in the material or workmanship. Structural defects or any other defects shall be cause for rejection of the anti-g garment.
- \* 4.7.6 High temperature storage. The anti-g garment shall be packaged in a corrugated box with maximum dimensions of 13-1/2 by 4-1/2 by 8-1/2 inches. The packaged anti-g garment shall be subjected to a temperature of plus 160 degrees Fahrenheit or warmer for at least 4 hours. The packaged anti-g garment shall then be kept at room temperature for at least 24 hours. The anti-g garment shall be removed from the box, fitted to the inanimate model specified in 4.8, and inflated 500 times, in accordance with table XIV, to a pressure of not less than 12 psi. At the completion of this test, the anti-g garment shall be examined for failures or defects in the material or workmanship. Structural defects or any other defects shall be cause for rejection of the anti-g garment.
- \* 4.7.7 Low temperature operation. The anti-g garment shall be subjected to a temperature of minus 30 degrees Fahrenheit or colder for a period of 4 hours. During the 4-hour period the anti-g garment is being subjected to the minus 30 degrees Fahrenheit, it shall be inflated at the rate of 10 times per hour to a pressure of not less than 6 psi in accordance with table XIV. At the completion of this test, the anti-g garment shall be examined for failures or defects in the material or workmanship. Structural defects or any other defects shall be cause for rejection of the anti-g garment.
- \* 4.7.8 Bond strength (bladder). Five specimens shall be cut from different locations of the bladder so that the specimens will be representative of the sealing of the entire bladder. The specimens shall be taken from the straight of the bladder only. Each of the specimens shall be cut across and perpendicular to the seam of the bladder and shall be 1 inch (plus

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or minus 1/16 inch) wide and 6 inches (plus or minus 1/16 inch) long. A suitable inspection apparatus equipped with an autographic recording device (see test method 5100 of FED-STD-191) shall be used to conduct the bond strength test. The front clamp of each jaw of the inspection apparatus shall be 1 inch by 3 inches. The rate of separation of the jaws of the inspection apparatus under no load shall be 12 inches (plus or minus 1/2 inch) per minute. One of the free ends of a specimen (an end that is not bonded) shall be placed in the upper jaw of the inspection apparatus. The other free end of the specimen shall be placed in the lower jaw of the inspection apparatus. The bonded portion (seam of bladder) of the specimen shall be in the center between the two jaws. The jaws shall be separated until either breakage of the cloth or separation of the bond occurs. The highest value required to separate the bonded specimens or to break the cloth shall be recorded as the test result of the individual bonded specimen. This test shall be repeated until the other four specimens have been tested for bond strength. The lowest value obtained from the tests of the five specimens shall be reported as the test result for the bond strength test and shall be not less than 40 pounds.

\* 4.7.9 Coated nylon taffeta cloth

\* 4.7.9.1 Air leakage. Three, 13-inch-diameter specimens of the coated nylon taffeta cloth specified in table II shall be individually inspected for air leakage. An apparatus conforming to figure 9, or equivalent, shall be used for this inspection. The specimen with the coated side down shall be placed on the specimen holder. The rubber gasket shall be placed on the cloth side of the specimen. The plate collar shall be placed on the gasket. The specimen holder, the specimen, the gasket, and the collar shall then be securely bolted together so that a leaktight fit shall result. A sufficient amount of water to keep the cloth side surface of the specimen completely covered during the inspection shall be placed on the cloth side of the specimen. The specimen shall then be inflated with air (see 4.3.3) to a pressure of 7 psig. This pressure shall be maintained for 5 minutes (plus or minus 1/2 minute). While this pressure is maintained, the specimen shall be observed for leakage through the top of the plate collar. Any air bubbles on the cloth side surface, which are produced by air pressure closing the spaces between the cloth and the coating, shall be removed. A continuous production (flow) of air bubbles is an indication of leakage and shall be cause for rejection. This test shall be repeated until the other two specimens have been tested for air leakage.

\* 4.7.9.2 Adhesion. Ten specimens of the coated nylon taffeta cloth specified in table II shall be tested for adhesion. Each specimen shall be cut 1 inch (plus or minus 1/16 inch) wide and 6 inches (plus or minus 1/16 inch) long, with the length dimension in the warp direction of the coated nylon taffeta cloth. One of the specimens shall be superimposed and aligned on another of the specimens, with the coated sides in contact. The two specimens,

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without seam tape between them, shall be thermally bonded together, across their entire width, 1/4 inch from the end. The width of the seal (adhesive bond) shall be 1/8 inch (plus or minus 1/32 inch). A suitable inspection apparatus equipped with an autographic recording device (see test method 5100 of FED-STD-191) shall be used to conduct the adhesion test. The front clamp of each jaw of the inspection apparatus shall be 1 inch by 3 inches. The rate of separation of the jaws of the inspection apparatus, under no load, shall be 12 inches (plus or minus 1/2 inch) per minute. One of the free ends of a specimen (an end that is not bonded) shall be placed in the lower jaw of the inspection apparatus. The other free end of the bonded specimens shall be placed in the lower jaw of the inspection apparatus. The bonded portion of the specimens shall be in the center between the two jaws. The jaws shall be separated until either breakage of the cloth or separation of the bond occurs. The highest value required to separate the bonded specimens or to break the cloth shall be recorded as the test result of the individual bonded specimens. This test shall be repeated until the other eight specimens have been tested for adhesion. The lowest value obtained from the tests of the five pairs of specimens shall be reported as the test result for the adhesion test and shall be not less than 20 pounds.

