

PURCHASE DESCRIPTION

PARKA, EXTREME COLD WEATHER (GEN III)

1. SCOPE

1.1 Scope. This purchase description covers the requirements for an insulated loft jacket, manufactured from a water repellent nylon cloth and batting material to be used as a component of the Extended Cold Weather Clothing System (ECWCS), GEN III.

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

Extra Small – Short
Extra Small – Regular

Small – Short
Small - Regular
Small – Long

Medium - Regular
Medium – Long

Large - Regular
Large - Long

Extra Large - Regular
Extra Large - Long
Extra Large – Extra Long

Double Extra Large - Regular
Double Extra Large – Long
Double Extra Large – Extra Long

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 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

A-A-55634 - Zipper, (Fastener, Slide Interlocking)

A-A-50199 - Thread, Polyester Core, Cotton or Polyester-Covered

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-STD-129 – Military Marking for Shipment and Storage

MIL-PRF-5038 - Tape, Textile and Webbing, Textile, Reinforcing Nylon

MIL-DTL-32072 – Thread, Polyester

MIL-DTL-32075 – Label: For Clothing, Equipage, and Tentage, (General Use)

MIL-T-3530 – Thread and Twine, Mildew Resistant or Water Repellent Treated

(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 from the Standardization Document Order Desk, 700 Robbins Ave. Philadelphia, PA 19111-9054).

2.2.2 Other Government documents, drawings and publications. The following 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.

CODE OF FEDERAL REGULATIONS (CFR)

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 the 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-132 - Colorfastness to Dry Cleaning
- 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 C-518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM D-737 - Air Permeability of Textile Fabrics
- ASTM D-747 - Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
- ASTM D-751 - Coated Fabrics
- ASTM D-1388 - Standard Test Method for Stiffness of Fabrics
- ASTM D-1424 - Tearing Strength of Fabrics by Falling-Pendulum Type Apparatus
- ASTM D-1776 - Practice for Conditioning and Testing Textiles
- ASTM D-3775 - Warp End Count and Filling Pick Count of Woven Fabric
- 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)

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

(For all inquiries, please contact the American National Standards Institute, 25 West 43rd St., 4th Floor, New York, NY 10036). Website address is <http://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.)

NATIONAL AEROSPACE STANDARD (NASM)

NASM 16491 - Grommet, Metallic, General Specification for-FSC 5325
NASM 20652 - Eyelets, Metallic, and Eyelet Washers, Metallic-FSC 5325

(Application for copies are available from the Aerospace Industries Association, 1250 Eye Street NW, Washington, DC 20005.)

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 purchase description 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 4.2).

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 Recycle, recovered, or environmental 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 jacket shall have a single-breasted front with a slide-fastener, left-hand separating, (double-slider closure which will permit the opening of the fastener from either the top or bottom), from the top of the collar to the bottom of the jacket hem. The jacket shall have a draw-cord closing hood, and a draw-cord bottom. The hood shall be capable of being rolled up, and secured in a pocket at the back of the neck, by a loop fastener. The jacket shall have two vertical opening, outer pockets with slide fasteners, and two inner mesh pockets. The jacket will be fabricated with an outer layer, an insulation layer, and finally, an inside layer of lightweight

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rip-stop material. The sleeves shall have an exterior layer of durable fabric running from the elbows to the cuffs, with adjustable hook and loop cuff fasteners. A windbreak flap shall be provided, which runs from the top of the neck opening to the bottom of the jacket hem, on the inside of the left section of the slide fastener. A piece of hook fastener tape shall be centered and sewn above the loop fastener of the upper chest area per pattern placement. The exterior surfaces of the jacket shall be Urban Gray 505 in color. See Figures 1-3.

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 Parka layer shell (outside material). The cloth shall be a plain weave, water resistant treated, nylon cloth (texture approximating 115 by 100 yarns per inch, warp and filling, respectively), meeting the requirements in Table I when tested as specified in 4.5. The color of the cloth shall match Urban Gray 505.

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. Jacket Layer Shell (outside material), physical requirements

Characteristic	Requirement
Weight, oz/sq. yd (max.)	3.3
Breaking strength, lbs (min.)	
Warp	100
Filling	100
Tearing Strength, lbs. (min.)	
Warp, Threshold	4.0
Filling, Threshold	4.0
Warp, Objective	6.0
Filling, Objective	6.0
Air Permeability, ft ³ /ft ² /min. (max)	1.0
Moisture vapor transmission	
Rate, g/m ² /24h (min.) -	
Initial, Procedure B, Threshold	600
Objective	1200
Stiffness, in-lbs (max.)	
At 70°F, Objective	0.001
Threshold	0.002
At 32°F, Objective	0.001
Threshold	0.002
Blocking, rating (max.)	No. 2
Water permeability, cm (min) -	
Initial	30
Spray rating, (min.) -	
Initial	100, 100, 90

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TABLE I. Jacket Layer Shell (outside material), physical requirements (Cont'd)

Characteristic	Requirement
Spray rating, (min.) -	
After 5 launderings	100, 90, 90
Resistance to organic liquid, pass/fail -	
Initial	No wetting
After 5 launderings	No wetting
Dynamic absorption, percent (max.):	
Threshold	5.0
Objective	1.5
Dimensional stability, percent (max.)	
Warp	2.5
Filling	1.5
Color	Urban Gray 505
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 Urban Gray 505. The color of the face side of the cloth shall be Urban Gray 505, and shall match the applicable standard sample.

3.5.1.4 Spectral reflectance. The spectral reflectance shall conform to the requirements specified in Table II, initially and after laundering, when tested as specified in 4.5.

TABLE II. Spectral Reflectance Requirements: Reflectance (percent)

Wave length, Nanometers (nm)	Urban Gray 505		
	Min	Max (Objective)	Max (Threshold)
600	12	26	26
620	14	26	26
640	14	28	28
660	14	30	30
680	18	34	34
700	24	38	50
720	26	42	60
740	30	46	63
760	32	48	65

TABLE II. Spectral Reflectance Requirements: Reflectance (percent) (Cont'd)

Wave length, Nanometers (nm)	Urban Gray 505		
	Min	Max (<i>Objective</i>)	Max (<i>Threshold</i>)
780	34	48	65
800	34	50	65
820	36	54	65
840	38	54	65
860	40	56	65

3.5.2 Nylon, rip-stop cloth (lining cloth). The cloth for the inside of the jacket lining shall be a rip-stop weave nylon meeting the physical requirements in Table III when tested as specified in 4.5. The color of the cloth shall match Urban Gray 505.

TABLE III. Nylon, Rip-Stop Cloth (lining cloth) - Physical Requirements.

