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AVIS

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**MANUFACTURING DATA  
FOR  
OVERALLS, EXTREME COLD WEATHER, MULTICAM®**

**1.0 SCOPE**

**1.1 Scope**

This Manufacturing Data covers the materials, design, construction and inspection requirements for the Overalls, Extreme Cold Weather, MULTICAM® for use by the Canadian Special Operations Forces Command (CANSOFCOM).

**1.2 Intended Use**

The Overalls, Extreme Cold Weather, MULTICAM® is worn with the Parka, Extreme Cold Weather, MULTICAM®.

**1.3 Classification**

The Overalls covered by this Manufacturing Data will be supplied in one (1) of the following types as specified in the Contract:

- (a) Type I - Overalls, Extreme Cold Weather, MULTICAM®, Cloth, Nylon/Cotton, MULTICAM®, Oil and Water Repellent Treated; and
- (b) Type II - Overalls, Extreme Cold Weather, MULTICAM®, Cloth, Knit, Jersey, Aramid/FR Viscose, MULTICAM®, Water Repellent Treated.

**2.0 GENERAL**

**2.1 Intellectual Property**

The information, data, know-how, formulas, algorithms, software, processes, systems, methods, designs, text, works, figures, tables, sketches, photographs, plans, drawings, specifications, samples, reports, names, inventions and/or ideas contained herein (hereinafter "Intellectual Property") is the exclusive property of Her Majesty The Queen in Right of Canada as represented by the Minister of National Defence (hereinafter referred as "DND"). No one has the right to reproduce, disclose, disseminate, or utilize, in any manner or in any form, this Intellectual Property, or any part thereof, without the prior written consent of DND. For further information on the restrictions applicable to this Intellectual Property, or to request consent from DND, please contact the Contracting Authority.

## 2.2 Applicable Documents

The following documents form part of this Manufacturing Data to the extent specified, and are supportive of this Manufacturing Data when referenced; all other document references are to be considered supplemental information only. In the event of a conflict between the documents referenced and the contents of this Manufacturing Data, then the contents of this Manufacturing Data must take precedence:

### DND Specifications and Standards (provided upon request)

- CF-B-854 Buttons, Nylon
- D-80-001-028/SF-001 Specification for Cord, Plaited, Spun, Synthetic Fibre
- D-80-001-055/SF-001 Specification for Label, Clothing and Equipment
- D-83-001-005/SF-001 Fastener, Slide, Interlocking
- D-LM-008-002/SF-001 Specification for Marking for Storage and Shipment

### DND Drawings (provided upon request)

- 2811 Strap and Button Assembly, 45-Ligne
- 373118 Button, Nylon, Slotted, 30-Ligne
- 389556 Button, Bar, Plastic, 45-Ligne
- 8790166 Strap and Button Arrangement, 30-Ligne, Type I
- CS-149 Socket, Fastener
- CS-150 Studs, Fastener
- CS-151 Eyelet, Fastener
- CS-153 Button, Fastener

### CAN/CGSB Standards (email: [ncr.cgsb-ongc@pwgsc.gc.ca](mailto:ncr.cgsb-ongc@pwgsc.gc.ca))

- CAN/CGSB-4.2-M Textile Text Methods
- CAN/CGSB-4.131-M Cotton-Covered or Polyester-Covered, Polyester Thread
- CAN/CGSB-4.139 Polyester Staple Thread
- CAN/CGSB-54.1-M Stitches and Seams, Parts I and II
- CAN/CGSB-86.1-2003 Care Labelling of Textiles
- 4-GP-80Ma Cotton Thread
- 4-GP-85Ma Nylon Thread

### American Society for the Testing of Materials ([www.astm.org](http://www.astm.org))

- D 5736 Standard Test Method for Thickness of Highloft Nonwoven Fabrics
- D 6242 Standard Test Method for Mass Unit Area of Nonwoven Fabrics

