

PURCHASE DESCRIPTION

TROUSER, SOFT SHELL COLD WEATHER (GEN III)

1. SCOPE

1.1 Scope. This purchase description covers the requirements for a soft shell trouser, which serves as a layer of the GEN III ECWCS.

1.2 Classification. The trouser shall be of one type in the following sizes, as specified (see 6.2).

SCHEDULE OF SIZES

<u>Size</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>	<u>X-Large</u>
Regular	X	X	X	X
Long			X	X

2. APPLICABLE DOCUMENTS.

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government Documents.

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

FEDERAL SPECIFICATIONS

V-T-295 - Thread, Nylon

FEDERAL STANDARDS

FED-STD-4 - Glossary of Fabric Imperfections

COMMERCIAL ITEM DESCRIPTIONS

A-A-55126 - Fastener Tapes, Hook and Loop, Synthetic
AA-A-55634 - Zipper, (Fastener, Slide Interlocking)

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-STD-129 - Military Marking for Shipment and Storage
MIL-PRF-5038 - Tape, Textile and Webbing, Textile, Reinforcing Nylon
MIL-W-5664 - Webbing, Textile, Elastic
MIL-DTL-32075 - Label: For Clothing, Equipage, and Tentage, (General Use)
MIL-F-10884 - Fasteners, Snap

(Copies of these documents are available from the Acquisition Streamlining and Standardization Information System (ASSIST) database, online at <http://assist.daps.dla.mil/quicksearch/> or www.dodssp.daps.mil or the Standardization Document Order Desk, 700 Robbins Ave. Philadelphia, PA 19111-9054).

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

U.S. ARMY NATICK SOLDIER CENTER

DRAWINGS

2-1-2519 – Universal Camouflage Pattern

(Copies of drawings are available from the U.S. Army Natick Soldier Center, ATTN: AMSRD-NSC-IP-E, Kansas St., Natick, MA 01760-5019)

CODE OF FEDERAL REGULATIONS

16 CFR Part 1500 – Federal Hazardous Substances Act Regulations
29 CFR Part 1910 – Occupational Safety and Health Standards

(Copies of these documents are available online at: www.access.gpo/nara/cfr or from the Superintendent of Documents, U.S. Government Printing Office, North Capitol & "H" Streets, N.W., Washington, DC 20402-0002.)

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

- AATCC-8 - Colorfastness to Crocking: AATCC Crockmeter Method
- AATCC-16 - Colorfastness to Light
- AATCC-22 - Water Repellency: Spray Test
- AATCC-61 - Colorfastness to Laundering, Home and Commercial: Accelerated
- AATCC-70 - Water Repellency: Tumble Jar Dynamic Absorption
- AATCC-96 - Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics, Except Wool
- AATCC-135 - Dimensional Changes in Automatic Home Laundering of Woven and Knitted Fabrics, Except Wool
- AATCC-150 - Dimensional Changes in Automatic Home Laundering of Garments

(Copies of these documents are available from www.aatcc.org or American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Triangle Park, NC 27709-2215.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM D-737 - Air Permeability of Textile Fabrics
- ASTM D-747 - Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
- ASTM D-1424 - Tearing Strength of Fabrics by Falling-Pendulum Type Apparatus
- ASTM D-1776 - Practice for Conditioning and Testing Textiles
- ASTM D-3776 - Mass Per Unit Area (Weight) of Fabric
- ASTM D-5034 - Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- ASTM D-6193 - Practice of Stitches and Seams
- ASTM E-96 - Water Vapor Transmission of Materials

(Application for copies are available from www.astm.org or American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN NATIONAL STANDARDS INSTITUTE

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

(For all inquiries, please contact the American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036. Website address www.ansi.org)

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

MISCELLANEOUS

Principle and Methods of Toxicology, A Wallace Hayes (editor), pp 394-396, 1989.

(Copies of this document is available from Raven Press, 1185 Avenue of the Americas, New York, NY 10036)

Marzulli, F. and H. Maibach, "Contact Allergy: Predictive Testing in Humans,"
Advances in Modern Toxicology, Volume 4, pp 353-372, 1977.

(Copies of this document are available from the U.S. Army Center for Health Promotion and Preventative Medicine, ATTN: MCHB-DC-TTE, Bldg., E-2100, Aberdeen Proving Ground, MD 21010-5422.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.3), a sample shall be subjected to first article inspection (see 4.1).

3.2 Guide samples. Samples, when furnished, are solely for guidance and information to the contractor. Variations from the specification may appear in the sample in which case this specification shall govern.

3.3 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Design. The soft shell trouser is designed for use in extreme cold weather climates and conditions and is a component part of the Gen III Extreme Cold Weather Climate System (ECWCS GEN III). It has a center front fly opening with a slide fastener closure and a front wind protection flap. It also has two front pockets with hook and loop fastener openings. The waist has belt loops, provisions for suspenders, and has a binding that covers an elastic cord that has cord lock adjustments. The leg openings have a nylon/lycra binding at the end and hook and loop adjustments. The legs have a slide fastener opening on the outer seam that opens from the bottom and has a double flap closer that is secured with hook and loop fasteners midway up the leg and at the bottom. All slide fasteners have a thong for ease of opening when wearing gloves.

This design provides a garment that is light in weight, low in bulk, has environmental protection and comfort in movement.

3.5 Basic Materials.

3.5.1 Standard sample. All cloth materials shall match the applicable standard sample for shade and appearance on the face side, and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.4).

3.5.1.1 Basic shell material. The cloth shall be a plain weave, stretch, nylon and spandex cloth (texture approximating 95 by 60 yarns per inch, warp and filling, respectively), with water repellency, meeting the performance requirements of Table I when tested as specified in 4.5. The color of the cloth shall be Universal Camouflage.

* 3.5.1.2 Physical requirements. The cloth shall conform to the physical requirements specified in Table I when tested as specified in 4.5.

TABLE I. Basic Shell Material - Physical Requirements.

Characteristic	Requirement
Weight, oz/sq. yd (max.)	5.5
Breaking strength, lbs (min.)	
Warp	165
Filling	130
Elongation, percent	
Warp	45-60
Filling	80-100
Tearing Strength, lbs. (min.)	
Warp	8.0
Filling	8.0
Air Permeability, ft ³ /ft ² /min. (max)	5
Moisture vapor transmission	
Rate, g/m ² /24h (min.) -	
Initial	800
Stiffness, in-lbs (max.)	
At 70°F	0.001
At 32°F	0.001
Blocking, rating (max.)	No. 2
Water permeability, cm (min.) -	
Initial	30
Spray rating, rating	
Initial	100, 100, 90
After 5 launderings	100, 90, 90
Resistance to organic liquid, pass/fail -	
Initial	No wetting

Dynamic absorption, percent (max.)	4.0
Dimensional stability, percent (max.)	
Warp	5.5
Filling	5.0
Color	Universal Camouflage
Pattern Execution	Universal Camouflage Pattern
Spectral Reflectance	Table II
Colorfastness to:	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
Laundering	
Light	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
Crocking	Equal to or better than the standard sample or not less than AATCC chromatic transference scale rating of 3.5
Toxicity	<u>1/</u>

1/ The finished cloth shall not present a dermal health hazard when used as intended.

3.5.1.3 Color.

3.5.1.3.1 Army Universal Camouflage. The color of the cloth shall be Universal Camouflage pattern and shall match Desert Sand 500, Urban Gray 501, and Foliage Green 502. Each area of the specific color of the pattern shall be in accordance with the applicable standard sample or drawing number 2-1-2519.

3.5.1.4 Pattern execution.

3.5.1.4.1 Army Universal Camouflage pattern execution. The Universal Camouflage pattern shall reproduce the standard sample in respect to design, colors and registration of the respective areas. The pattern repeat of the dyed, printed, and finished cloth shall be 36.00 inches (+1.25 inches, -2.50 inches) in the warp direction. The various areas of the pattern shall be properly registered in relation to each other and shall present definite sharp demarcations with a minimum of feathering or spew. Each pattern area shall show solid coverage; skitteriness exceeding that shown by the standard sample in any of the printed areas shall not be acceptable. When the standard sample is not referenced for pattern execution or design, a pattern drawing shall be provided, and the pattern on the finished cloth shall match that of Drawing 2-1-2519.

3.5.1.5 Spectral reflectance.

3.5.1.5.1 Spectral reflectance, Army Universal Camouflage. The spectral reflectance of the colors in the Universal Camouflage cloth shall conform to the requirements specified in Table II, initially and after laundering when tested as specified in 4.6.8 and 4.6.8.1.

TABLE II. Spectral Reflectance Requirements: Reflectance (percent).