Characteristic	Requirement
Weight, oz/sq. yd (max.)	1.7
Fabric Count, yarns/inch (min.)	
Warp	180
Filling	96
Break Strength, lbs. (min.)	
Warp	115
Filling	80
Tearing Strength, lbs. (min.)	
Warp	7.5
Filling	5.0
Air Permeability, ft ³ /ft ² /min.	1.0 – 3.0
Color	Urban Gray 505
Spectral Reflectance, %	Table II
Colorfastness to:	
Laundering	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
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.

3.5.3 Batting material, heavy weight. The batting material used for the body and sleeve insulation shall conform to the physical requirements in Table IV. Testing shall be as specified in 4.5.

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TABLE IV. Batting Material (heavy weight) - Physical Requirements.

Characteristic	Requirement
Weight, oz./sq.yd	6.0 +/- 0.6
Thickness @ 0.002 psi, in. (max.)	1.0
Intrinsic Clo @ 0.002 psi, (min.)	3.5
Drape stiffness, inches, (max.)	4.0
Water gain, wt % (max.)	400
Dimensional stability, percent (max.)	
After 5 Launderings	
Machine/Warp	10.0
Cross Machine/Filling	10.0
Toxicity	<u>1/</u>

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

3.5.4 Batting material, light weight. The batting material used for the hood and outer pockets insulation shall conform to the requirements in Table V. Testing shall be as specified in 4.5.

TABLE V. Batting Material (light weight) - Physical Requirements.

Characteristic	Requirement
Weight, oz./sq.yd	2.0 +/- 0.1
Thickness @ 0.002 psi, in., max.	0.35
Intrinsic Clo @ 0.002 psi, min	1.4
Drape stiffness, inches, max	2.5
Dimensional stability, percent, max.	
After 5 Launderings	
Machine/Warp	10.0
Cross Machine/Filling	10.0
Water Gain, wt%, max	400
Toxicity	<u>1/</u>

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

3.5.5 Cloth, nylon, (reinforcing material). The reinforcement material used for the elbow patches shall be a plain weave, nylon cloth conforming to the requirements in Table VI when tested as specified in 4.5. The color shall match Urban Gray 505.

TABLE VI. Cloth, Nylon (Reinforcing Material) - Physical Requirements.

Characteristic	Requirement
Weight, oz/sq. yd (max.)	5.5
Fabric Count, Yarns per inch (min.)	
Warp	58
Filling	38
Breaking strength, lbs (min.)	
Warp	280
Filling	180

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TABLE VI. Cloth, Nylon (Reinforcing Material) - Physical Requirements. (Cont'd)

Characteristic	Requirement
Tearing Strength, lbs. (min.)	
Warp	8.0
Filling	8.0
Stiffness, in-lbs (max.)	
At 32°F	0.001
At 70°F	0.001
Blocking, rating (max.)	No. 2
Spray rating	
Initial	100, 100, 90
After 1 laundering	100, 90, 90
Resistance to organic liquid, pass/fail	
Initial	No wetting
After 1 laundering	No wetting
Dynamic absorption, percent (max.)	<u>1/</u>
Dimensional stability, percent (max.)	
Warp	2.5
Filling	2.0
Color	Urban Gray 505
Spectral Reflectance, %	Table II
Colorfastness to:	
Laundering	Equal to or better than “3-4” rating on AATCC Gray Scale for Color Change
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>2/</u>

1/ The cloth shall show not more than a 25 percent increase in dynamic absorption properties after one laundering when compared to an unlaundered sample of cloth.

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

3.5.6 Cloth, inner pockets. The cloth used for the inner pocket shall be a Tricot knit mesh of 100% polyester or equal conforming to the physical requirements in Table VII. The color of the cloth shall match Urban Gray 505. Testing shall be as specified in 4.5.

TABLE VII. Inner Pocket Material - Physical Requirements.

Characteristic	Requirement
Weight, oz./ sq. yd.	2.0 +/- 0.2
Colorfastness to:	
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	<u>1/</u>

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

3.6 Components.

3.6.1 Bias binding tape. The binding tape for the inside pocket shall be a 5-7 oz/sq yd, 100% cotton or polyester/cotton woven material. The material shall be cut on the bias to make a 1-5/8 inch wide binding tape. As an alternate, braided folded elastic 1185 conforming to HNW style B1185 may be used. The color shall be Urban Gray 505.

3.6.2 Elastic material. The elastic material used on the cuffs shall be in accordance with MIL-W-5664, Type II, 1-inch ± 1/16 inch in width.

3.6.3 Elastic cord. The elastic cord used on the jacket bottom and hood shall be 1/8 inch, + 1/32, – 0 inch wide, having an elongation of 120% ± 10%; a minimum weight of 0.2 ounces per linear yard; a minimum of 62 picks per inch; 16 carriers, 1 end per carrier; a minimum of 12 elastic strands having a polyester yarn cover. The elastic cord shall have a seared and knotted end. The color shall match Urban Gray 505. Testing shall be as specified in 4.5.

3.6.4 Tape, nylon. The tape used for attaching the hook fastener tape on the cuffs shall conform to type III, class 1, 1-inch wide, of MIL-PRF-5038. The color shall match Urban Gray 505.

3.6.5 Tape, binding. Tape, MIL-PRF-5038, ¼-inch shall be used to attach the barrel locks at the jacket bottom and for the slide fastener thongs.

3.6.6 Fastener 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 ± 1/32 inch as to prevent stitching runoffs or improper fit into automatic sewing equipment. The color shall match Urban Gray 505.

3.6.6.1 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.

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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 Urban Gray 505.

3.6.6.2 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 Urban Gray 505.

3.6.6.3 Colorfastness, tape hook and loop. Unless otherwise specified, for Urban Gray 505, 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.)"

3.6.6.4 Hook and loop laundry durability test method. When tested in accordance with 4.6.14 the hook and loop tapes shall not exhibit fraying edges, peeling yarns, or damage appearance that detracts from the tape appearance or durability.

3.6.7 Thread. The thread for all seaming and stitching shall be Type I or II, size B, 2-ply at 6.0 pounds breaking strength, with a "Water repellent" treatment, conforming to V-T-295; as an alternate, bobbin/looper thread can be Nylon, size AA, 2-ply, with a minimum breaking strength of 4.0 pounds with a "Water-Repellent" finish. As an alternate to nylon thread, polyester, size B, 2 or 3 ply, conforming to Type I, Class 1, Subclass B of MIL-DTL-32072, or size 40, 2 or 3 ply polyester core thread conforming to A-A-50199. All thread shall be water repellent treated as specified in MIL-T-3530. Stitching shall be 9-12 stitches per inch, lockstitch. The color of the thread shall be Urban Gray 505.