- \* 4.8 Inanimate models. Two inanimate models, each consisting of two legs and one torso, shall be required. The anti-g garments in sizes small regular and small long shall be fitted to the small model. The anti-g garments in sizes medium regular, medium long, large regular, large long, and large extra long shall be fitted to the large model. The inanimate models shall conform to figure 10 and table XV.

TABLE XV. Models

Models	Leg Dimensions in Inches <u>1/</u>						
	A	B <u>2/</u>	C <u>2/</u>	D	E		
Small	33	6-3/4	2-11/16	1-1/4	1-1/4		
Large	33	7-3/16	3-1/16	1-1/4	1-1/2		
Models	Torso Dimensions in Inches <u>1/</u>						
	G	H	I	J	K	L	M
Small	14-1/4	12-3/4	8-1/16	10-1/8	6-13/16	1-1/4	1-1/4
Regular	14	13-3/4	9-1/8	11-3/8	7-15/16	1-1/4	1-1/2

1/ Tolerances on all dimensions shall be plus or minus 1/16 inch.

2/ Dimensions B and C are diameters.

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- \* 4.8.1 Fitting anti-g garment to models. Fitting of the anti-g garments for all tests that require the use of the inanimate models shall be accomplished as follows: Wooden or plastic spacers shall be inserted between the anti-g garment and the model. The spacer for the torso section shall be 4 inches wide by 12 to 14 inches long by 3/4 inch thick and shall be inserted so that the 4-inch width will face the model. The spacer for each leg shall be 2 inches wide by 12 to 14 inches long by 3/4 inch thick and shall be inserted so that the 2-inch width will face the model. The adjustment laces of the anti-g garment shall then be taken up and tied so that the anti-g garment will fit snugly, but not tightly, around the abdomen and thighs. All slide fasteners shall be in the fully closed position. The model shall be placed in a sitting position approximately that of a pilot seated in the cockpit of an aircraft with the seat back angle of approximately 15 degrees. If a snug fit cannot be obtained at the waist of the sizes large long and large extra long anti-g garments, shims shall be affixed to the model on both sides of the I and K dimensions shown on figure 10. All spacers shall be removed prior to commencement of the tests.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A

5.1.1.1 Unit packaging. Each anti-g garment shall be folded in accordance with good commercial practice and in a manner to form a compact package. The folded anti-g garment shall be placed in a bag that is made of polyethylene conforming to L-P-378. The excess air shall be removed from the bag. After the excess air has been removed from the bag, the bag shall be heat sealed.

5.1.1.2 Intermediate packaging. Each anti-g garment packaged as specified in 5.1.1.1 shall be placed in a snug-fitting box conforming to type optional, class domestic, grade 275 of PPP-B-636. Closure of the box shall be in accordance with the appendix of the box specification.

5.1.2 Level C. Anti-g garments shall be packaged to afford adequate protection against physical damage during shipment from the supply source to the first receiving activity. If the requirements specified herein are met, the supplier's standard practice may be used for level C packaging.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2). Shipping containers packed with anti-g garments that have not been tested for endurance shall not contain any anti-g garments that have been tested for endurance. (see 5.3.1 and 6.2).

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5.2.1 Level A. Ten garments of the same size and packaged as specified in 5.1.1.1 and 5.1.1.2 shall be packed in a box conforming to type SF, class weather resistant, style RSC, grade V2s or V3s of PPP-B-636. Closure and strapping of the box shall be in accordance with the appendix of the box specification.

5.2.2 Level B. Ten garments of the same size and packaged as specified in 5.1.1.1 and 5.1.1.2 shall be packed in a box conforming to type CF, class domestic, style RSC, variety DW, grade 275 of PPP-B-636. Closure of the box shall be in accordance with the appendix of the box specification.

5.2.3 Level C. Anti-g garments shall be packed in a manner that will insure acceptance by the carrier and safe delivery at destination. Shipping containers shall conform to the rules and regulations applicable to the mode of transportation.

5.3 Marking. Unit packages, intermediate packages, and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.1 Special marking. The shipping containers for anti-g garments that have been subjected to the endurance test specified in 4.7.3 shall be marked, in letters that are at least 1 inch high, with the following information: ENDURANCE TESTED - NOT TO BE USED IN FLIGHT.

## 6. NOTES

6.1 Intended use. The anti-g garment covered by this specification is intended to be worn by fighter aircraft pilots to counteract G forces.

\* 6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification
- (b) Size required (see 1.1)
- (c) Waiver or requirements for first article inspection, including first article test reports and shipping instructions (see 3.2 and 4.5 through 4.5.2).
- (d) Government furnished patterns (see 3.11)
- (e) Government loaned connector (see 3.12 and 4.3.2)
- (f) Selection of applicable levels of preservation and packaging and packing (see 5.1 and 5.2)
- (g) Destination of tested anti-g garments (see 5.2 and 6.5).

\* 6.3 Color samples. Samples of color shades can be obtained from the procuring activity or as directed by the contracting officer.

6.4 Stature and weight ranges. Proper fitting of the anti-g garment is based on stature and weight; other body measurements are not used in selecting the proper size. The applicable stature and weight ranges for each size are shown in table XVI.