Wavelength, Nanometers (nm)	Desert Sand 500		Urban Gray 501		Foliage Green 502	
	Min	Max	Min	Max	Min	Max
600	28	42	12	26	8	18
620	30	44	14	26	8	18
640	34	50	14	28	8	20
660	38	59	14	30	10	26
680	44	63	18	34	10	26
700	46	69	24	38	12	28
720	48	71	26	42	16	30
740	48	76	30	46	16	30
760	50	80	32	48	18	32
780	54	80	34	48	18	34
800	54	80	34	50	20	36
820	54	80	36	54	22	38
840	56	82	38	54	24	40
860	56	82	40	56	26	42

3.5.2 Mesh Tricot pocket lining. Lining fabric shall be Tricot knit mesh of 100% polyester or equal. The color shall be Urban Gray 505. The fabric cloth shall meet the physical requirements specified in Table III when tested as specified in 4.5.

TABLE III. Mesh Pocket Lining - Physical Requirements.

Characteristics	Requirement
Weight (oz./sq yd)	2.0 ± 0.2
Dimensional Stability, percent (max.)	
Warp	5.0
Filling	5.0
Colorfastness:	
Laundering	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
Crocking	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
Light	Equal to or better than the standard sample or not less than AATCC chromatic transference scale rating of 3.5
Toxicity	1/

1/ The finished cloth shall not present a dermal health hazard when used as intended.

3.6 Components.

3.6.1 Thread. The thread for all seaming and stitching shall be V-T-295, “Thread, Nylon” Type I or II, size B, 3 ply at 6.0 pounds breaking strength, with “Water-Repellent” treatment. As an alternate, bobbin/looper threads can be Nylon, size AA, 2-ply, with a minimum breaking strength of 4.0 pounds, with “Water-Repellent” finish. The stitching shall be 9-12 stitches per inch. The color shall be Foliage Green 504.

3.6.2 Webbing/tape. Tape, MIL-PRF-5038, ¼-inch wide shall be used to construct the slide fastener thong and the retainer for the barrel lock. The color shall be Foliage Green 504.

3.6.3 Tape, hook and loop. The hook and loop fastener tape shall conform to type II, class 1 of A-A-55126, with selvage edges. No slit or split edges are permitted. Sew all hook and loop minimum of 1/8 inch from bound selvage to prevent needle cutting along edges. To prevent raveling, do not sew directly on selvage. However, each required width shall maintain a tolerance of $\pm 1/32$ inch as to prevent stitching runoffs or improper fit into automatic sewing equipment. The color shall match Foliage Green 504.

3.6.3.1 Alternate tape, loop. As an alternate, loop fastener tape without selvages edges (reduce field fraying) shall conform to class 1 of A-A-55126 except without selvage edges: YKK Cosmolon Edge to Edge" with heat-sealed edges or Velcro "DD", an edge-to-edge loop tape. Sew all loop tape minimum of 1/8 inch from edge to prevent needle cutting along edges. However, each required width shall maintain a tolerance of $\pm 1/32$ inch as to prevent stitching runoffs or improper fit into automatic sewing equipment. The color shall match Foliage Green 504.

3.6.3.2 Alternate tape, hook. As an alternate to hook tape without selvages (reduce field fraying), the following products may be used: Extruded plastic hook tape identified as "Velcro brand HTH 841" or "YKK brand SA200A". The color shall match Foliage Green 504.

3.6.3.3 Colorfastness, tape hook and loop. Unless otherwise specified, for Foliage Green 504, the fastener tapes (hook and loop) shall show fastness to dry cleaning (if required by contract), light (170 Kilojoules), laundering (after 5 cycles) and crocking when tested in paragraph 4.5. The finished tape fasteners shall show fastness equal to or better than a rating "4-5" to dry cleaning and light, equal to or better than a rating of "2-3" for laundering using AATCC Gray Scale for Color Change and equal to or better that rating of "4" for crocking using AATCC Chromatic Transference Scale. The color depreciation for laundering and light shall remain in the same hue as compared to the original sample. (Hue/cast is defined as the attribute of color that classifies a color as red, blue, green etc.)".

3.6.3.4 Hook and loop laundry durability test method. When tested in accordance with 4.6.17, the hook and loop tapes shall not exhibit fraying edges, peeling yarns, or damage appearance that detracts from the tape appearance or durability.

3.6.4 Elastic cord. The elastic cord shall be 1/8-inch width, $+1/32$ -inch, minus 0-inch, elastic cord conforming to elongation, 120% \pm 10%; weight per linear yard, 0.2-ounces (max); picks per inch, 60 (min); number of carriers 16; end per carrier, 1; number of elastic strands, 12 (min); cover yarn, polyester. The elastic cord shall have a seared and knotted end. The color shall match Foliage Green 504.

3.6.5 Elastic material. The elastic material used for the suspenders and the center back waistband shall be in accordance with MIL-W-5664, Type II, 1 inch, $\pm 1/16$ inches in width for the suspenders and $1\text{-}\frac{1}{2} \pm 1/16$ inch wide for the waistband.

3.6.5.1 Leg cuff elastic material. The leg cuff elastic material shall be one (1) inch gripper elastic style number 952 from John Howard Company or equal. The color shall be Black.

3.6.6 Slide fasteners. The slide fastener for the fly and side waist slide fasteners (zippers) shall be in accordance with A-A-55634, No 5 continuous element chain, with 175 pounds minimum crosswise strength, type I, style 4, auto-lock slider with thong, open top, closed bottom stop with water repellent treated tape. The color shall be Foliage Green 504.

3.6.6.1 Leg opening slide fastener. The leg opening slide fasteners (zippers) shall be the same as above except a non-lock slider on reverse* chain with a water repellent treated tape and thong to maximize the water repellency shall be use. Also, “pulling up” on slider opens leg slide fasteners (zippers) where as, fly and side waist slide fasteners (zippers) close. The color shall be Foliage Green 504.

*Reverse chain is when slide fasteners (zipper) tape side and slider pull represents face.

3.6.7 Barrel lock. The barrel locks shall maintain a 3-pound minimum holding strength on elastic cord (see 3.6.4) at -40°F, 70°F and 140°F when tested in accordance with 4.6.11. The barrel lock shall be ½ -inch x 3/8-inch elliptical or 3/8-inch round shape, minimum push-button size. The color shall match Foliage Green 504.

3.6.7.1 Snap Fasteners. Snap fasteners shall conform to MIL-F-10884 style 2A. The snap fasteners shall have a Black chemical finish, except the button cap shells may have a foliage green 504 baked-on enamel finish. The enamel shall be uniformly coated over the top surface of the shell including the visible portion of the edge. The gloss for the Black chemical finish and the enamel finish shall be no more than 40. The enamel shall be capable of withstanding attachment operations without removal of any enamel. The enamel coating shall be smooth and free of sags, runs, and streaks.

3.6.8 Interfacing. The interfacing fabric shall be Pellon #933 material or equal.

3.7 Construction. See Figures 1-5 and patterns for details.

3.7.1 Fly slide fastener (zipper) cover (left). Over-edge interlining to inside of outer slide fastener (zipper) cover facing. Attach left slide fastener (zipper) tape to fly slide fastener (zipper) cover facing with double seam LSbj-2 (double topstitch 1/8 in. nominal apart) per pattern placement. Seam facing to outer-shell fly cut edge with SSa-1, turn and topstitch for SSc-1 finished seam. Double J-stitch, 1-1/2 inches nominal from cover edge and finish topstitching at slide fastener (zipper) bottom tape. Sew second J-stitch, 1/4 in. further out. Finished slide fastener (zipper) cover shall be 1/2 in. nominal from slide fastener (zipper) chain.

3.7.1.1 Fly slide fastener (zipper) backing (right). Sew backing pattern strips together with SSa-1 seam, turn and topstitch for SSc-1 finished seam at 1/16 in. from edge. Sew right side slide fastener (zipper) tape to backing strip and outer-shell fly cut edge with SSa-1. Turn and topstitch assembly together 1/16 in. from edge turn in along slide fastener (zipper) tape. Bartack bottom between double J-stitch line and 1 in. up along inside J-stitch line penetrating slide fastener (zipper) backing. When slide fastener (zipper) is engaged the slide fastener (zipper)

cover shall effectively cover slide fastener (zipper) and top stitch of backing and snap fastener stud and socket shall be aligned.

3.7.1.2 Leg slide fastener (zipper) opening. Over-edge cover, backing strip and outer-shell edges. Fold slide fastener (zipper) cover strips longitudinally in half and insert interlining. Topstitch length of cover strip 1/16 in. from edge. Repeat process for slide fastener (zipper) backing strips Except without interlining, sew with 4 topstitched rows 1/4 in. apart. Sew slide fastener (zipper) tape to cover strip with seam SSa-1, turn and topstitch along outer-shell 1/16 in. from edge going through slide fastener (zipper) tape. At bottom of seam insert leg adjustment tab and double stitch through width of tab. Sew other slide fastener (zipper) tape to backing strip and outer-shell fabric with SSa-1. Turn and topstitch 1/16 in. along edge. Bartack top of slide fastener (zipper) tape and backing strip together. Finished appearance shall show cover in flat even manner covering slide fastener (zipper) and all lower stitch lines. Slide fastener (zipper) closes when slider is pulled down. Slide fastener (zipper) shall not protrude beyond slide fastener (zipper) cover.