3.6.8 Fastener, slide, interlocking. All slide fasteners shall conform to A-A-55634, with the types and styles as specified below.

3.6.8.1 Front closure slide fasteners. Front closure zippers shall be plastic individual element, type III, style 13 (separating double autolock sliders such that opens both from top and bottom), No. 5 chain with 100 lbs. min. crosswise strength with water resistant treated tape and thong on top slider in shade Urban Gray 505.

3.6.8.2 Pocket slide fasteners. Pocket zippers shall be plastic individual element, type I, style 7 (closed ends, autolock slide that closes when pulled upward), No. 5 chain with 100 lbs. min. crosswise strength with water resistant treated tape and thong in shade Urban Gray 505.

3.6.9 Barrel lock. The barrel lock shall maintain a 3-lb. minimum holding strength on the elastic draw cord (see 3.6.3) at -40°F, 70°F and 140°F when tested in accordance with 4.8.13. The barrel locks shall be ½-inch x 3/8- inch elliptical or 3/8-inch round shape, minimum push-button size. The color of the barrel locks shall be Urban Gray 505.

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3.6.10 Cannon clip. The cannon clip used inside the front pockets, shall be Urban Gray 505 and it shall be equal to or better than Part #743-0125 of ITW Nexus.

3.6.11 Grommet. The grommets used on the inside of the lower back of the front pockets and also on the inside of the front panels near the hem shall be in accordance with type III, class III, size zero (0) of NASM 16491. The color shall be Urban Gray 505.

3.6.11.1 Eyelet. The eyelets on the inner layer of the hem of the front panels shall be in accordance with NASM 20652, 1B, dash No. ABE-122. The color shall be Urban Gray 505.

3.6.12 Labels. Each parka 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.

3.6.12.1 The combination size, identification and instruction label for the parka. The combination label shall be sewn on the inside of the parka along the middle back seam of the hood area. The printed label shall be facing the body. The instruction label shall include the following information:

Parka, Extreme Cold Weather
Care Instruction Label

LAUNDERING: (DO NOT DRY CLEAN)

a. Home Laundering. The parka 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 a 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 rustproof hanger. DO NOT PRESS.

b. Field Laundering. The parka shall be field laundered using Formula II of FM 42-414, Appendix E. DO NOT STARCH OR BLEACH.

3.7 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 VIII 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.

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

TABLE VIII. Cutters Must (List of Pattern Parts)

	PIECE NAME	FABRIC	QTY
1	ECLT_FRONT LEFT	SELF	CUT 1 FACE UP
2	ECLT_FRONT RIGHT	SELF	CUT 1 FACE UP
3	ECLT_BACK	SELF	CUT 1 FACE UP
4	ECLT_SLEEVE	SELF	CUT 2
5	ECLT_CUFF	SELF	CUT 2
6	ECLT_CUFF TAB	SELF	CUT 2
7	ECLT_OUTER COLLAR	SELF	CUT 1 FACE UP
8	ECLT_INNER COLLAR	SELF	CUT 1 FACE UP
9	ECLT_COLLAR FACING	SELF	CUT 1 FACE UP
10	ECLT_COLLAR ENDS	SELF	CUT 2
11	ECLT_HOOD CENTER	SELF	CUT 1 FACE UP
12	ECLT_HOOD SIDE	SELF	CUT 2
13	ECLT_HOOD TAB	SELF	CUT 1 FACE UP
14	ECLT_ZIP WIND FLAP w/FUSE alternative	SELF	CUT 1 FACE UP
15	ECLT_BOTTOM BAND	SELF	CUT 1 FACE UP
16	ECLT_HOOD TUNNEL	SELF	CUT 1 FACE UP
17	ECLT_INSIDE POCKET BAG	C5	CUT 2
18	ECLT_ELBOW PATCH	C1	CUT 2
19	ECLT_POCKET BAG UNDER	C2+C4	CUT 2
20	ECLT_SLEEVE LINING	C2+C3	CUT 2
21	ECLT_FRONT LINING	C2+C3	CUT 2
22	ECLT_BACK LINING	C2+C3	CUT 1 FACE UP
23	ECLT_HOOD SIDE LINING	C2+C4	CUT 2
24	ECLT_HOOD CENTER LINING	C2+C4	CUT 1 FACE UP
25	ECLT_INNER COLLAR LINING	C2+C4	CUT 1 FACE UP
26	ECLT_CUFF TAB FUSE	FUSE	CUT 2
27	ECLT_HOOD TAB FUSE	FUSE	CUT 1 FACE UP
28	ECLT_POCKET BAG TOP	C2	CUT 2
	COMMENTS BELOW:		
	SELF = BASIC SHELL MATERIAL C1 (CONTRAST1) = NYLON REINFORCING FABRIC C2 (CONTRAST2) = NYLON RIP-STOP CLOTH (LINING CLOTH) C3 (CONTRAST3) = HEAVYWEIGHT BATTING MATERIAL C4 (CONTRAST4) = LIGHTWEIGHT BATTING MATERIAL C5 (CONTRAST5) = TRICOT KNIT MESH FUSE : INTERFACING FUSIBLE OR SEW IN		

The lengths of the center front, slide fasteners and pocket slide fasteners for the various size-length jackets shall be as shown in TABLE XI, line items 4 and 7, respectively.

3.8 Stitches, seams, and stitching. All seams shall be consistent and exhibit a uniform appearance and conform to the ASTM D 6193 stitch and seam types. The backside of seams

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(inside garment) shall be flat with no protruding seam allowance to create irritation or discomfort. The seams shall be sewn with 9-12 stitches per inch for all outside visible stitching. The width of the bight of stitching shall not be less than 1/16 inch. All material edges shall be clean finished, either turned-in, turned-under, or serged. Seam allowances shall be maintained with seams sewn so that no raw edges, run-offs, pleats, puckers or open seams occur. Loop fastener tape shall be stitched on the loop pile and not on the selvage. Bartacks shall be added for reinforcement as follows and as shown in Figures PARKA, EXTREME COLD WEATHER (GEN III)-VIEW 1 through PARKA, EXTREME COLD WEATHER (GEN III) - VIEW 4.

Bartack Location	Bartack Length, Inch	Quantity per Garment
Zipper Pull	3/4	4

Batting and ripstop fabric for the front, back and sleeve linings shall be joined by stabilizing stitching. Batting and ripstop fabric for the hood, side and center and the pocket bag front and back shall be joined by quilting.

3.8.1 Type 301 stitching. Ends of all stitching shall be backstitched or overstitched not less than 1/2-inch except where ends are turned under or caught in other seams or stitching. Ends of a continuous line of stitching shall overlap not less than 1/2-inch. Thread tensions shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread of excessively tight stitching resulting in puckering of the materials sewn. The lock shall be embedded in the materials sewn. All 301 stitch and bartack thread ends shall be trimmed to a length of not more than 1/4-inch.