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TABLE XVI. Stature and Weight Ranges

Size of Anti-g Garment	Stature Range (Inches)	Weight Range (Pounds)
Small regular	63.0 - 67.9	131 - 160
Small long	68.0 - 72.9	131 - 160
Medium regular	64.5 - 69.4	161 - 190
Medium long	69.5 - 74.4	161 - 190
Large regular	67.0 - 71.24	191 - 220
Large long	71.25 - 75.4	191 - 220
Large extra long	75.5 - 79.0	191 - 230

\* **6.5 Test samples.** The test methods described in 4.7.3 for endurance and in 4.7.8 for bond strength (bladder), which are required for the sampling inspection specified in 4.6.3.2 and 4.6.3.3, are destructive tests. Since these tests are destructive, the anti-g garments and the bladders selected and tested in accordance with 4.6.3.2 and 4.6.3.3 should not be included in the quantities of serviceable finished end items required. The anti-g garments selected as samples and subjected to the endurance test should be delivered to the procuring activity. The bladders selected as samples and subjected to the bond strength (bladder) test should not be delivered.

**6.6 Qualification.** With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the supplier is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Aeronautical Systems Division (Attention: ASD/ENCCE), Wright-Patterson Air Force Base, Ohio 45433, and information pertaining to qualification may be obtained from that activity.

\* **6.7 International standardization agreement.** Certain provisions (the connector specified in 3.4.19) of this specification are the subject of international standardization agreement STANAG 3200. When amendment, revision, or cancellation of this specification is proposed which affects or violates the international agreement concerned, the preparing

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activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

6.8 Notations of changes. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, or deletions) from the previous issue were made. These notations were 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 irrespective of the marginal notations and relationship to the last previous issue.

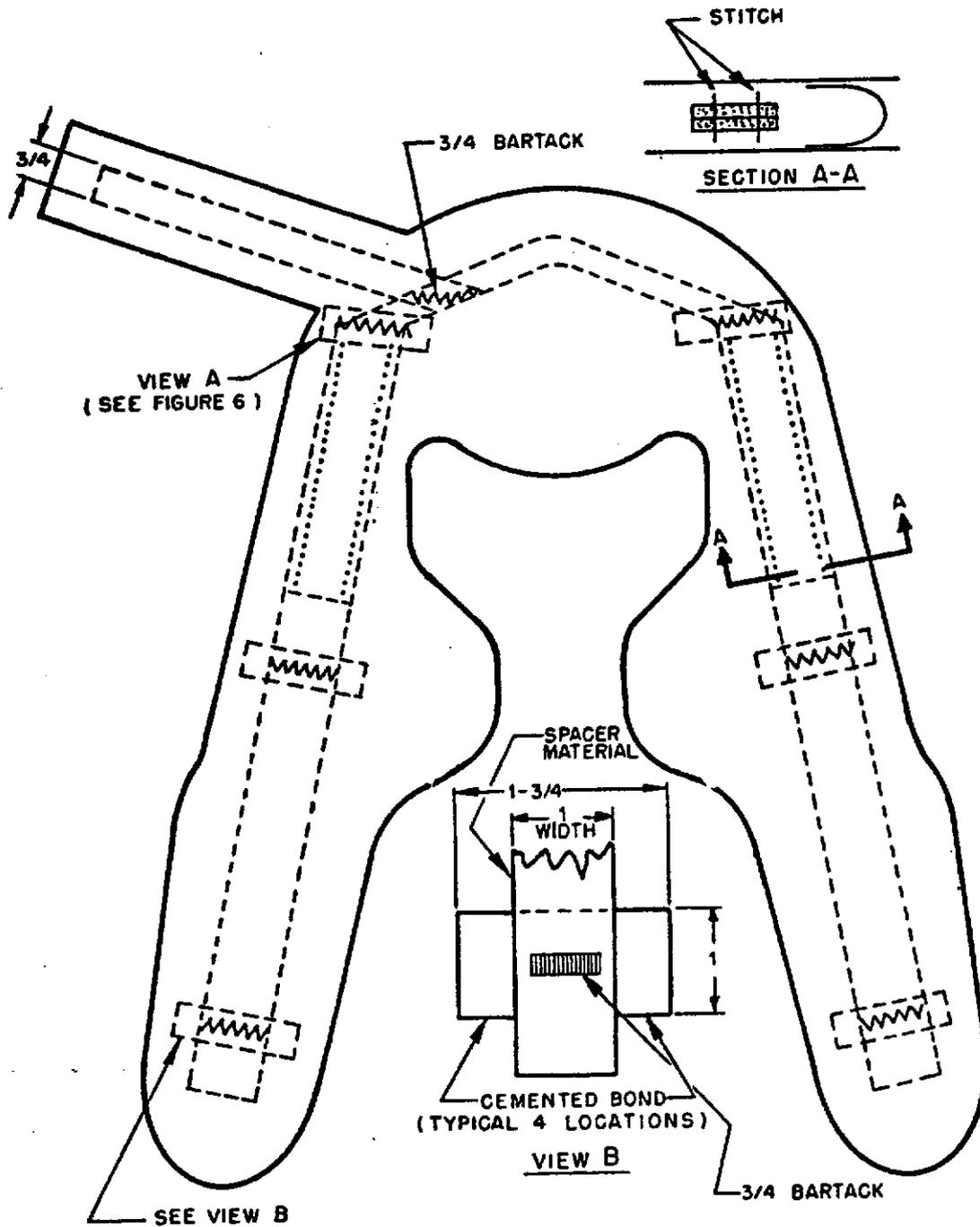
Custodian:  
Air Force - 11

Preparing activity:  
Air Force - 11

Reviewer:  
Air Force - 82

Project No. 8475-F113

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DIMENSIONS IN INCHES  
FIGURE 1. Bladder Construction