### International Standards Organization (ISO) ([www.iso.org](http://www.iso.org))

- ISO 11092 Textiles - Physiological Effects - Measurement of Thermal and Water Vapour Resistance Under Steady-State Conditions (Sweating Guarded Hot-Plate Test)

### FED Standards (Download Documents: <http://assist.daps.dla.mil/quicksearch/>)

- FED-STD-595C - Colors Used in Government Procurement
- A-A-55126B Commercial Item Description - Fastener Tapes, Hook and Loop, Synthetic

Federal Aviation Administration: (www.faa.gov)

- Federal Aviation Regulations (FAR) Part 25 - Airworthiness Standards Transport Category Airplanes: Subpart D - Design and Construction (Fire Protection: 25.853 Compartment Interiors)

U.S. Department of Transportation (www.transportation.gov)

- Code of Federal Regulation (CFR) Part 517 (Federal Motor Vehicle Safety Standards) 571.302 - Flammability of Interior Materials

2.2.1 Order of Precedence

The order of preference is as follows:

- (a) In the event of inconsistency between contract documents, such as contract, Manufacturing Data, drawing and sealed pattern, the order of precedence shall be contract, Manufacturing Data, drawing and sealed patterns;
- (b) In the event of a conflict between the text of this manufacturing data and the references cited herein, the text of this manufacturing data must take precedence;
- (c) In the event of inconsistency within this manufacturing data, the Contracting Authority must be contacted for clarification; and
- (d) Nothing in this document supersedes applicable laws and regulations, unless a specific exemption has been obtained.

2.3 Material Standards

The following material standards are supplemental to this standard:

- (a) Specification for Cloth, Nylon/Cotton, MULTICAM®, Oil and Water Repellent Treated;
- (b) Specification for Cloth, Twill, Aramid/FR Viscose, MULTICAM® Oil and Water Repellent Treated;
- (c) Specification for Waterproof Moisture Vapour Permeable (WMVP) Barrier Fabric;
- (d) Specification for Cloth, Taffeta, Nylon; and
- (e) Specification for Cloth, Plain Weave, Nylon.

2.4 Definitions

Earth Tone	By definition, earth tone is considered a color scheme that draws from a color palette of browns, tans, grays, greens, oranges, whites and some reds. The colors in an earth tone scheme are muted and flat in an emulation of the natural colors found in soils, moss, trees and rocks. For the purpose of this specification, the earth tone color (where specified) must be based on the predominantly brown, tan and gray color series (lusterless) within FED STD-595C, where those colors do not include any elements of orange, red and white.
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Hook and Loop Fastener	A fastening consisting of two strips of nylon fabric, one having hooked threads and the other a coarse surface, that form a strong bond when pressed together, trademarked under the name VELCRO®.
MULTICAM®	A proprietary design for a computer generated digital camouflage pattern patented by Crye Precision Ltd.
Slide Fastener	A fastener for locking together two toothed edges by means of a sliding tab, commonly referred to as a zipper.

### 2.5 Layout Sketches

Schematic layout sketches for the Overalls are included as part of this Annex. The sketches are designed to provide a general layout of the Overalls only. They are not to scale and are not representative of the style, fit, colour scheme or form of the final garment. The following sketches are included in Appendix 1:

- (a) Figure 1 - Front and Back View;
- (b) Figure 2 - Finished Hip and Cargo Pockets Measurements;
- (c) Figure 3 - Dimensions of Garment Components;
- (d) Figure 4 - Top Side Opening;
- (e) Figure 5 - Suspenders Dimensions;
- (f) Figure 6 - Bottom Side Opening and Storm Cuff; and
- (g) Figure 7 - Care and Marking Label.

### 2.6 Patterns

DND will provide patterns as follows:

- (a) Sealed pattern: CANSOFCOM - Overalls, Extreme Cold Weather, MULTICAM® (Sealed for construction and design only); and
- (e) Paper patterns - DSSPM paper patterns for all sizes under Style Code OECWIA31 - Overalls, Extreme Cold Weather, Improved, Combat, Type I - CADPAT™ (TW) and Type II – Search and Rescue Technicians, Improved, Integrated Clothing Ensemble (ICE). Size 7034 (Regular/Medium) will be used for tendering purposes.