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

a. When thread breaks, skipped stitches, run-offs, or bobbin runouts occur during sewing, the stitching shall be repaired by restarting the stitching a minimum of 1/2- 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 1/2 inch in back of the defective area, continue over the defective area, and continue a minimum of 1/2 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/

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

3.8.1.2 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.

3.8.1.3 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:

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

4.2 First article inspection. When a first article is required (3.1 and 6.3), it shall be examined for the defects in 4.6, the finished dimensions in 4.7 and performance as specified in 4.4.1 and 4.5.

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

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 materials specified shall be tested for the characteristics listed in Table IX in accordance with the test methods specified.

TABLE IX. Basic Material Tests

Characteristic	Requirement Paragraph	Test Method
Parka layer shell (outside material)		
Fiber identification, weave and yarns per inch	3.5.1.1	<u>1/</u>
Weight	3.5.1.2	ASTM D-3776
Breaking strength	3.5.1.2	ASTM D-5034 (GE or GT)
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	4.8.1 & 4.8.1.1
Stiffness	3.5.1.2	
At 70°F		ASTM D-747 <u>5/</u>
At 32°F		<u>2/</u> & ASTM D-747 <u>5/</u>
Blocking	3.5.1.2	4.8.2
Water permeability	3.5.1.2	
Initial		4.8.3
Spray rating	3.5.1.2	
Initial		4.8.4.1

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TABLE IX. Basic Material Tests (Cont'd)

Characteristic	Requirement Paragraph	Test Method
Parka layer shell (outside material)		
Spray rating	3.5.1.2	
After 5 launderings		4.8.4.3
Resistance to organic liquid	3.5.1.2	
Initial		4.8.5.1
After 5 launderings		4.8.5.3 & 4.8.5.1
Dynamic absorption	3.5.1.2	AATCC-70
Dimensional stability	3.5.1.2	AATCC-96, Option 1C
Color	3.5.1.2	4.8.6
Spectral reflectance	Table II	4.8.7 & 4.8.7.1
Colorfastness to:		
Laundering	3.5.1.2	4.8.8.1
Light	3.5.1.2	4.8.8.2
Crocking		AATCC-8
Toxicity	3.5.1.2	4.8.12
Nylon-rip-stop (lining material)		
Fiber identification and weave	3.5.2	<u>1/</u>
Weight	3.5.2	ASTM D-3776
Fabric count	3.5.2	ASTM D-3775
Breaking strength	3.5.2	ASTM D-5034(GE or GT)
Tearing strength	3.5.2	ASTM D-1424
Air permeability	3.5.2	ASTM D-737
Color	3.5.2	4.8.6
Spectral reflectance	Table II	4.8.7 & 4.8.7.1
Colorfastness to:		
Laundering	3.5.2	4.8.8.1
Light	3.5.2	4.8.8.2
Crocking	3.5.2	AATCC-8
Toxicity	3.5.2	4.8.12
Batting material, heavy weight		
Weight	3.5.3	ASTM D-3776
Thickness		<u>3/</u>
Intrinsic Clo @ 0.002 psi	3.5.3	ASTM C-518
Drape stiffness	3.5.3	ASTM D-1388
Water Gain	3.5.3	<u>4/</u>
Dimensional stability	3.5.3	AATCC-135 (1)(V)(A)(i)
Toxicity	3.5.3	4.8.12
Batting material, lightweight		
Weight	3.5.4	ASTM D-3776
Thickness	3.5.4	<u>3/</u>
Intrinsic Clo @ 0.002 psi	3.5.4	ASTM C-518
Drape stiffness	3.5.4	ASTM D-1388
Water Gain	3.5.4	<u>4/</u>

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TABLE IX. Basic Material Tests (Cont'd)

Characteristic	Requirement Paragraph	Test Method
Batting material, lightweight		
Dimensional stability	3.5.4	AATCC-135 (1)(V)(A)(i)
Toxicity	3.5.4	4.8.12
Cloth, inner pockets		
Fiber identification and knit type	3.5.6	1/
Weight	3.5.6 & 3.6.1	ASTM D-3776
Colorfastness to:		
Laundering	3.5.6	AATCC-61, IIA
Crocking	3.5.6	AATCC-8
Light	3.5.6	4.8.8.2
Toxicity	3.5.6	4.8.12
Cloth, Nylon (reinforcing material for elbow patches)		
Fiber identification and weave	3.5.5	1/
Weight	3.5.5	ASTM D-3776 (Method C)
Fabric count	3.5.5	ASTM D-3775
Breaking strength	3.5.5	ASTM D-5034 (G-E or G-T
Tearing strength	3.5.5	ASTM D-1424
Stiffness		
At 70°F	3.5.5	ASTM D-747 5/
At 32°F	3.5.5	2/ & ASTM D-747 5/
Blocking	3.5.5	4.8.2
Spray rating		
Initial	3.5.5	4.8.4.1
After 1 laundering	3.5.5	4.8.4.2 & 4.8.4.1
Resistance to organic liquid		
Initial	3.5.5	4.8.5.1
After 1 laundering	3.5.5	4.8.5.2 & 4.8.5.1
Dynamic absorption		
Initial	3.5.5	AATCC-70
After 1 laundering		4.8.8.3 & AATCC-70
Dimensional stability	3.5.5	AATCC-96, Option 1C, A
Color	3.5.5	4.8.6
Spectral reflectance	Table II	4.8.7 & 4.8.7.1
Colorfastness to:		
Laundering	3.5.5	4.8.8.1
Light	3.5.5	4.8.8.2
Crocking	3.5.5	AATCC-8
Toxicity	3.5.5	4.8.12
Elastic cord		
Elongation	3.4.9	4.8.10
Weight	3.4.9	ASTM D- 3776
Picks/inch	3.4.9	Visual

TABLE IX. Basic Material Tests (Cont'd)

Characteristic	Requirement Paragraph	Test Method
Elastic cord		
Number of carriers	3.4.9	Visual
Ends per carrier	3.4.9	Visual
Elastic strands/width	3.4.9	4.8.11
Fastener Tape, Hook and Loop		
Color	3.5.3	4.8.6
Colorfastness To:		
Dry cleaning	3.6.6.3	AATCC -132
Light	3.6.6.3	4.8.8.2
Laundering after 5 cycles	3.6.6.3	AATCC – 61, Opt. 3A
Crocking	3.6.6.3	AATCC – 8
Laundry Durability	3.6.6.4	4.6.14 - 4.6.14.4

1/ A certificate of compliance shall be submitted for this characteristic.