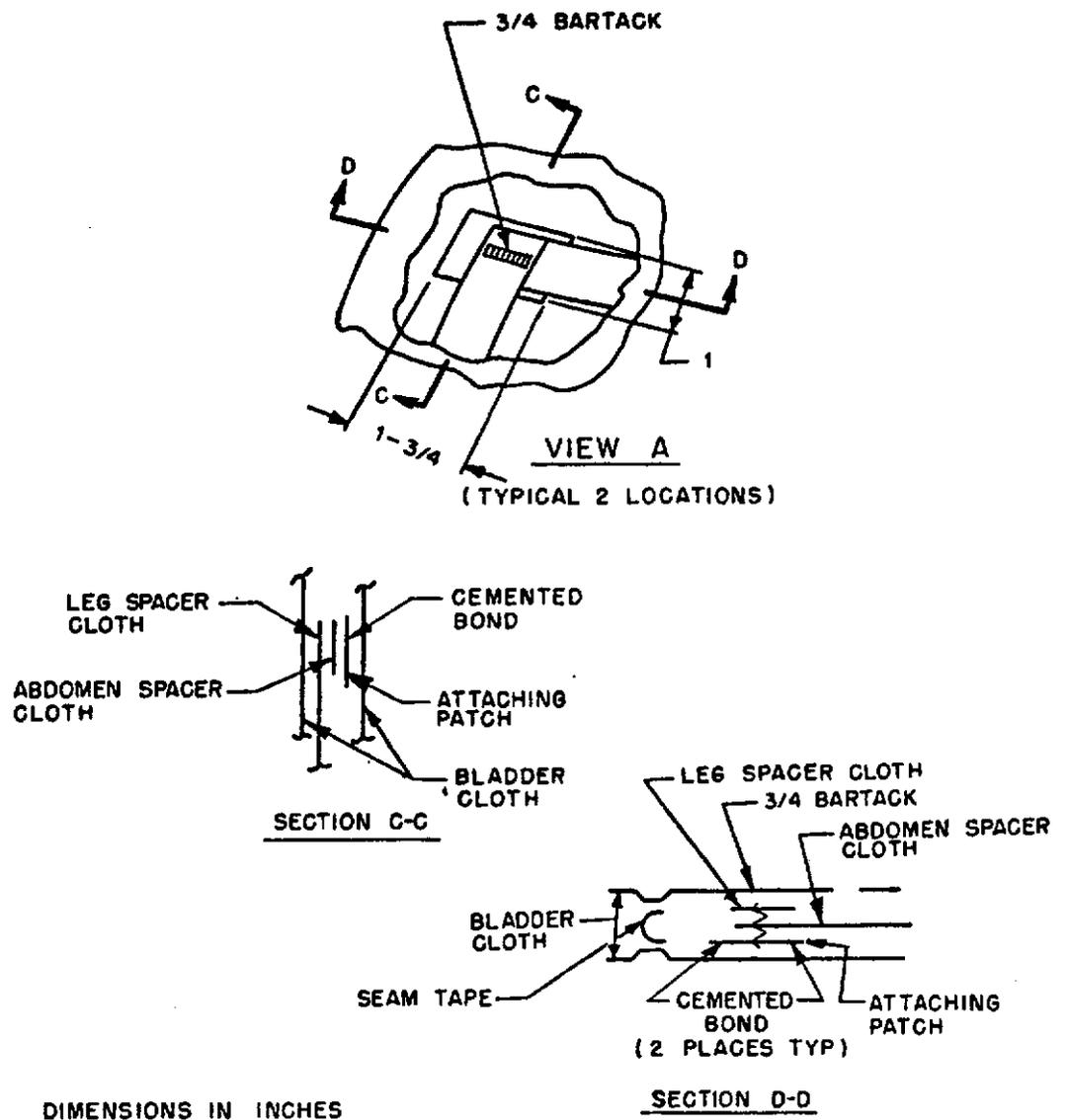


FIGURE 2. Bartack (View A)