Note: The paper patterns for the Overalls, Extreme Cold Weather, Improved, Combat, Type I - CADPAT™ (TW) and Type II – Search and Rescue Technicians, Improved, Integrated Clothing Ensemble (ICE) are to be used for the construction of the Overalls, Extreme Cold Weather, MULTICAM®. The paper patterns have the following deviations:

- The message pockets on the external front bib have been deleted; and
- The ration pockets on the internal front bib have been deleted.

### 3.0 **REQUIREMENTS**

#### 3.1 Design

The design must be in accordance with Sealed Patterns and must incorporate the following features:

- (a) Bib top overalls with suspenders and belt loops;
- (b) Slide fastener front closure;
- (c) Two (2) side hip handwarmer pockets;
- (d) Cargo pockets on thighs with covered buttoning flap closure;
- (e) Full length side openings with two-way separating slide fasteners;
- (f) Seat and knee patches;
- (g) Inseam bottom leg reinforcement;
- (h) Drawcord at hem;
- (i) Storm cuffs;
- (j) Fully insulated and lined; and
- (k) Waterproof-breathable liner.

Note: Unless otherwise specified, these garments must be governed by the Scale of Measurements at Appendix 2.

#### 3.2 Materials

The following applies:

- (a) Shell Material - The following applies:
  - i. The shell material for Type I must be Cloth, Nylon/Cotton, MULTICAM®, Oil and Water Repellent Treated; and
  - ii. The shell material for Type II must be Cloth, Knit, Jersey, Aramid/FR Viscose, MULTICAM®, Water Repellent Treated;
- (b) Barrier Layer - The barrier layer material must be Waterproof Moisture Vapour Permeable (WMVP) Barrier Fabric;
- (c) Lining Material - Taffeta - The lining material must be Cloth, Taffeta, Nylon;
- (d) Lining Material - Nylon - The lining material used for the front and back cuff reinforcement must be Cloth, Plain Weave, Nylon;
- (e) Handwarmer Fleece - The handwarmer fleece fabric must:
  - i. Be commercially available fleece knitted from 100% filament polyester yarns, the cloth double faced, veloured and sheared;
  - ii. Have a maximum mass of 275 g/m<sup>2</sup>

- iii. Have a maximum thickness of 6.3 mm (0.25 in) and minimum thickness of 5.8 mm (0.23 in) when measured under 0.03 kPa pressure according to CAN/CGSB-4.2 Method 37;
  - iv. Have a maximum dimensional change of 7% in the warp direction and 5% in the weft direction, with the total shrinkage for both directions not to exceed 10%, when laundered according to the conditions prescribed for the garment; and
  - v. Be a non-florescent earth-tone colour;
- (f) **Insulation** - The following applies:
- i. The batting must be a commercially available product made from synthetic fibers, manufactured for use in outerwear garments meant to provide a high degree of cold weather protection;
  - ii. The integrity of the batting must be maintained through the normal service life of the garments, through wear and tear of motion, abrasion between layers of cloth, frequent stuff packing and unpacking, etc. No thin spots, lumping, clumping, curling, slipping, or changes in dimensional stability over time are allowed;
  - iii. There must be no fiber migration of the batting through the fabric;
  - iv. The batting and any accompanying scrim must:
    - a. Be launderable at high temperatures up to 70°C, in domestic machines, coin operated machines, commercial or field laundries; and
    - b. Be machine tumble dryable at high temperatures up to 75°C;
  - v. Any scrim, quilting, surface treatment, or other addition to the actual insulation batting must be compatible with the batting and must not degrade its performance;
  - vi. Any scrim, quilting, etc. required for the necessary performance of the batting when in the garment must be incorporated; and
  - vii. The batting must be in compliance with Table 1. Testing must be conducted on the batting alone, without any scrim or lining material attached;