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/ Batting thickness shall be measured on panels using a 12” x 12” calibrated Measure-Matic Thickness Gauge, or equivalent, under a pressure of 0.002 pounds per inch (psi).

4/ The insulation should adsorb a maximum weight gain in water when subjected to room temperature distilled water for 20 minutes with excess water when removed via centrifugation at 1500rpm for 5 minutes.

5/ 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 End item visual examination. Each jacket shall be subjected to visual examination. All fabric and garment defects shall be scored in accordance with Table X. Material defects are defined in Section I of FED-STD-4. All shade evaluations of the garments shall be evaluated at a distance of approximately 3 feet and under the artificial daylight as specified in 4.8.6.

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TABLE X. End item visual examination

Examination	Defect	Classification	
		Major	Minor
Material defects and damages	Any smash, multiple float or loose slub	101	
	Cut, tear, mend, burn, needle chew, or hole	102	
	Misweave, area of poor dye penetration, dyestreak, broken or missing yarn, visible mend, thin place or shade bar <u>1</u> /	103	201
Cleanliness	Any spot, streak, or stain of a permanent nature on a any portion of garment which would be visible when the garment is worn.		202
	Removable spot, streak, or stain on outside of garment		203
	Thread ends not trimmed throughout garment		204
	Any holding or basting threads visible on outside of the finished garment, when applicable		205
Component and assembly	Any defective component <u>1</u> /	104	206
	Any component part omitted	105	
	Any required operation omitted or improperly performed <u>1</u> /	106	207
Drawcord	Any drawcord caught in hem or tunnel stitching restricting use of drawcord	107	
	Any end not heat seared		208
	Any drawcord omitted	108	
	Any end not knotted		209
	Any drawcord insufficient in length	109	
	Any barrel lock omitted		210
	Not caught in center bartack, when specified		211
Slide fastener	Any part of slide fastener bent, broken, otherwise defective	110	
	Not closing as specified	111	
	Length not as specified	112	
	Color not as specified		212
	Thong not as specified		213
Snap fastener	Any part of assembly missing, mismatched, broken, cracked, bent, not securely clinched, affecting function: - two or more snap fasteners	113	
	- one snap fastener		214
	One or more clinched too tightly cutting surrounding fabric	114	
	Loose, i.e., socket or stud spins freely or wobbles in connection portions		215
	One or more having rough or sharp edge	115	
Wrist tabs	Missing	116	
	Improperly located <u>1</u> /	117	216
Labels	Missing, illegible, or incorrect	118	
	Incorrectly placed or attached		217

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TABLE X. End item visual examination (Cont'd)

Examination	Defect	Classification	
		Major	Minor
Accuracy of seaming	Seam twisted, pleated, seaming or puckered <u>1/</u>	119	218
	Part of garment caught in any unrelated operation or stitching <u>1/</u>	120	219
	Thread break secured by stitching back of the break less than 1/2 inch		220
	Ends of all seams and stitchings when not caught in other seams or stitching, uneven or backtacked less than 1/2 inch		221
	Color not as specified		222
	Gage of stitching uneven or not as specified		223
	Edge of seam tape less than 1/8 inch from seam allowance	121	
	Seam tape lifting off fabric	122	
	Visible scorching (heat degradation of fabric) in excess of 3/16 inch width or 1/2 inch in length at any location along a taped seam	123	
	Open seams	More than 1/8 inch up to 1/4 inch	124
More than 1/4 inch			
	NOTE: One or more broken or two or more continuous skipped or run-off stitches constitute an open seam. On double stitched seams, a seam is considered open when one or both sides of the seam are open. Raw edge not securely caught in stitching shall be classified as an open seam		
Seams and stitching	Not specified seam or stitch type	125	225
	Missing, broken or skipped stitches <u>1/</u>		226
Stitch tension	Loose tension in any area:	126	227
	- more than 1-inch but not more than 2-inches		
	- more than 2-inches	127	
	Tight tension (stitches break when normal strain is applied to the seam or stitching)	128	
Stitches per inch (to be scored only when the condition exists on major portion of the seam)	Missing, broken, or skipped stitches <u>1/</u>	129	
	Less than minimum specified:		228
	- one stitch		
	- two or more stitches		229
Pockets and flaps	More than maximum specified		
	Flap attached crookedly, i.e., distance between sides of pocket and underside of opened flap varies more than 1/4-inch		230
	Pocket or flap poorly shaped		231
	Flap not covering front or back edge of pocket by 3/16 inch or more		232
	Insignia tab set crookedly		233
	Pocket divider not properly placed		234

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TABLE X. End item visual examination (Cont'd)

Examination	Defect	Classification	
		Major	Minor
Heat sealed seams and non-wicking buffer	Any seam tape not located as specified		
	Non-wicking buffer missing	130	
	Non-wicking buffer not properly placed	131	
	Any seam tape not 1/8 inch overlap on each side of sewn seam	132	
	Any seam tape not overlapped 3/4 inch minimum	133	
	Any required stitching not covered by seam tape		236
	Any needle punctures that have not been repaired using heat sealing tape		237
Repairs	Any area of the laminate knit fabric bordering the seam tape that is melted exposing laminate film	134	
	Any heat sealing repairs extending beyond 25 inches in length	135	
Seam tape adhesion	More than five repairs on any one item <u>1/</u>	136	
	Seam tape lifting off fabric within 3/4 inch of seam <u>1/</u>	137	
Shaded part	Visible scorching (heat degradation of the fabric on the laminate) in excess of 3/16 inch in width or 1/2 inch in length at any location along a taped seam	138	
	Variation in shade within an outside part <u>1/</u>	139	238
Fronts	Any part required to be cut from one piece on material shaded <u>1/</u>	140	239
	NOTE: Parts suspected as being shaded shall be examined at a distance of 3 feet against the background of the other parts and colors of the garment. When the shade difference is readily discernible under these examining conditions, it shall be scored as a shaded part.		
Length of fronts	Hem uneven by 1/4 inch or more at bottom when fastened		240
	Uneven by 1/4 inch or more at neck when fastened		241
	Flaps uneven by more than 1/4 inch when fastened		242
	Left flap less than 1/4 inch longer at bottom than right flap when fastened		243
Bartacks	Bartack omitted	141	
	Any bartack not in specified location, insecure, or not serving intended purpose:		
	- more than two	142	
	- two or less		244
Hood flap	Any loose stitching, incomplete or broken		245
	Length or width not as specified		246
	Snaps not in locations specified	143	
Label/tag	Loop fasteners not in locations specified	144	
	Not heat sealed	145	
	Barcode omitted or not readable by scanner		247
Fastener tape hook & pile	Human-readable-interpretation (HRI) omitted or illegible		248
	Not attached to location specified		249
	Causes damage to the garment	146	
Fastener tape hook & pile	Not properly placed	147	
	Not specified length		250

1/ This defect shall be scored as major when seriously affecting serviceability and as a minor when affecting serviceability but not seriously.