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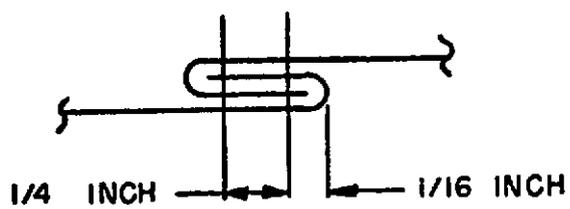
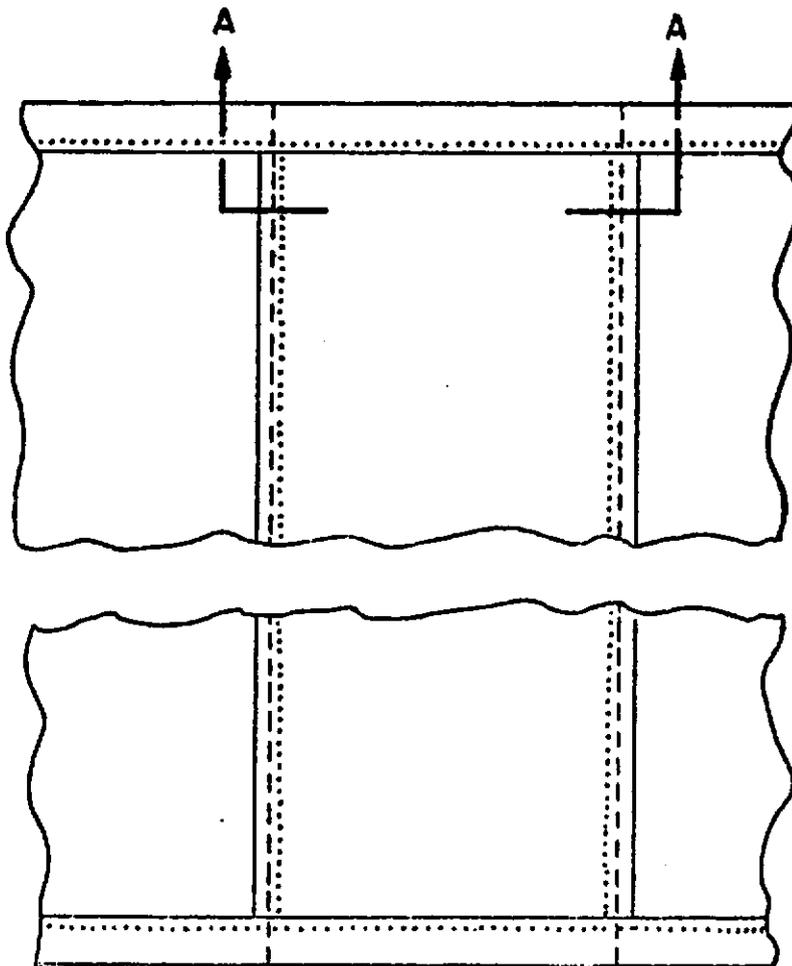
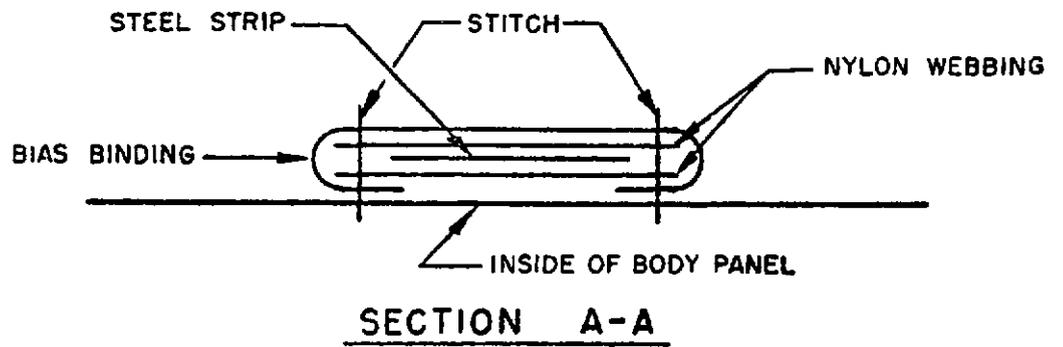