3.7.1.3 Waistband side slide fastener (zippers). Slide fastener (zippers) allow for quick release of back and side waistband assemblies. For side waistband, fold slide fastener (zipper) cover strips longitudinally in half and insert interlining. Topstitch length of strip 1/16 in. from edge. Repeat process for slide fastener (zipper) backing strips except w/o interlining, sew with 4 topstitched rows 1/4 in. apart and over-edge inside edge. Sew slide fastener (zipper) tape, backing strip, slide fastener (zipper) cover, outer-shell with knit interlining and pocket pouch assembly with SSa-1, turn, and topstitch 1/16 in. along outer-shell edge from cover. For back waistband, sew other slide fastener (zipper) tape side to double layer seat outer-shell slit with over-edging with SSa-1, turn and topstitch 1/16 in. along outer-shell edge. Slide fastener (zipper) shall close when slider is pulled up. Bartack base of slide fastener (zipper) tape and double bartack or bartack top tape portion through waistbands. With slide fastener (zipper) engaged, finished appearance shall show cover flat and even, hiding away slide fastener (zipper) and stitch lines on opposite side. Waistband adjustment tabs shall cover top portion of slide fastener (zipper) with hook and loop tapes in alignment connecting side waistband to back.

3.7.2 Waistband (sides and back). Side waistbands: Sew 1 x 1 in. hook tape on left waistband and loop tape on right side per pattern placements. Longitudinally fold waistband pattern strips in half, inside out. Sew ends with seam SSa-1 and turn right side out. Insert interlining within structure and double bartack 3/8 x 2 in. suspender webbings with Seam LSd-2 per pattern placement. Sew waistband strip with interlining with Seam LSbh-1 (except sub interlining for tape) onto upper outer-shell trouser. Topstitch waistband on lower portion 1/16 in. from edge with zipper tape and outer cover sewn under waistband. Attach belt loops (see below) and top stitch upper waistband 1/16 in. from edge including belt loops. Attach metal snaps through waistband with stud on left side and socket on left. Finished appearance shall exhibit fly zipper cover in flat even manner covering zipper stitch line with snap fastener and hook and loop tapes in alignment and total of 4 inside suspender webbing hold downs.

3.7.2.1 Back waistband (elastic center back and 2 end strips). Sew side strips with SSe-2 (except do not topstitch strips until they are attached to back elastic strip) insert interlining, sew 1 x 3 in. loop tape strips facing out per pattern placement. Sew center back strip inside out to

side strips with seam SSa-1, turn. Longitudinally fold 4 in. wide center back waistband strip face out in half and insert 1-1/4 in. wide elastic into fold. Sew entire bottom back length of inner waistband to top of double layer seat patch outer-shell while catching zipper tape, zipper cover and backing, front pocket pouch assembly with SSa-1, turn and repeat outer back waistband assembly with LSd-1. Topstitch all edges around both end strips 1/16 in. nominal and vertically double topstitch through point where end strips and elastic ends join. Stretch out elastic center strip and topstitch through center of elastic length with double backtack reinforcement at ends of topstitch. Attach two belt loops per pattern placement with bartack at each corner. Finished appearance should exhibit elasticized back waistband section capable of stretching 10-1/2 in. without any seam thread breakage or restriction.

3.7.2.2 Waistband adjustment side tabs. Sew 1 x 2 in. hook tape on inside tab panel per pattern placement. Sew two layers inside out with SSa-1, turn face out. Topstitch 1/16 in. around three sides for completed tabs for final Seam SSe-2. Double topstitch tabs to side waistband with Seam LSd-1.

3.7.3 Front pockets. Fold pocket cover strips longitudinally in half and insert interlining. Topstitch length of strip 1/16 in. along outer edge. Assemble front pocket pouches pattern pieces with safety stitch. Insert top pocket pouch under waistband. Sew entry side of pouch into zipper cover assembly with SSa-1, turn and topstitch along outershell 1/16 in. from edge. This side attaches cover strip to knit portion of pocket pouch. Bartack top and bottom of pocket cover. Finished appearance shall show pocket cover in flat even manner flush with opening side. Pocket opening shows printed outer-shell side as facing, knit fabric as backing.

3.7.3.1 Cargo side pockets. Assemble pocket flap. Sew 1-1/2 x 2 in. loop strips to inner flap strip per pattern placement. Fold pocket flap strip longitudinally in half. Sew sides with seam SSe-2, insert interlining and topstitch three sides 1/16 in. along edges. Sew to outer shell pattern placement with LSq-2. Bartack each end of flap. Assemble cargo pocket bellow locations (10) with seam OSf-1 per pattern placement. Sew end of elastic cord to 3 x 3/8 in. wide heat-cut nylon webbing and bartack cord to end of webbing, sew opposite side of webbing into side stitch for tunnel strip with SSa-1. Sew 2 x 1 in. hook tapes to top of pocket piece per pattern placement. Sew eyelet or preset metal eyelet into top of pocket face per pattern placement for elastic cord exit. Add cord lock and knot end of cord. Assemble top tunnel 1 in. wide strip with elastic cording inside. Sew top portion with seam SSe-2. Turn strip and sew in back with seam LSd-1. Sew body of pocket piece onto outer-shell per pattern placement with LSd-1. Bartack each side of upper pocket beginning seam and double stitch or bartack lower section of pocket on bellows side and double stitch both bellows opening on top and bottom 3/8 in. either side. Finished appearance of pocket shall be flat and even with bellow openings set at 0 - 1/16 in. apart and pocket flap covering upper stitch line with hook and loop in alignment. Cord and cord lock shall be capable of withstanding stress when elastic cord is pulled to absolute maximum stretch.

3.7.4 Leg adjustment tab. Sew tab pattern pieces with SSe-2 and preset metal socket into tab per pattern placement.

3.7.5 Leg elastic hem Elastic ends shall be heat cut. Sew 3/4 in. wide elastic to base of leg

assembly with seam SSb-1, pull on elastic strip, insert two 3/8 in. webbing hold-down loops and topstitch 1/16 in. from inner elastic edge. Double stitch or bartack and hold-down loop insertion points and ends of elastic. Set metal studs per pattern placement. Finished appearance of leg cuff (with zipper engaged) shall show leg tab socket to be aligned with studs. Leg cuff shall be capable of stretching 22-1/2 in. with no stitch line or seam breakage. Use short 3 in. slide fastener (zipper) thong on leg slide fastener (zipper).

3.7.6 Belt loops (6). Fold belt loop pattern strip longitudinally in half for seam type EFu-1. Sew with 301 or 401 stitch to fabricate belt loop 1-3/8 in. wide. With seam in center back, topstitch each side 1/16 in. from edges. Place belt loops per pattern placement. Bartack both sides on top and bottom ends of belt loop fold over (4 bartacks / belt loop). Opening of belt loops shall be 2-1/2 inches minimum.

3.7.7 Suspenders - Use 1 x 5 1/2 in nylon webbing tape with heat cut ends. Place one end around 1 inch plastic double loop. Sew seam EFa-1 and sew over 1 x 1 1/2 in hook and tape strips leaving 1/4 inch apart in middle. Run opposite end through triple adjustment plastic loop (snake over middle post). On other plastic loop side sew elastic suspender tape with seam LSd-1 with double stitch line or bartack. Place opposite side of elastic suspender tape through second plastic double loop and in through and around center post of triple adjustment plastic loop. Sew same with LSd-1. Finished appearance of suspenders shall be capable of attaching to / or detaching from inside waistband webbing strips using hook and loop strips and be capable of adjusting and holding suspenders in place while under ultimate stretch of elastic tape. There shall be seam slippage or needle cutting of elastic tape.

3.7.8 Labels. Each trouser shall have a label in accordance with Type VI, Class 14 of MIL-DTL-32075. The color of the labels shall approximate the ground shade of the basic fabric or White. In addition it shall contain a bar coding label in accordance with Type VIII and Class 17.

3.7.8.1 The combination size, identification and instruction label for the trouser. The combination label shall be sewn on the inside of the trouser along the back seam of the waistband. The printed label shall be facing the body. The instruction label shall include the following information:

Trouser, Soft Shell Cold Weather

Care instruction label

LAUNDERING (do not dry clean)

- a. Home laundering. The garment shall be machine laundered using the delicate/gentle fabric cycle or laundered by hand. Use cold water (up to 90°F/32°C) and cold water laundry detergent (i.e., Liquid Tide or Era Plus). Rinse in clean, cold water. **DO NOT STARCH OR BLEACH**. Dry in tumble dryer at temperature not exceeding 130°F/54°C as degradation of the component materials will result. Avoid over drying. To drip dry, place on a rust proof hanger. **DO NOT PRESS**.

b. Field laundering. The garment shall be field laundered using formula II of FM 42-414, Appendix E. **DO NOT STARCH OR BLEACH.**

3.8 Patterns. Standard patterns providing a seam allowance of ½ inch for all seams, except where otherwise specified, will be furnished by the Government. The pattern list in Table IV is provided to insure that the pattern set provided is complete. The Government patterns shall not be altered in any way, and are to be used only as a guide for cutting the contractor's working patterns. The working patterns will be identical to the Government patterns, except that additional notching to facilitate manufacture is possible. Also, minor modifications are permitted where necessary to accommodate manufacturer's processes and using automatic equipment. These modifications shall not alter the serviceability or appearance requirements.