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4.7 Jacket finished measurements. The jacket finished measurements shall be in accordance with Table XI.

TABLE XI. Parka Finished Measurements (Measurements in inches)

REGULAR		XS	S	M	L	XL	2XL	TOL +/-
1	ACROSS CHEST <u>1/</u>	25 ½	27 ½	29 ½	31 ½	33 ½	35 ½	-0.25", +0.5"
2	BACK LENGTH <u>2/</u>	31	31 1/2	32	32 1/2	33	33 1/2	-0.5", +0.5"
3	SLEEVE LENGTH FROM CB <u>3/</u>	36	36 3/4	37 1/2	38 1/4	39	39 3/4	-0.5", +0.5"
4	CF ZIPPER LENGTH <u>4/</u>	30	30 1/2	31	31 1/2	32	32 1/2	-0.5", +0.5"
6	CUFF FINSHED MEASUREMENT <u>6/</u>	5	5 ¼	5 ½	5 ¾	6	6 1/4	-0.25", +0.25"
7	POCKET ZIPPER LENGTH <u>7/</u>	9	9	9	9	9	9	-0.5", +0.5"
8	HOOD DEPTH <u>8/</u>	11	11 ½	12	12 ½	13	13 ½	-0.25", +0.25"
9	HOOD OPENING <u>9/</u>	15 ¾	16	16 ¼	16 ½	16 ¾	17	-0.25", +0.25"
10	FRT HOOD OPENING CORD FINISHED KNOT <u>10/</u>	32 1/2	33	33 1/2	34	34 1/2	35	-0.5", +0.5"
11	HEM ELASTIC CORD <u>11/</u>	60	64	68	72	76	80	-0.5", +0.5"
12	INSIDE POCKET ELASTIC MEASUREMENT <u>12/</u>	7 1/2	8	8 1/2	9	9 1/2	10	
13	CUFF ELASTIC MEASUREMENT <u>13/</u>	3 1/2	3 1/2	4	4	4 1/2	4 1/2	
SHORT		XS	S					
2	BACK LENGTH	30	30 1/2					-0.5", +0.5"
3	SLEEVE LENGTH FROM CB	34 1/2	35 1/4					-0.5", +0.5"
4	CF ZIPPER LENGTH	29	29 1/2					-0.5", +0.5"
LONG			S	M	L	XL	2XL	
2	BACK LENGTH		32 1/2	33	33 1/2	34	34 1/2	-0.5", +0.5"
3	SLEEVE LENGTH FROM CB		38 1/4	39	39 3/4	40 1/2	41 1/4	-0.5", +0.5"
4	CF ZIPPER LENGTH		31 1/2	32	32 1/2	33	33 1/2	-0.5", +0.5"
XLONG						XL	2XL	
2	BACK LENGTH					35	35 1/2	-0.5", +0.5"
3	SLEEVE LENGTH FROM CB					42	42 3/4	-0.5", +0.5"
4	CF ZIPPER LENGTH					34	34 1/2	-0.5", +0.5"
<u>1/</u> Across chest measurement is taken at bottom of armhole flat from edge to edge.								
<u>2/</u> Back Length Measurement is taken from bottom of center back neck straight to bottom of hem								
<u>3/</u> Sleeve length from CB is taken from bottom of center back neck straight to sleeve hem with sleeve extended out flat.								
<u>4/</u> CF zipper opening is taken from top of top stop to bottom of bottom stop.								
<u>6/</u> Cuff Opening is taken from edge to edge at sleeve hem flat and relaxed.								
<u>7/</u> Front pocket zipper is measured from bottom of top stop to top of bottom zipper stop.								
<u>8/</u> Hood depth is measured 9" up from neck point with hood folded in half and flat from the back of the hood to the front								
<u>9/</u> Hood Opening is measured with hood fold in half flat from bottom of hood opening to top of hood at hood opening								
<u>10/11/12/ & 13/</u> For construction purposes only not for measuring								
SEAM ALLOWANCE: 1/2" : all seams except for: 3/8" : neckline								

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4.8 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.

4.8.1 Moisture vapor transmission rate. ASTM E-96 with temperature and humidity conditions of 73.5° +/-1°F and 50 +/- 2% Relative Humidity. 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/m²/24h The evaporation rate shall be determined by conducting an upright cup, Procedure B test (see 4.8.1.1), without a test specimen for a period of exactly two (2) hours).

4.8.1.1 Procedure B, ASTM E-96. The backside 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 +/-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.

4.8.2 Blocking. ASTM D-751, Blocking Resistance at Elevated Temperatures, except that the test shall be performed at a temperature of 180° +/- 2°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.

4.8.3 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.

4.8.4 Spray rating.

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

4.8.4.2 After 1 laundering (for cloth, nylon (reinforcing)). Test specimens shall be laundered for one (1) laundering cycle in accordance with AATCC-96, Test VI, A.

4.8.4.3 After 5 laundering (on loft layer shell fabric). Test specimens shall be laundered for five (5) laundering cycle in accordance with 4.8.8.3 and then tested for spray rating.

4.8.5 Resistance to organic liquids.

4.8.5.1 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

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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.

4.8.5.2 After 1 laundering (for cloth, nylon (reinforcing)). Test specimens shall be laundered for one (1) laundering cycle in accordance with AATCC-96, Test VI, A.

4.8.5.3 After 5 launderings . Test specimens shall be laundered for five (5) laundering cycles in accordance with 4.8.8.3 and then tested for resistance to organic liquids.

4.8.6 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 $7500^{\circ} \pm 200^{\circ}\text{K}$, with illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at $2856^{\circ} \pm 200^{\circ}\text{K}$.

4.8.7 Spectral reflectance. Spectral reflectance data shall be determined on the face side and shall be obtained from 600 to 860 nanometers (nm) at 20nm 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 bandwidth shall be less than 26nm at 860nm. 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 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 1/4-inches in diameter. Any color having spectral reflectance values falling outside the limits at four or more of the wavelengths specified shall be considered test failure.

4.8.7.1 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 4.8.7.

4.8.8 Colorfastness.

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

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

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4.8.8.3 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°F + 10°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°F – 160°F, and dry for approximately fifteen (15) minutes. The laundering equipment, washer and dryer, shall be in accordance with AATCC-135.

4.8.9 Stiffness. ASTM D-747.

4.8.10 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

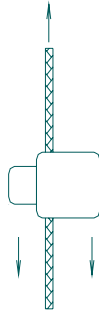
B = Measurement of elongation at 2 pounds

4.8.11 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.