FIGURE 3. Seam Type

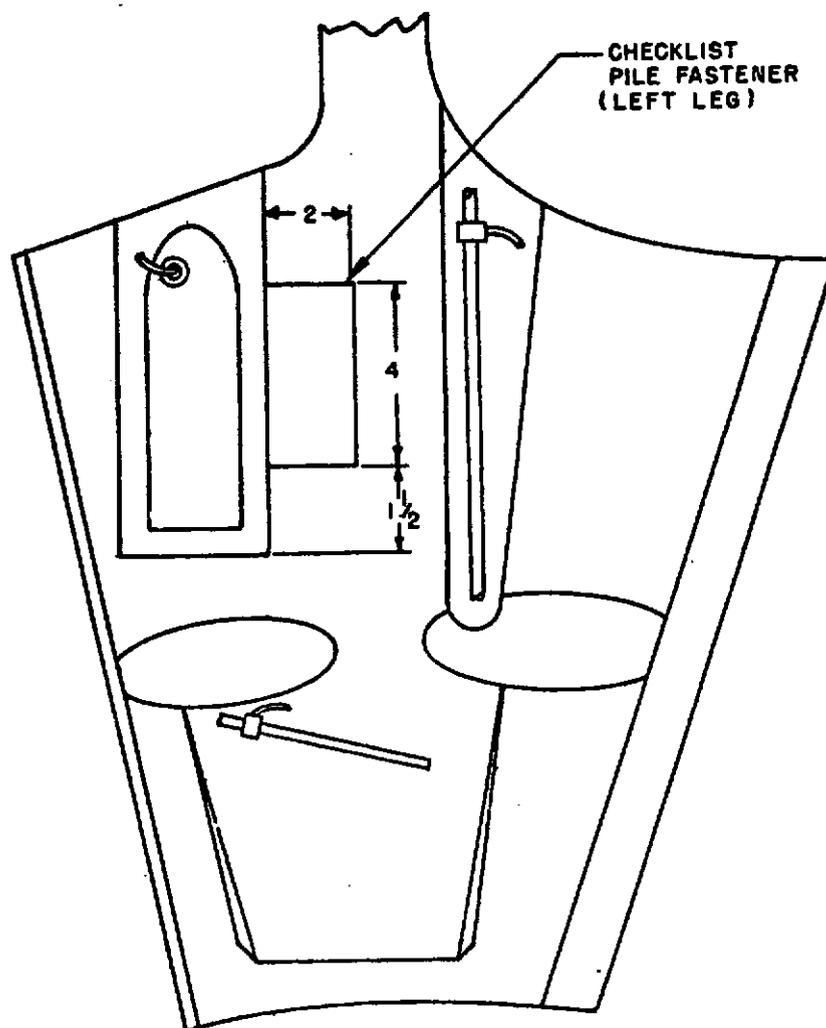


DIMENSIONS IN INCHES

\*

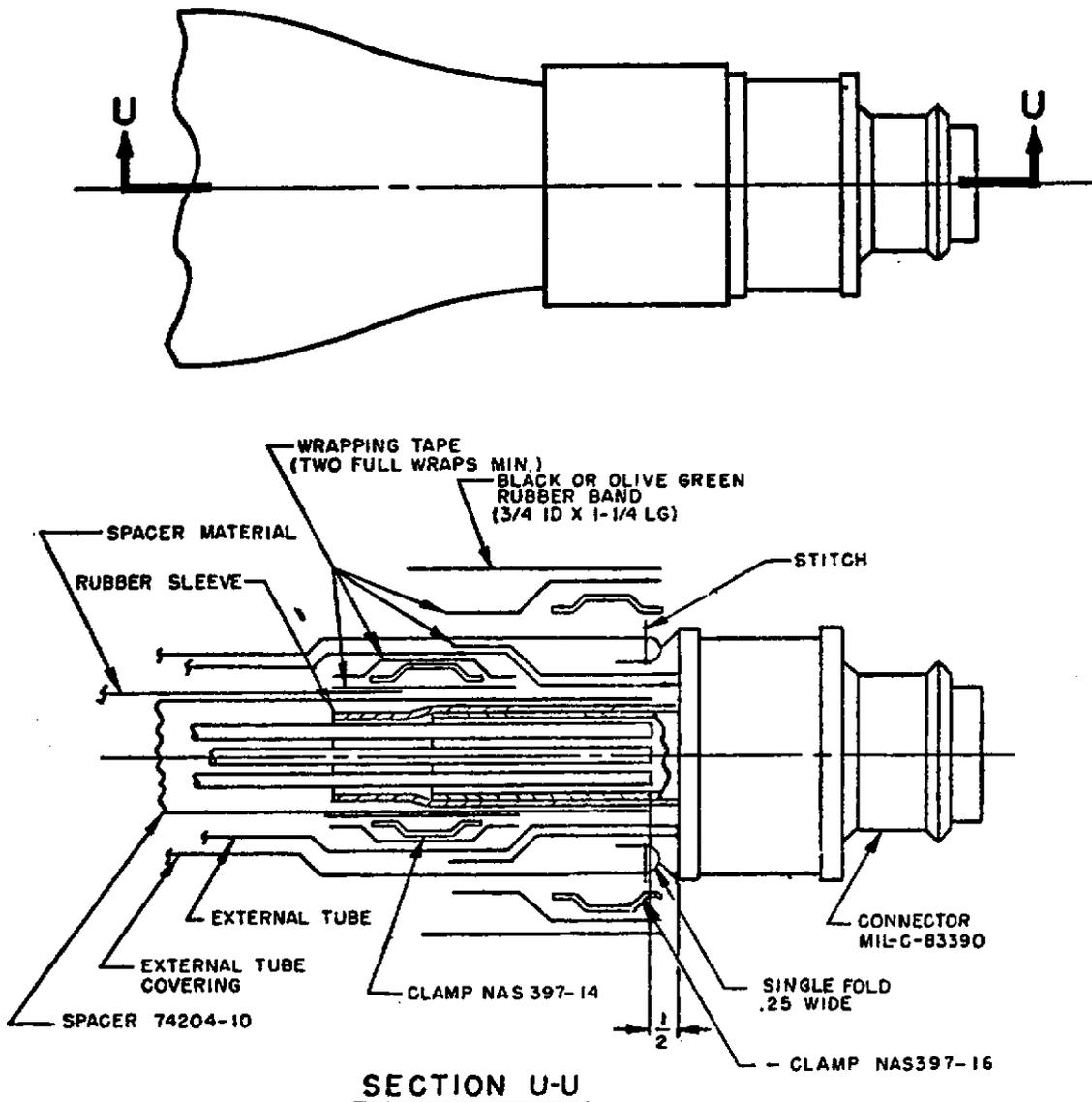
FIGURE 4. Steel Strip Channel

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DIMENSION IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCE:  $\pm \frac{1}{8}$  INCH