3.8.1 Pattern parts. The component parts shall be cut from the materials indicated and in accordance with the pattern parts listed in Table IV.

Table IV. List of Pattern Parts.

Material	Code	Nomenclature
Basic shell material	SSB-ANKLE TAB	Ankle tab
Interfacing	SSB-ANKLE TAB FUSE	Ankle tab fuse
Basic shell material	SSB-BACK LEG	Back leg
	SSB-BACK WBND	Back waistband
	SSB-FLY	Fly
Interfacing	SSB-FLY FUSE	Fly fuse
Basic shell material	SSB-FLY FACING	Fly facing
	SSB-FRONT LEG	Front leg
	SSB-GUSSET	Gusset
	SSB-HIP GUARD	Hip guard
	SSB-KNEE	Knee
	SSB-LEFT WBND	Left waistband
Interfacing	SSB-LEFT WB FUSE	Left waistband fuse
Basic shell material	SSB-LEG FLAP	Leg flap
Interfacing	SSB-LEG FLAP FUSE	Leg flap fuse
Basic shell material	SSB-LEG PKT	Leg pocket
	SSB-LEG PKT FAC	Leg pocket facing
	SSB-LEG ZIP FLAP	Leg zipper flap
	SSB-BELT LOOP	Belt loop
	SSB-LOWER FRONT LEG	Lower front leg
	SSB-LOWER LEG WELT	Lower leg welt
	SSB-LOWER LEG GUARD	Lower leg guard
	SSB-PANT SEAT	Pant seat
Mesh Tricot Lining	SSB-TOP PKT BAG	Top pocket bag
Basic shell material	SSB-PKT WELT	Pocket welt
	SSB-RIGHT FT WBND	Right front waistband

Interfacing	SSB-RIGHT WBND FUSE	Right waistband fuse
Basic shell material	SSB-SIDE WBND	Side waistband
Interfacing	SSB-SIDE WBND FUSE	Side waistband fuse
Basic shell material	SSB-TOP PKT	Top pocket
	SSB-UPPER LEG ZIP W	Upper leg zipper welt
	SSB-WAIST TAB	Waist tab
Interfacing	SSB-WAIST TAB FUSE	Waist tab fuse

3.9 Stitches, seams, and stitching. All stitches, seams and stitching shall conform to ASTM-D-6193. Unless otherwise specified, primary seams use either SSa-1 with 504, 505 or other 3 or 4 thread over-edge or SSa-2 with 516 safety stitch. All primary seams shall be topstitched using 301 lock stitch at 9-12 stitches per incg for finished seam type LSq-2. Pocket pouch assembly requires safety stitch. Seam allowances shall be maintained with seams sewn so that no raw edges, run-offs, pleats, puckers or open seams occur.

3.9.1 Primary seams I.e. side seams, inseams, crotch seam, seat seam and horizontal knee patch seams, any and all darts shall be seam type LSq-2. Pre-sew all double layer seat and knee patches inside out with seam SSa-1 with turnout for final assembly.

3.9.2 Type 301 stitching. Ends of all stitching shall be backstitched or overstitched not less than ½ inch except where ends are turned under or caught in other seams or stitching. Ends of a continuous line of stitching shall over-lap not less than ½ inch. Thread tensions shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread or excessively tight stitching resulting in puckering of the materials sewn. The lock shall be embedded in the materials sewn.

3.9.2.1 Repairs of type 301 stitching.

a. When thread breaks, skipped stitches, run-offs, or bobbin run-outs occur during sewing, the stitching shall be repaired by restarting the stitching a minimum of ½ inch back of the end of the stitching. 1/

b. Except for pre-stitching, thread breaks or two or more consecutive skipped or run-off stitches noted during inspection of the item shall be repaired by overstitching. The stitching shall start a minimum of ½ inch in back of the defective area, continue over the defective area, and continue a minimum of ½ inch beyond the defective area onto the existing stitching. Loose or excessively tight stitching shall be repaired by removing the defective stitching without damaging the materials, and re-stitching in the required manner. 1/

3.9.2.2 Automatic stitching. Automatic machines may be used to perform any of the required stitch patterns provide the requirements for the stitch pattern, stitches per inch, and size and type of thread are met; and at least three tying, overlapping or back stitches are used to secure the ends of the stitching.

3.9.3 Bartacks and backtackings. All reinforcement bartacks shall use Nylon Size B thread with a water repellent treatment. Bartacks include bottom of fly slide fastener (zipper) on crotch seam, inside J-stitch attaching inner fly slide fastener (zipper) backing, each side of top cargo pocket, elastic cord to inner webbing cargo pocket tunnel assembly and each corner of flaps. top of leg slide fasteners (zippers), top and bottom of front pocket opening cover strip, belt loops with 4 at each corner, inside suspender loop webbings with 2 at each end, lower side waistband slide fasteners (zippers), upper leg slide fastener (zipper) ends. Backtacking or double stitching reinforcements include both elastic ends of leg hem on bottom of leg zipper tape and leg adjustment tab, inside leg hold-down webbing loops, top of fly slide fastener (zipper) tape, waistband adjustment side tabs, intersection crotch seam/seat seam, ends of darts, bottom and tops of all bellows pocket along either side of each bellows (2), back waist back elastic ends, ends of horizontal topstitch through elastic center and bottom cargo pocket on bellows side 1 in back and all suspender loops through plastic loops. As an alternate, backtacking can be replaced with bartacking. Bartack length is 3/8 inch with 24 stitches except for bottom of fly and waistband side slide fasteners (zippers), top and bottom front pocket opening, top of leg slide fastener (zipper) use 3/4 in. bartack. Do not sew over edges of belt loops.

3.9.4 Thread ends. All thread ends shall be trimmed to a length of not more than 1/4 inch unless otherwise specified.

4. VERIFICATION

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

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article is required (see 3.1 and 6.3), it shall be examined for the defects specified in 4.6.15 and tested as specified in 4.4.1, 4.6.16 and 4.5.

4.3 Conformance inspection. Sampling for inspection shall be performed in accordance with ANSI/ASQC Z1.4, as defined by contract, except where otherwise specified.

4.4 Component and end item inspections. In accordance with 4.1, components and materials in the end items shall be tested in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified or qualified in this document or applicable procurement documents. The government reserves the right to inspect all components and end items to determine conformance to requirements.

4.4.1 Component and material certification. Unless otherwise specified, a certificate of compliance will be acceptable as evidence that the requirements of 3.5 and 3.6 are met. When certificate of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

* 4.5 Basic material testing. The basic material specified in 3.5 through 3.5.2 shall be tested for the characteristics listed in Table V in accordance with the test method cited.

TABLE V. Basic Material Testing.

Characteristic	Reference Paragraph	Test method
Basic shell material		
Fiber identification, weave and fabric count		<u>1/</u>
Weight	3.5.1.2	ASTM D-3776 (Method C)
Breaking strength	3.5.1.2	ASTM D-5034 (G-E or G-T)
Elongation	3.5.1.2	ASTM D-5034 (G-E or G-T)
Tearing Strength	3.5.1.2	ASTM D-1424
Air Permeability	3.5.1.2	ASTM D-737
Moisture vapor transmission	3.5.1.2	4.6.1
Stiffness		
At 70°F	3.5.1.2	ASTM D-747 <u>3/</u>
At 32°F	3.5.1.2	<u>2/</u> & ASTM D-747 <u>3/</u>
Blocking	3.5.1.2	4.6.2
Water permeability	3.5.1.2	
Initial	3.5.1.2	4.6.3
Spray rating		
Initial	3.5.1.2	4.6.4.1
After 5 launderings	3.5.1.2	4.6.4.2 & 4.6.4.1
Resistance to organic liquid		
Initial	3.5.1.2	4.6.5.1
Dynamic absorption	3.5.1.2	AATCC-70
Dimensional stability	3.5.1.2	AATCC-96, Option 1C
Color	3.5.1.2	4.6.6
Pattern Execution	3.5.1.2	4.6.7
Spectral Reflectance	Table II	4.6.8 & 4.6.8.1
Colorfastness to:		
Laundering	3.5.1.2	4.6.9.1
Light	3.5.1.2	4.6.9.1.2
Crocking	3.5.1.2	AATCC-8
Toxicity	3.5.1.2	4.6.14
Mesh Tricot pocket lining		
Fiber identification and weave		<u>1/</u>
Weight	3.5.2	ASTM D-3776 (Method C)
Dimensional Stability	3.5.2	AATCC – 135, IIIA
Colorfastness:		
Laundering	3.5.2	AATCC-61, IIA
Crocking	3.5.2	AATCC-8
Light	3.5.2	4.6.9.1.2

Toxicity	3.5.2	4.6.14
Elastic cord		
Elongation	3.6.5	4.6.12
Weight	3.6.5	ASTM D- 3776
Picks/inch	3.6.5	Visual
Number of carriers	3.6.5	Visual
Ends per carrier	3.6.5	Visual
Elastic strands/width	3.6.5	4.6.13
Fastener Tape, Hook and Loop		
Color	3.6.4	4.6.6
Colorfastness To:		
Dry cleaning	3.6.4.3	AATCC -132
Light	3.6.4.3	4.6.9.1.2
Laundering after 5 cycles	3.6.4.3	AATCC – 61, Opt. 3A
Croaking	3.6.4.3	AATCC - 8
Laundry Durability	3.6.4.4	4.6.17-4.6.17.4

1/ A certificate of compliance shall be submitted for these requirements.