4.8.12 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.

4.8.12.1 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.

4.8.13 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.

4.6.14 Hook and loop laundering durability test method procedures. The hook and loop tape shall meet the requirements stated in 3.6.6.4 when tested for laundry durability. Use test replica or garment test sample method to verify laundry durability.

4.6.14.1 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 3.6.6 – 3.6.6.2, sewn to the test sample shall represent production widths, lengths and quantities used in jacket 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.

4.6.14.2 Alternate Garment Test Sample. As an alternate, use two loft jackets 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).

4.6.14.3 Wash Procedures for Test Replica Samples or Alternate Garment Test Samples. Launder two test replica samples, one hook sample and one loop sample, two loft jackets, 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.

4.6.14.4 Number of Laundering/Drying Cycles. A total of 10 laundering and drying cycles for each test replica sample set or loft jacket sets.

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 loft jacket is intended for use by personnel of the Department of Defense as a component of the Extended Cold Weather Clothing System. The principle purpose is to provide protection against the adverse effects of extreme cold weather.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this document.
- 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. The first article should be a preproduction sample. The contracting officer shall specify the appropriate type of first article and the number of units to be furnished. The contracting officer shall 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 Possible material sources.

- a. Fastener tape, hook & loop
Velcro USA, Inc.

Or

YKK Corporation of America

- b. Cannon clip.
ITW Nexus (Part #743-0125)

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

6.7 Subject term (keyword) listing.

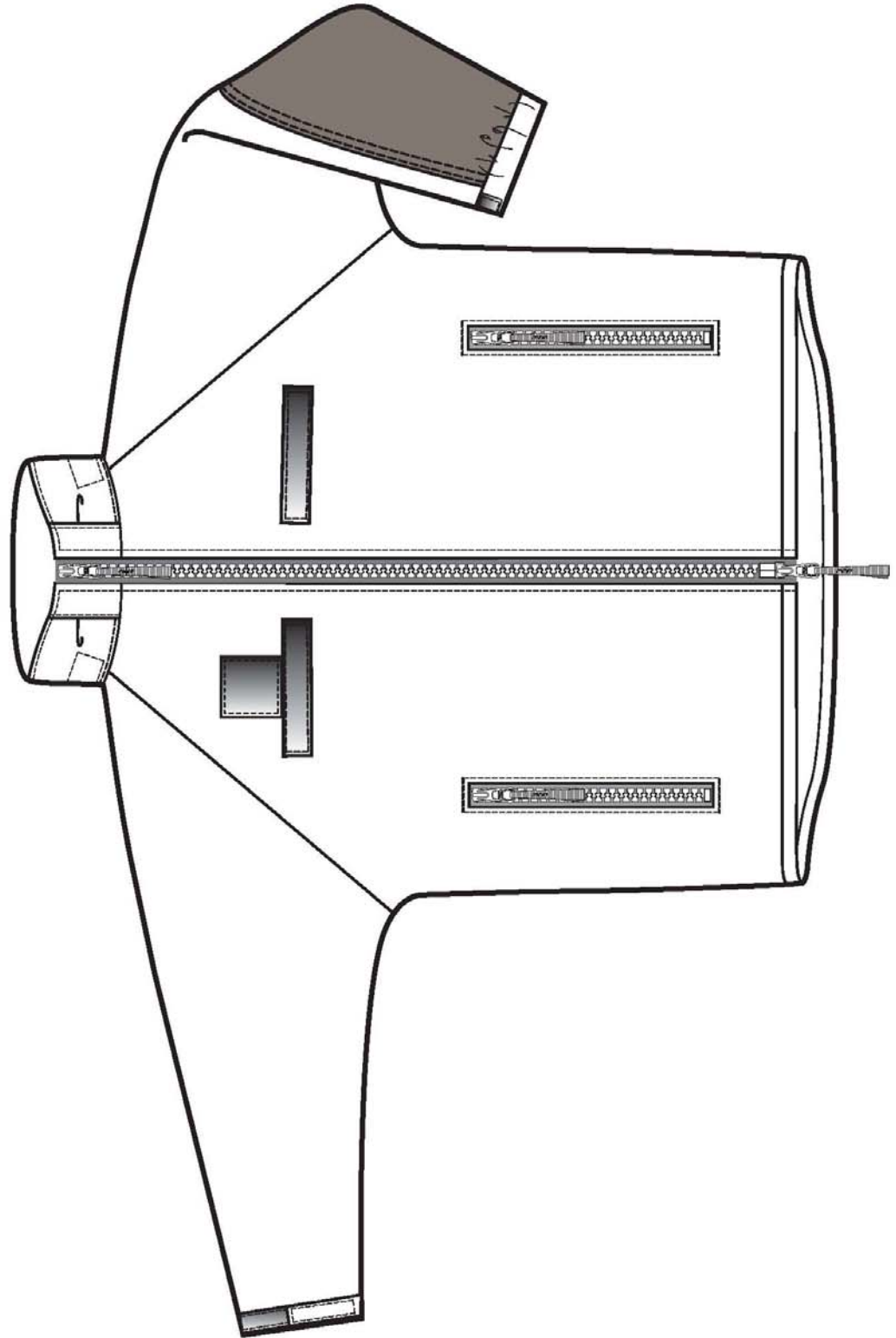
Cold Weather Clothing
ECWCS
Extended cold weather clothing system
Moisture vapor permeable
Loft
Jacket