FIGURE 5. Location of Checklist Fastener



DIMENSIONS IN INCHES  
DIMENSIONS IN INCHES

FIGURE 6. Connector and External Tube Section

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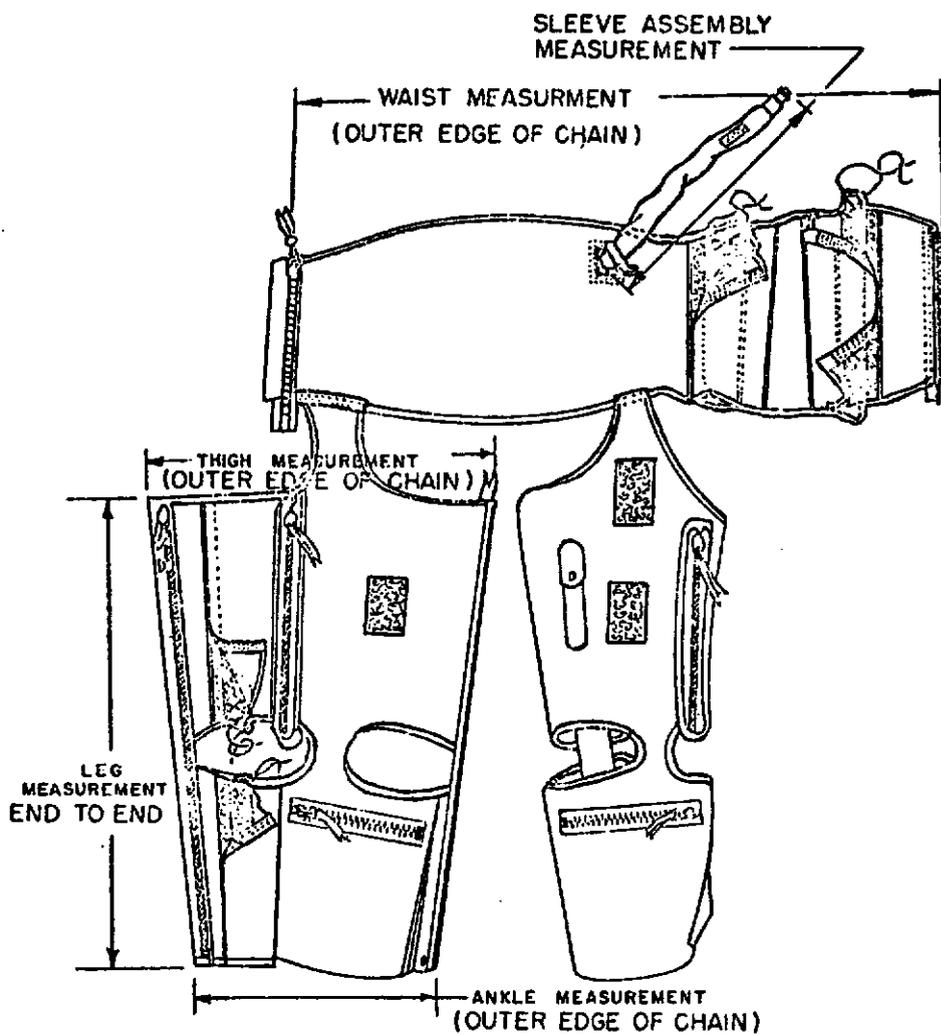