2/ The test specimens and testing machine shall be exposed to 32°F +/- 2°F for 4 hours. The test shall then be performed in still air at that temperature

3/ Stiffness (bending moment) shall be conducted in accordance with ASTM D-747 except as follows:

a. Unless otherwise specified, the testing conditions shall be in accordance with ASTM D-1776.

b. The test specimen shall be a rectangle of cloth of dimensions two (2) by one (1) inches with the long dimension parallel to the fabric direction under test, warp or filling, as applicable.

c. The load scale reading shall be recorded only at the specimen angular deflection of 60 degrees.

d. The stiffness is the bending moment of specimen at a deflection angle of 60 degrees and shall be calculated to three significant figures as follows:

$$\text{Bending moment, in.-lb.} = \frac{\text{Load scale reading} \times \text{moment weight}^*}{100}$$

* Testing machine of Tinius Olsen Testing Machine Co.

4.6 Methods of testing. All testing shall be done in a standard condition environment defined by the ASTM D-1776, if not specifically defined by the individual test procedure.

4.6.1 Moisture vapor transmission rate. ASTM E-96 with temperature and humidity conditions of 73.5° ± 1°F and 50 ± 2% R.H. The linear air flow velocity in the wind tunnel shall be set to yield an upright, 'open cup' evaporation rate at all test specimen positions of 15,000 ± 1,000 g/m²/24hrs, (the evaporation rate shall be determined by conducting an upright cup, Procedure B test without a test specimen for a period of exactly two (2) hours).

4.6.1.1 Procedure B. ASTM E-96. The back side of the basic material shall face the water. The test specimen shall be conditioned, after set-up in the test cup with water level of $3/4 \pm 1/16$ inch below the specimen surface, in the wind tunnel for a period of not less than four (4) hours and not more than sixteen (16) hours. Conditioning time of less than 4 hours may be used provided that equilibrium conditions have been demonstrated to exist within the test sample/sample cup/wind tunnel. (In cases of dispute, the conditioning time shall be 4 hours.). After conditioning, the cup shall be immediately weighed to start the test and again after exactly twenty-four (24) hours to complete the test. Five (5) specimens shall be tested.

4.6.2 Blocking. Blocking Resistance at Elevated Temperatures, except that the tests shall be performed at a temperature of $180^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for 30 minutes. Only one (1) specimen shall be tested. Evaluate the resistance of the specimen to blocking by the scale given below:

- 1 -- *No Blocking.* Cloth surfaces are free and separate without any evidence of cohesion or adhesion.
- 2 -- *Trace Blocking.* Cloth surfaces show slight cohesion or adhesion.
- 3 -- *Slight Blocking.* Cloth surfaces must be lightly peeled to separate.
- 4 -- *Blocking.* Cloth surfaces separate with difficulty or coating is removed during separation.

4.6.3 Water permeability. ASTM D-751, Hydrostatic Resistance, Procedure B, Procedure 1 with a rising hydrostatic head at 10 mm/sec applied to the face side of the test specimen. Five (5) specimens shall be tested. Leakage is defined as the appearance of one (1) or more droplets of water within the 4-1/2 inch diameter test area.

4.6.4 Spray rating.

4.6.4.1 Initial. Testing shall be conducted in accordance with AATCC-22.

4.6.4.2 After 5 launderings. Test specimens shall be laundered for five (5) laundering cycles in accordance with 4.6.9.1.1 and then tested for spray rating in accordance with 4.6.4.1.

4.6.5 Resistance to organic liquids.

4.6.5.1 Initial. Place a small specimen of the cloth on a smooth horizontal surface, face side up. Using a pipette or eyedropper, gently deposit one (1) drop of n-tetradecane on the surface of the specimen. After 30 seconds, examine the specimen under light at an angle. Absence of light reflectance at the cloth/drop interface shall be taken as evidence of wetting. Three (3) specimens (or areas) taken at various locations across the sample unit shall be tested. Evidence of wetting on one (1) or more specimens shall be considered a test failure.

4.6.6 Color matching. The color and appearance of the cloth shall match the standard sample when viewed using the AATCC Evaluation Procedure 9, Option A, with sources simulating artificial daylight and that have a correlated color temperature of $7,500^{\circ} \pm 200^{\circ}\text{K}$, with

illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at $2,300^\circ \pm 200^\circ\text{K}$.

4.6.7 Pattern execution. The pattern of the cloth shall be matched to the pattern, Drawing No. 2-1-2519.

4.6.8 Spectral reflectance. Spectral reflectance data shall be determined on the face side and shall be obtained from 600 to 860 nanometers (nm) at 20 nm intervals on a spectrophotometer, relative to the barium sulfate standard, the preferred white standard. Other white reference materials may be used provided they are calibrated to absolute white, e.g., magnesium oxide or vitolite tiles. The spectral band width shall be less than 26 nm at 860 nm. Reflectance measurements may be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a source that simulates either CIE source A or CIE source D65. The specimen shall be measured as a single layer, backed with six layers of the same fabric and shade. Measurements shall be taken on a minimum of two (2) different areas and the data averaged. The measured areas should be at least 6 inches away from the selvage. The specimen shall be viewed at an angle no greater than 10 degrees from the normal, with the spectral component included. Photometric accuracy of the spectrophotometer shall be within 1 percent and wavelength accuracy within 2 nm. The standard aperture size used in the color measurement device shall be 1.0 to 1.25 inches in diameter. Any color having spectral reflectance values falling outside the limits at four or more of the wavelengths specified shall be considered a test failure.

4.6.8.1 Accelerated laundering (Spectral Reflectance Durability Test). The cloth shall be laundered separately in accordance with AATCC-61 (Option 3A) except that a 4-gram sample size shall be used (Note: A sample size large enough to evaluate the spectral reflectance shall be used) and that the procedure shall be conducted using (10) stainless steel spheres and the 1993 AATCC Standard Reference Detergent without optical brightener. The samples shall then be evaluated for spectral reflectance in accordance with 4.6.8.

4.6.9 Colorfastness.

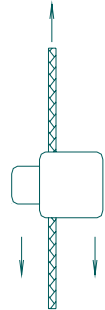
4.6.9.1 Laundering. AATCC-61, Test 1A (3 cycles) except that 1993 AATCC Standard Reference Detergent (non-phosphate) without optical brighteners shall be used.

4.6.9.1.1 Laundering procedure. Place 2.0 ± 0.2 pounds of the cloth and, if needed, ballast in an automatic washing machine set on permanent press cycle, high water level and warm ($100^\circ\text{F} + 10^\circ\text{F}$, -0°F) wash temperature. Place 0.5 ounce (14 grams) of 1993 AATCC Standard Reference Detergent (non-phosphate) without optical brighteners into the washer. The duration of each laundering cycle shall be 30 ± 5 minutes. After laundering, place sample and ballast in an automatic tumble dryer set on permanent press cycle, $150^\circ\text{F} - 160^\circ\text{F}$, and dry for approximately fifteen (15) minutes. The laundering equipment, washer and dryer, shall be in accordance with AATCC-135.

4.6.9.1.2 Light. AATCC-16, Option A (after 40 fading units) or E (after 170 kilojoules).

4.6.10 Stiffness. Stiffness at 70°F – ASTM D-747

4.6.11 Barrel lock test. The barrel lock holding strength shall be tested as follows:



Barrel lock holding strength: Using tensile testing machine in accordance with ASTM D-5034 at 2 inches/minute either pull-up cord on stationary engaged barrel lock or vice-versa.