CUSTODIAN:
Army – GL

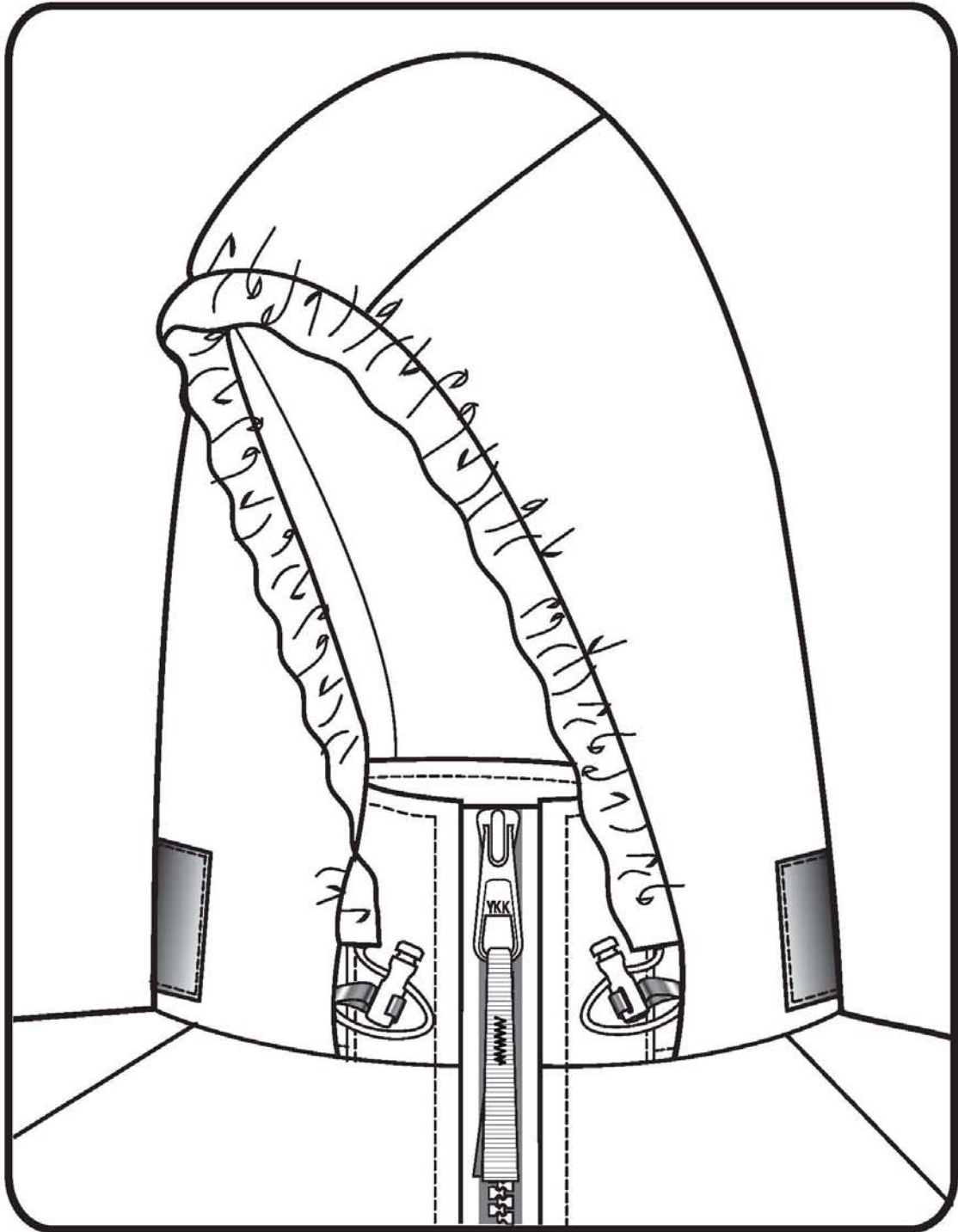
PREPARING ACTIVITY:
Army - GL

Project No. 8415-

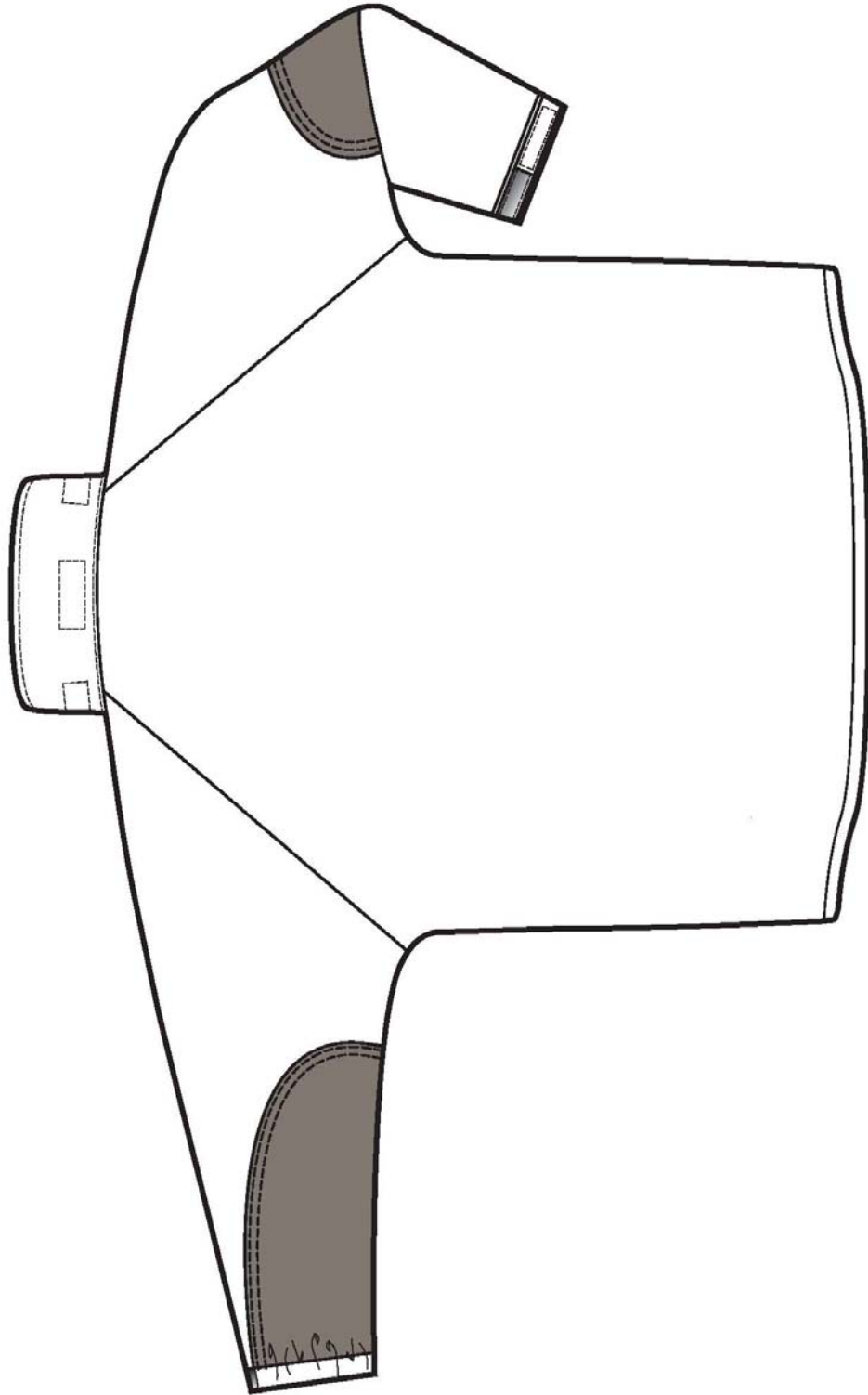
ECLT EXTREME COLD LOFT TOP
VIEW 1



ECLT - VIEW 2



ECLT -VIEW 3



ECLT - VIEW 4