FIGURE 7. Finished Measurements

\*

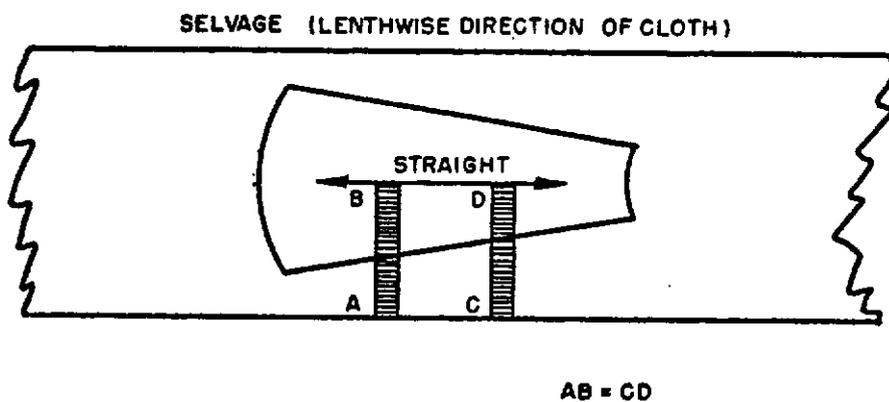


FIGURE 8. Directional Line

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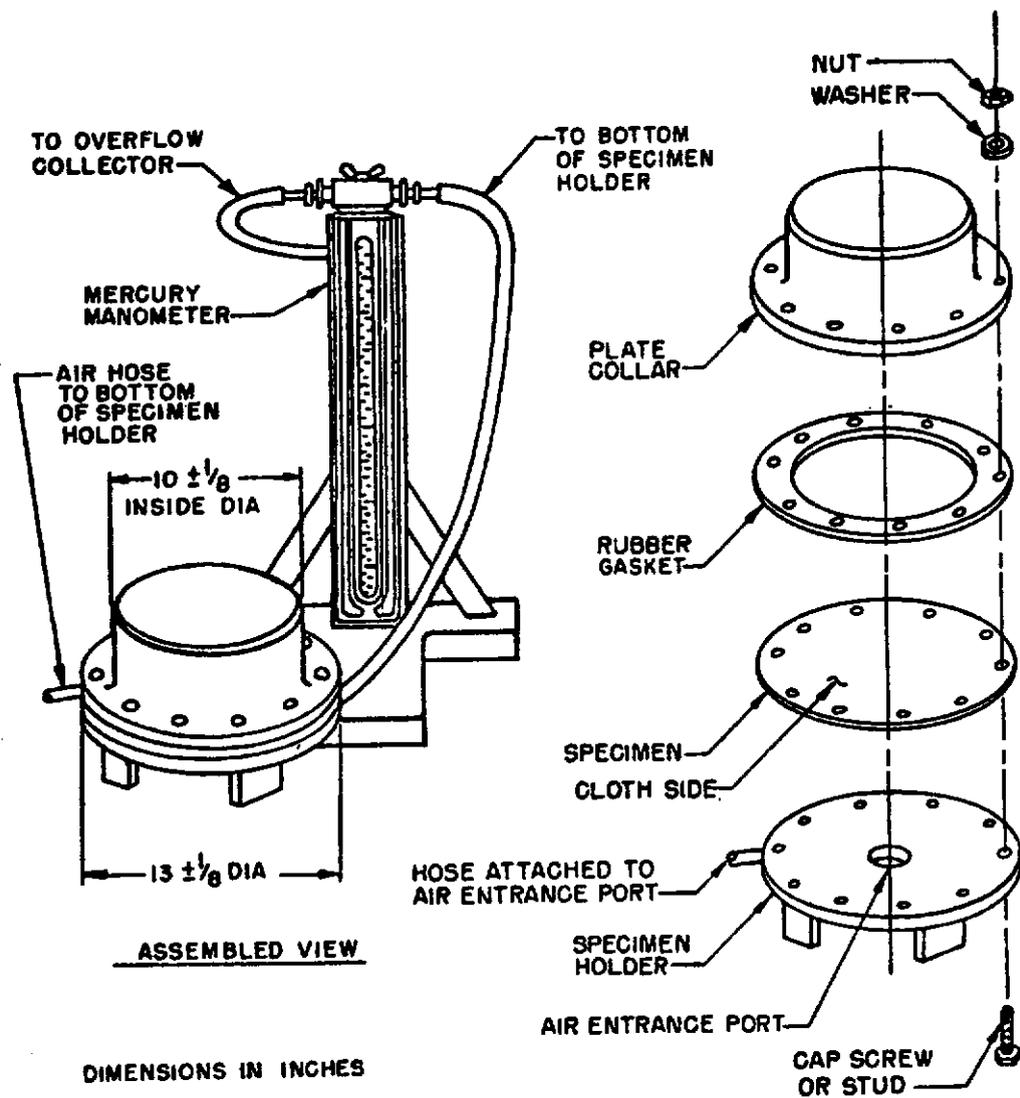
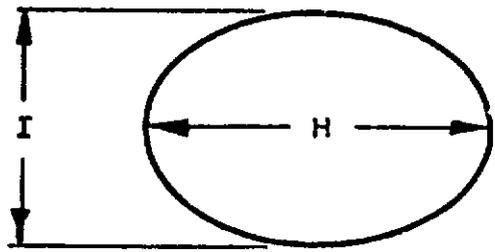
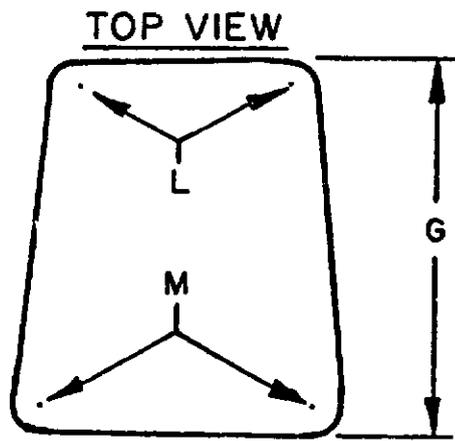
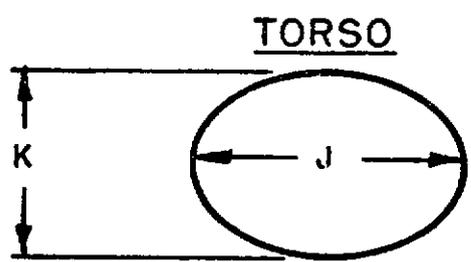
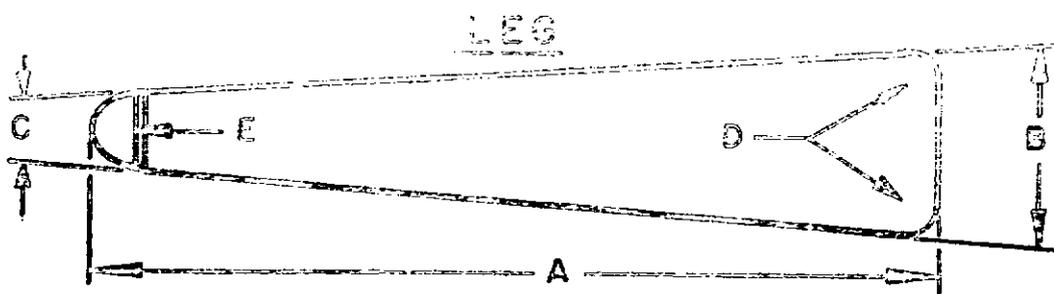


FIGURE 9. Inspection Apparatus

ALL DIMENSIONS IN MILLIMETERS



DIMENSIONS B AND C ARE DIAMETERS.

FIGURE 10. Models