4.6.12 Elongation. Cut a 14-inch specimen from a representative sample cord and make two marks on the cord so that a distance of 10 inches is between the gage marks. Suspend the cord from a clamp in such a manner as to allow a 2-pound weight to be hung on the lower end of the cord. Gradually lower the weight until the entire load is carried by the cord. After 2 minutes, take a measurement between the two marks and calculate the increase in length as follows:

$$\text{Elongation (\%)} = \frac{B-A}{A} \times 100$$

Where:

A = Initial measurement

B = Measurement of elongation at 2 pounds

4.6.13 Gage of rubber. The gage of rubber (elastic strands) shall be determined by counting the actual number of strands, laid side by side, contained in 1 inch. The gage is equivalent to the actual number of rubber yarns contained in 1 inch. A measuring device that measures the gage of rubber yarns may be utilized providing results are comparable.

4.6.14 Toxicity assessment. The contractor must furnish information, which certifies that the finished product is composed of materials, which have been safely used commercially or provided sufficient toxicity data to show compatibility with prolonged, direct skin contact. At a minimum, toxicity data should include results from a primary dermal irritation study in laboratory animals and a repeated insult human patch test (Modified Draize Procedure). The latter must be conducted under the supervision of a qualified dermatologist using at least 100 free-living individuals.

4.6.14.1 Toxicity documents. All finishes/chemicals used to process the garment shall be identified and accompanied by the appropriate Material Safety Data Sheet (MSDS) information.

The use of chemicals recognized by the Environmental Protection Agency (EPD) as human carcinogens is prohibited.

4.6.15 End item visual examination. Jackets shall be subjected to a visual examination for defects. All garment defects shall be scored in accordance with Table VIA. Material defects are defined in Section I of FED-STD-4 and Table VI. All shade evaluations of the garment shall be evaluated at a distance of approximately 3 feet and under the artificial daylight as specified in 4.6.6.

TABLE VI. Material Visual Examination

Examination	Defect
Cloth	Hole, Cut, tear, smash, burn, exposed drill hole, run, thin place, dye streak, color not as specified, misweave visible mends. Knots greater than Sears Scale Level C (See 6.5) Slubs greater than Sears Scale Level D (See 6.5)
Skitteriness	Pattern design not equal to standard sample; Excessive feathering or spew of pattern; Pattern repeat not equal to the standard sample; Army Universal Camouflage pattern less than 33-1/2 inches or more than 37-1/4 inches.

TABLE VIA. Trouser Visual Examination

Examination	Defect
Component Part	Component part of trouser omitted, not as specified, distorted, full, tight, or twisted; any part of trouser in unrelated stitching, the edge of any component part required to be forced out having folds of more than 1/8 inch Fullness creating unwanted permanent fold, pleat, or crease in fabric or garment
Stitching and Seams	Trouser seam: open stitching, puckered, distorted, pleated, wavy, twisted, irregular, or loose or tight stitch tension, broken or missing thread or stitch, needle chew, edge or raise stitching sewn too close to the edge resulting in damage to cloth, seam allowance not as specified, no visible raw edge (more than one occurrence of inside raw edge greater than 1 inch) Stitching not as specified Double needle intersecting seams staggered by more than 1/4 inch Run off of more than 1/2 inch for edge and raised stitching Thread color not as specified
Evenness	Length of jacket fronts uneven by more than 1/4 inch at top or bottom when closed Collar curls, puckers, pleats, or twists Sleeve lengths vary by more than 1/2 inch Hem by more than 1/8

Examination	Defect
	inch.
Hook & Loop	Hook & loop misplaced, damaged or omitted, twist or distortion when closed, out of alignment causing bulge Hook & loop out of alignment by more than 1/4 inch Hook & loop color or type not as specified
Hems	Hem of trouser bottom less than 1- inch or more than 1 1/8-inch Ends of hem not sewn closed, twisted puckered, pleated, wavy, distorted
Slide Fastener	Not specified length, not specified type Twisted, distorted, damaged, puckered, color not as specified Thong omitted, not as specified Not located in correct position on trouser front
Pocket and Flaps	Pocket companions not uniform in size or shape Pockets twisted, curled or puckered, not stitched as specified Pocket flaps not completely covering pocket opening, not positioned as specified Pocket construction not as specified Pockets out of alignment 1/4 inch or more Bellows exposed
Snap fastener	Any fastener not functioning properly i.e. fails to snap closed, provide a secure closure or to open freely. NOTE: The fasteners shall be snapped and un-snapped twice to determine whether parts of fastener separate freely; and also affect a secure closure. Clinched excessively tight, cutting adjacent material. Clinched loosely, permitting any component to rotate freely but not to the degree that any component can be expected to become detached during use.
Shade	Shade variation within part or between parts
Cleanness	Spot stain, excessive thread ends no more than 1/4inch (more than 3) not trimmed or removed, odor, affecting appearance or serviceability
Bar-tack	Omitted, misplaced, loose stitching, not specified size, not serving intended purpose.
Labels	Any label omitted, incorrect, illegible, not attached where specified
Packaging	Any trouser not packaged in accordance with contract or purchase order

4.6.16 Finished measurements. The trouser finished measurements shall be in accordance with Table VII.

Table VII. Trouser Finished Measurements (Measurements in inches)

Size	Tolerance	Small Reg	Medium Reg	Large Reg	Large Long	X Large Reg	X Large Long
Waist ½ Relaxed	- ¼, + ½”	TBD	17 ½	TBD	TBD	TBD	TBD
Inseam	- ¼, + ½”	TBD	31	TBD	TBD	TBD	TBD

Waist ½ relaxed measured at waist band with hook/loop full relaxed.

Inseam measured from top of crotch point to cuff.

4.6.17 Hook and loop laundering durability test method procedures. The hook and loop tape shall meet the requirements stated in 3.6.4.4 when tested for laundry durability. Use test replica or garment test sample method to verify laundry durability.

4.6.17.1. Test Replica Sample Preparation: Fabricate two test replica samples from basic material paragraph 3.5.1.1. One test replica sample shall contain hook tape on the outer surface and the other test replica sample shall contain loop tape on the outer surface. Finished dimensions of each test replica sample shall be 20-inches by 20-inches. The hook and loop tape, paragraphs 3.6.4-3.6.4.2, sewn to the test sample shall represent production widths, lengths and quantities used in trouser fabrication. Evenly distribute hook and loop tape pieces on both sides of each test replica sample. Sewn hook and loop pieces with box stitch 1/8-inch to 3/16-inch from selvage using 301 stitch type. Insert fabric squares into test replica sample to achieve 1.4 pound minimum weight per test sample. Close test replica sample and stitch around entire sample to prevent curling and balling up of internal fabric squares.

4.6.17.2. Alternate Garment Test Sample. As an alternate, used two (2) trousers sewn with representative hook and loop tapes used in production shall be laundered as a set. To assess worse case situation of hook and loop failure during laundry test, do not engage hook and loop tapes or slide fastener (zipper).

4.6.17.3 Wash Procedures for Test Replica Samples or Alternate Garment Test Samples. Launder two test replica samples, one hook sample and one loop sample, or two trousers with test method AATCC-150 which includes sample and ballast load weighing a total of 4-pounds. Note: For Garment Sample – do not engage hook and loop tapes to represent worse case situation. Wash setting shall be Permanent Press, 140°F wash and 80°F rinse with a 10 minute agitation time. Use 66 grams of detergent conforming to 1993 AATCC detergent without bleach for each laundering. Drying time shall be Permanent Press for 40-45 minutes.

4.6.17.4 Number of Laundering/Drying Cycles. A total of 15 laundering and drying cycles for each test replica sample set or soft shell trousers.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point’s packaging activities within the Military Service or Defense Agency, or within

the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. The ECWCS, GEN III, Soft Shell Trousers is for wear by soldiers, as a separate outer garment, or as a part/layer of multi-component Extreme Cold Weather Clothing System. The principle purpose is to provide protection against the adverse effects of cold wet weather.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Size required (see 1.2)
- c. When a first article is required (see 3.1, 4.2, and 6.3)
- d. Packaging (see 5.1)

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

6.4 Standard shade samples. For access to standard samples, address the contracting activity issuing the invitation for bids or request for proposal.

6.5 Fabric defects scales. Fabric Defect Replica Kits are available from Sears, Roebuck and Company, Department 817HG, FC568B, 3333 Beverly Road, Hoffman Estates, IL 60179.