Table 1: Requirements for Insulation

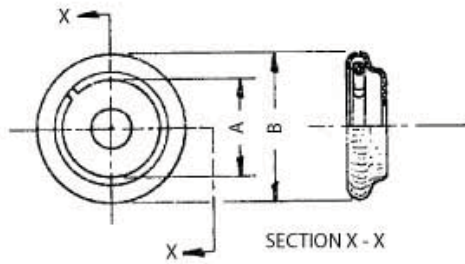
Property	Test Method	Requirement
Fiber Content – Batting	CAN/CGSB-4.2-M Test Method 14	100% polyester
Fiber Content – Scrim (if applicable)	CAN/CGSB-4.2-M Test Method 14	100% polyester
Mass (g/m <sup>2</sup> ) – batting only	ASTM D 6242	Maximum: 120
Thickness (mm)	ASTM D 5736 (0.014 kPa pressure)	Maximum: 20
CLO (CLO/g/m <sup>2</sup> )	ISO 11092 (dry)	Minimum: 0.02

*Note: PRIMALOFT® Silver (100 g/m<sup>2</sup>) has been known to meet these requirements.*

- (g) **Hook and Loop Fastener Tape** - The hook and loop fastener tape must:
- i. Be Type II, Class 1 100% nylon in accordance with A-A-55126B;
  - ii. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern; and
  - iii. Available in the following width (plain backed): 18 mm (0.75 in);

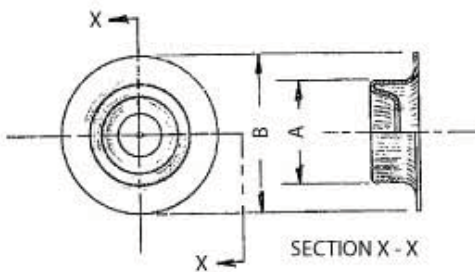
- (h) Sealing Tape - The sealing tape must be commercially available tape compatible with the Waterproof Moisture Vapour Permeable (WMVP) Barrier Fabric interlining material. The colour must match the barrier fabric;
- (i) Slide Fasteners (Non Water Resistant) - The slide fasteners must be as follows:
- i. Front closure:
    - a. Be Class 4, Type 7, 2-way non-separating with top stops on each end and automatic lock sliders in accordance with D- 83-001-005/SF-001; and
    - b. Flame retardant treated, monofilament (coil) as follows:
      1. Compliant with the FAR Part 25, Subpart D, Section 25.853 Flammability Test requirements; and
    - c. Compliant with the FMVSS 302 for burn rate;
  - ii. Handwarmer Pockets:
    - a. Be Class 3, Type 1 monofilament (coil) chain type with a regular pull; and
    - b. Have monofilament (coil) members, automatic lock sliders and 100% polyester tape with in accordance with D- 83-001-005/SF-001;
  - iii. Side Opening:
    - a. Be Class 4, Type 9 moulded chain type with a long pull; and
    - b. Have plastic interlocking members, automatic lock sliders and 100% polyester tape in accordance with D- 83-001-005/SF-001;
  - iv. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
- (j) Draw Cord - The draw cord for the leg bottom and the slide fastener pulls must:
- i. Be Cord, Plaited, Spun Synthetic Fibre, Type I in accordance with D-80-001-028/SF-001; and
  - ii. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
- (k) Buttons - The buttons must:
- i. Be slotted nylon conforming to specification CF-B-854 and drawing 373118 (30-ligne) or 389556 (45-ligne); and
  - ii. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
- (l) Suspender Elastic - The suspender elastic must be as follows:
- i. Commercially available elastic with knitted construction using 60%polyester/40% rubber ((± 5%);
  - ii. Weight: 50-57 m/kg (74.4-84.8 ft/lb);
  - iii. Stretch: 125%;
  - iv. Width: 3.8 cm (1.5 in) (maintained when stretched); and
  - v. Be black or white in colour;
- (m) Leg Lining Elastic - The leg lining elastic must be as follows:
- i. Commercially available elastic with knitted construction using 60%polyester/40% rubber ((± 5%);
  - ii. Weight: 100-115 m/kg (148.8-169.6 ft/lb);
  - iii. Stretch: 125%;
  - iv. Width: 19.1 mm (0.75 in) (maintained when stretched); and
  - v. Be black or white in colour;
- (n) Snap Fasteners - Snap fasteners must be regular spring clamp type in brass with a black finish and a phosphor bronze spring as detailed in the following drawings:

Drawing 1: CS-149 - Socket Fastener



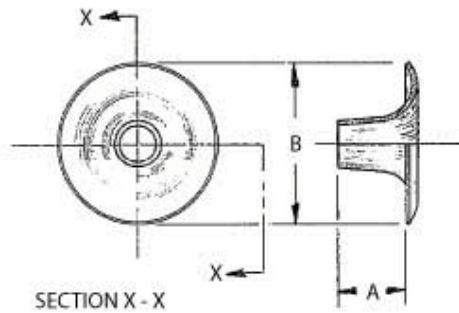
Inside diameter "A"	8.7 mm (0.3425 in)
Outside diameter "B"	14.3 mm 0.5625 in)

Drawing 2: CS-150 - Stud Fastener



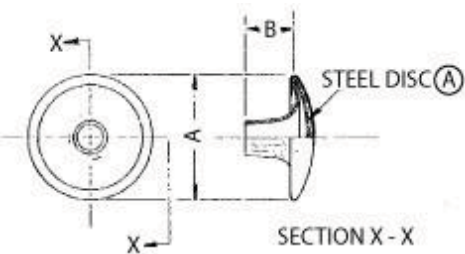
Diameter "A"	9.5 mm (0.375 in)
Diameter "B"	14.3 mm 0.5625 in)

Drawing 3: CS-151 - Eyelet Fastener



Barrel Length Diameter "A"	6.3 mm (0.25 in)
Flange Diameter "B"	14.3 mm (0.5625 in)

Drawing 4: CS-153 - Button Fastener



Diameter "A"	Ligne	24
	Diameter	15.5 mm (0.609 in)
Diameter "B"	Barrel Length	4.4 mm (0.172 in)

- (o) Thread - The following applies:
  - i. The thread for flame retardant fabric components must:
    - a. Be aramid spun staple thread (R27 Tex) conforming to Type II of A-A-55217;



- b. Be used for all sewing operations (seaming and serging) on the garments' sleeves, as well as all seams where a flame retardant fabric component is joined to a non-flame retardant fabric component (e.g., seaming of knit material to flame retardant material used on underarm and upper sleeve, stitching of the collar materials and the slide fastener placket, etc.); and
  - c. Be a non-florescent earthtone colour that is a good visual match to the components being sewn;
  - ii. The thread for non-flame retardant fabric component seaming, stitching, buttonholes and bartacks must:
    - a. Be cotton-covered or polyester-covered, polyester thread (R50 Tex) conforming to CAN/CGSB-4.131-M; and
    - b. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
  - iii. The thread for seaming and serging the lining, interlining and pocket linings must:
    - a. Be polyester staple thread (R40 Tex) conforming to CAN/CGSB-4.139; and
    - b. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
  - iv. The thread for quilting the lining must:
    - a. Be Nylon 70/2 thread conforming to 4-GP-85Ma on the nylon taffeta side of the quilt;
    - b. Be polyester staple thread in accordance with CAN/CGSB-4.139 on the backing side of the quilt; and
    - c. Match the colour of the lining material being used;
  - v. Unless otherwise specified, all other garment components must be matched for thread colour;
- (p) Buttonhole Gimp - The buttonhole gimp must:
- i. Be 100% cotton, 3 cord soft finish, R210 Tex, conforming to 4-GP-80Ma, Type 2A; and
  - ii. Be a non-florescent earth tone colour to match the MULTICAM® camouflage pattern;
- (q) All material must be sourced and supplied by the Contractor.