6.6 Material sources.

6.6.1 Fabrics.

- a. Basic shell – Nextec Application Inc., Style GLACIER
- b. Mesh Tricot pocket lining - Collins & Aikman

6.6.2 Webbing, elastic cord.

RI Textile Company
Part Number: DLB 48

or
Hope Global

Part Number: 2831

6.6.3 Tape, hook and loop.

Velcro USA, Inc
or
YKK Corporation of America

6.6.4 Barrel lock.

ITW Nexus
or
YKK Corporation of America
Part Number LC055/H

6.7 Subject terms (key word) list.

Trouser
ECWCS
Cold weather Clothing
Extended Cold Weather Clothing System

6.8. Asterisk (*) denotes change/update has been made to the paragraph compared to previous revision.

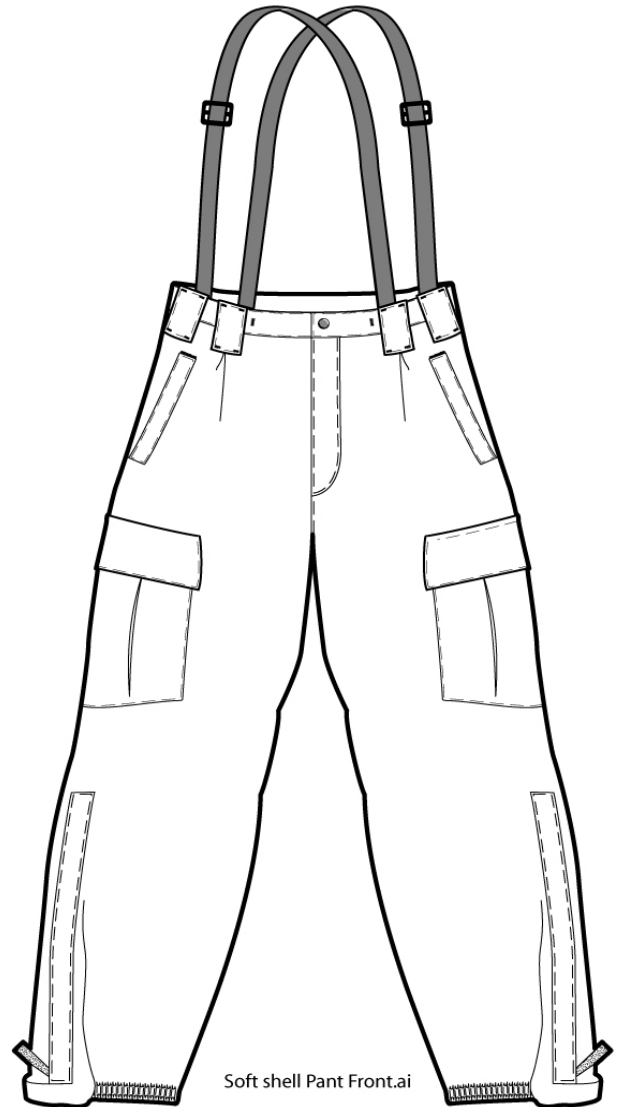
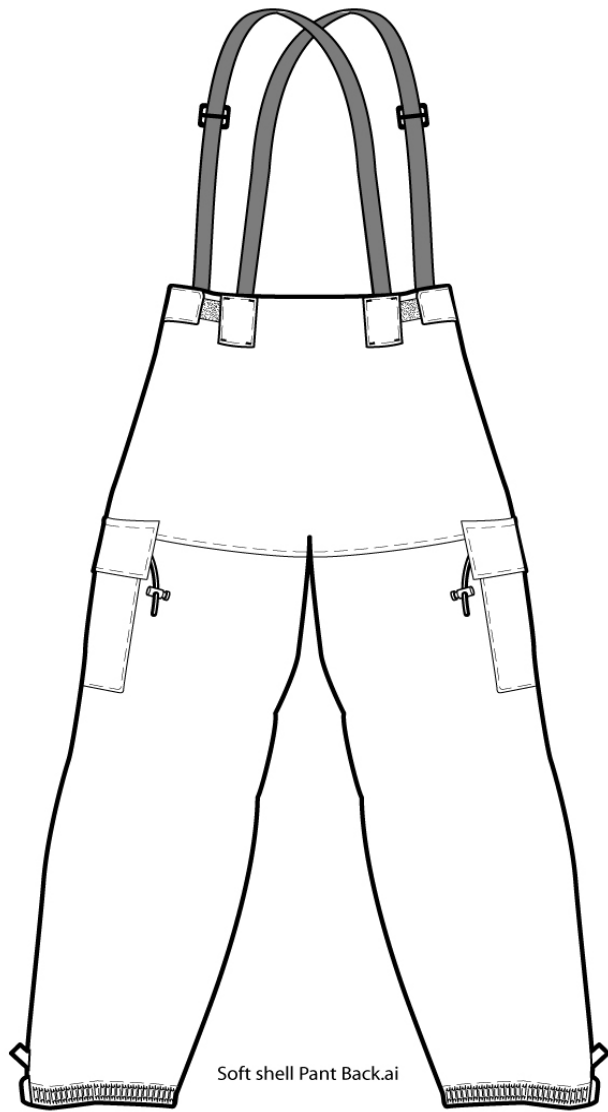
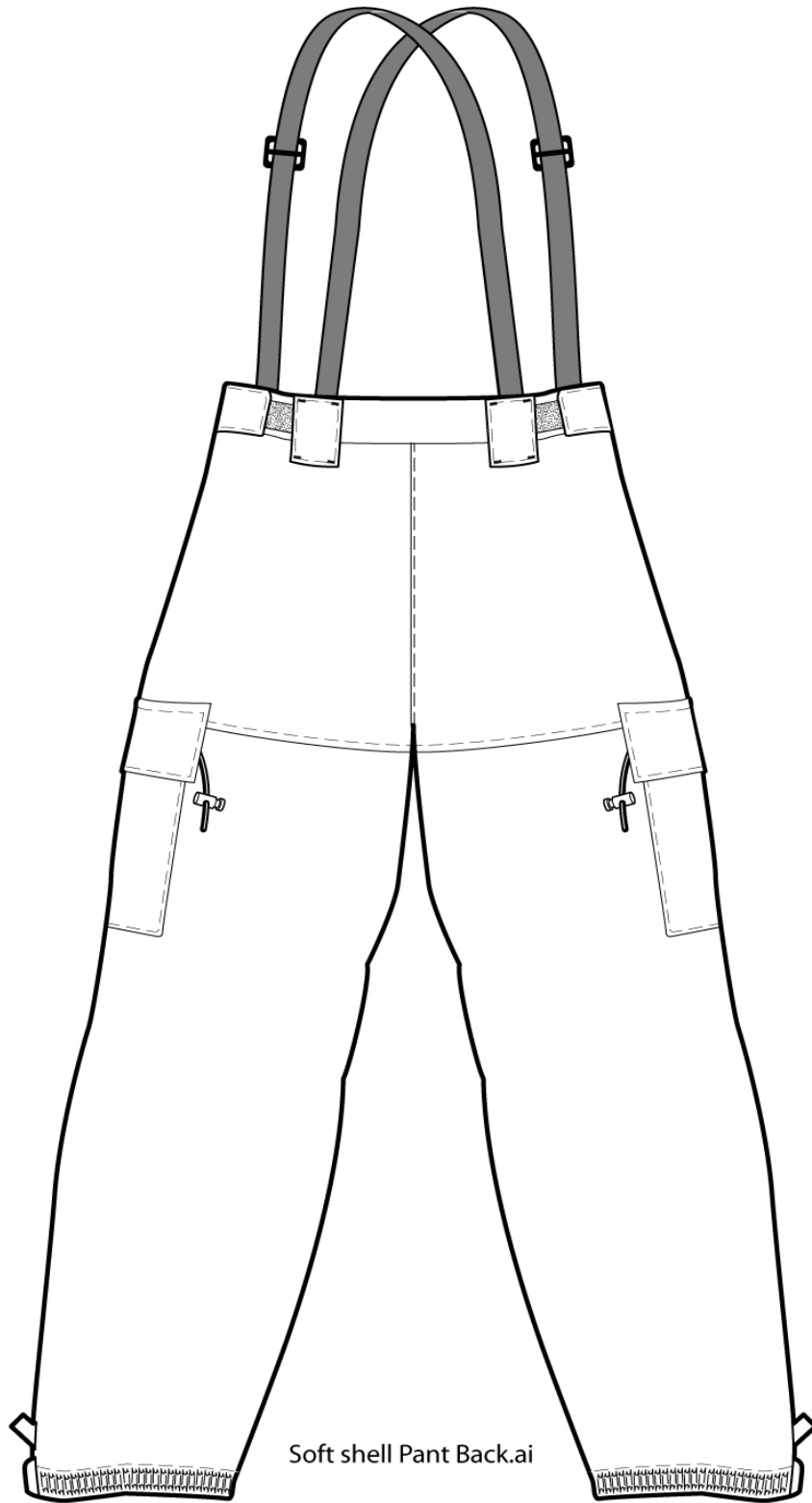
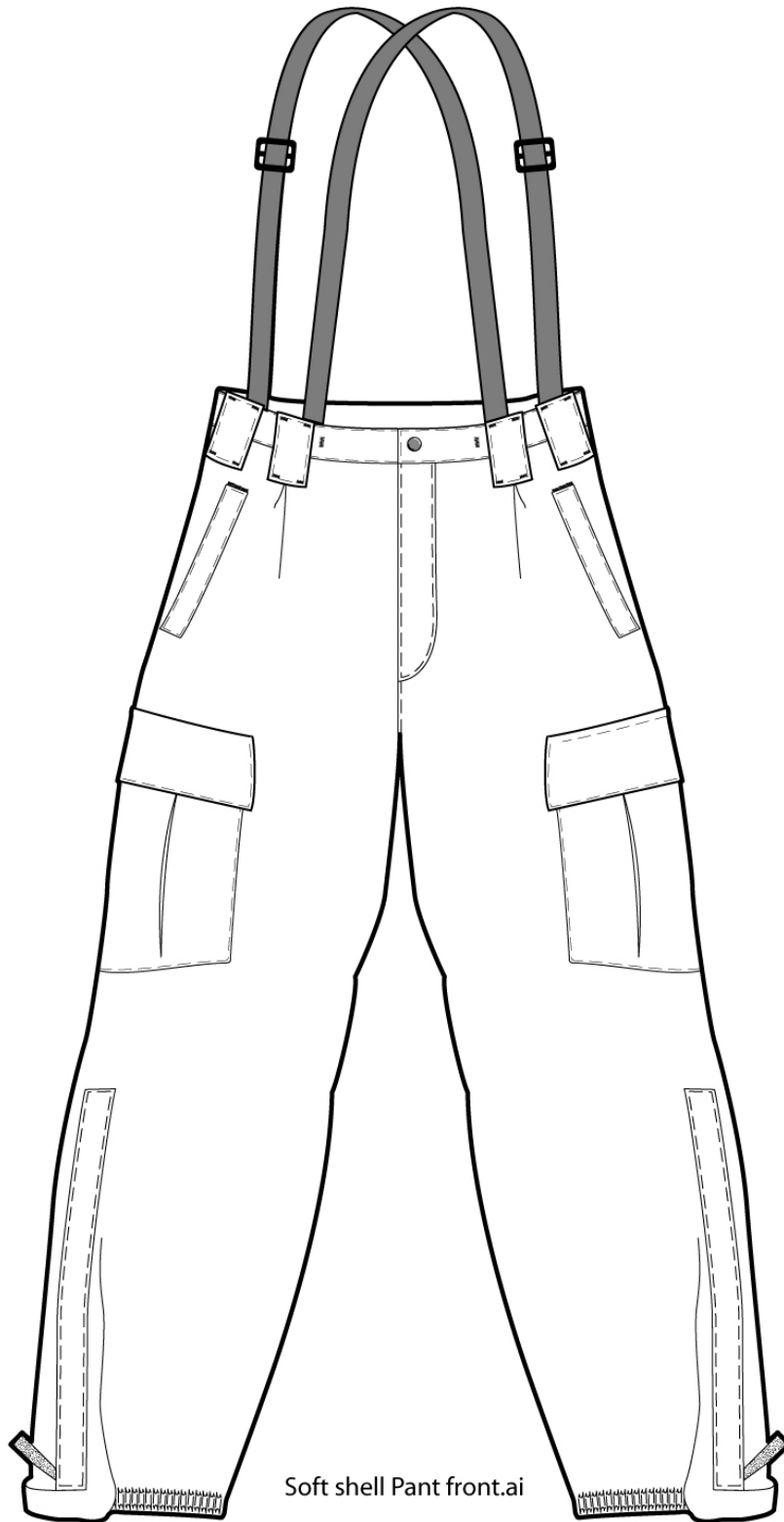


Figure 1



Soft shell Pant Back.ai

Figure 2



Soft shell Pant front.ai

Figure 3

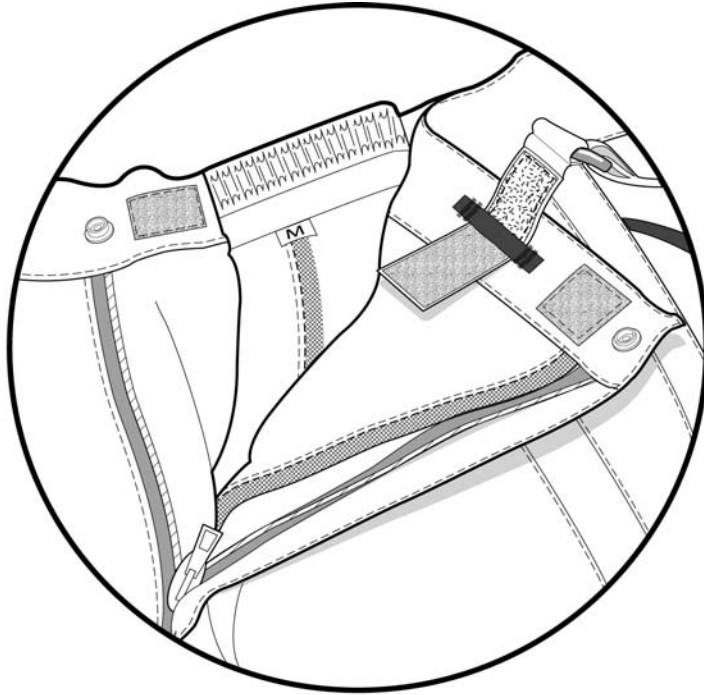
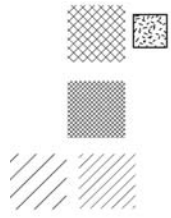
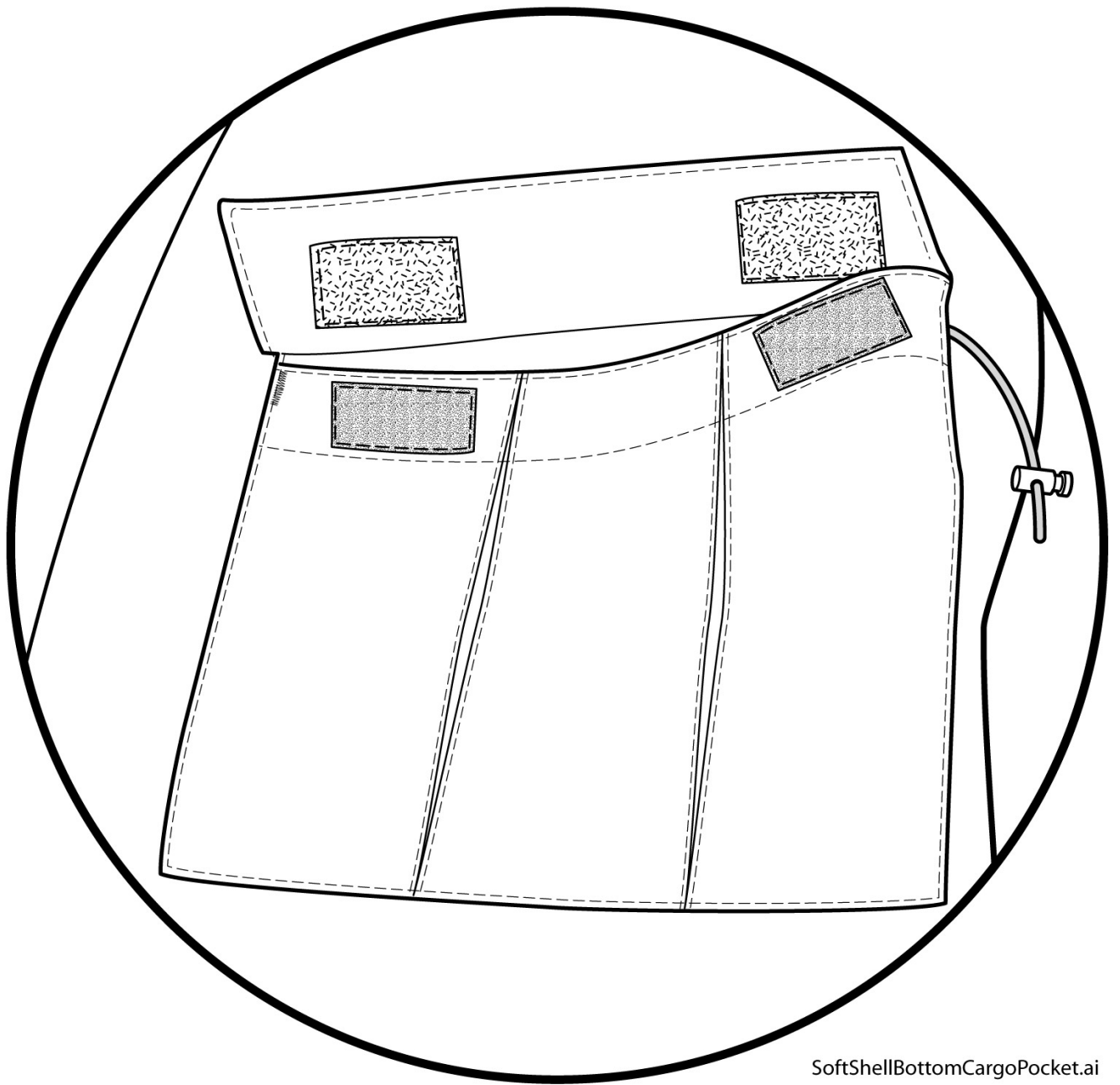


Figure 4

SoftShellBottomCargoPnt.ai



SoftShellBottomCargoPocket.ai

Figure 5