3.3 Sizing

The Overalls must be available in the following sizes in accordance with the Scale of Measurements at Appendix 2:

Inseam (in)	Waist (in)					
	26	30	34	38	42	46
64	X	X	X			
67		X	X	X	X	
70		X	X	X	X	X
73		X	X	X	X	X
76			X	X	X	X

Size	NSN (Type I)	NSN (Type II)
6426	8415-20-011-8260	TBD
6430	8415-20-011-8261	TBD
6434	8415-20-011-8262	TBD
6730	8415-20-011-8263	TBD

6734	8415-20-011-8264	TBD
6738	8415-20-011-8265	TBD
6742	8415-20-011-8266	TBD
7030	8415-20-011-8267	TBD
7034	8415-20-011-8268	TBD
7038	8415-20-011-8270	TBD
7042	8415-20-011-8271	TBD
7046	8415-20-011-8272	TBD
7330	8415-20-011-8273	TBD
7334	8415-20-011-8274	TBD
7338	8415-20-011-8275	TBD
7342	8415-20-011-8276	TBD
7346	8415-20-011-8277	TBD
7634	8415-20-011-8278	TBD
7638	8415-20-011-8279	TBD
7642	8415-20-011-8280	TBD
7646	8415-20-011-8281	TBD

The Overalls must also be available in special/extended sizes where the above sizes are not suitable.

### 3.4 Cutting

The following applies:

- (a) The Overalls must be cut using duplicates of Government supplied paper patterns as follows:
- i. Paper patterns include seam allowance but do not include 'make-up' allowance; and
  - ii. The Contractor is responsible for adding 'make-up' allowance to suit their production methods without changing the design, grade or requirements for the Overalls;

Note: Paper patterns will not be supplied to the Contractor for special/extended sizes.

- (b) The inherent properties of FR material render it prone to excessive fraying. Additional allowance has been incorporated into the patterns to accommodate fraying. Care must be taken to ensure that all seam allowances are adhered to without compromise to the shape and finished dimensions outlined in the scale of measurements; and
- (c) The shell parts of the Overalls must:
- i. Be cut and used in accordance with best commercial standards;
  - ii. Be cut in the direction of the warp as shown on the paper patterns; and
  - iii. Be cut from the same piece of shell material with the exception of all buttoning portions of the flaps and button strap assemblies, which may be cut from separate lays or ends of shell material.

### 3.5 Sewing

The following applies:

- (a) Seams must be as follows:
- i. Conform to CAN/CGSB-54.1-M; and

- ii. Be a minimum of 9.5 mm (0.375 in) wide unless otherwise specified;
- (b) Stitching must be as follows:
- i. Be either lock stitched Type 301 or chain stitch Type 401 (unless otherwise specified) conforming to CAN/CGSB-54.1-M, having not less than eight (8) nor more than ten (10) stitches per 2.5 cm (1 in);
  - ii. For double-needle stitched, needles set 6.4 mm (0.25 in) apart;
  - iii. Ends of all lock stitched seams and stitching, also breaks in thread, securely backstitched; and
  - iv. Present a regular even appearance without fabric pucker and be free from skips that may result from faulty machine thread tension or other stitching malfunctions;
- (c) Where double-lapped seams are specified, the needles must be set 6.4 mm (0.25 in) apart conforming to numerical designation 2.04.03 of CAN/CGSB-54.1-M;
- (d) Where seaming, turning and stitching is specified, the edges must be properly worked out before stitching;
- (e) Where seaming and serging is specified, this may be done in one or two operations;
- (f) All exposed raw edges must be serge finished with any 500 series, with not less than 10 stitches per inch (2.5 cm)
- (g) Buttonholes must:
- i. Be gimp reinforced eyelet type with not less than 22 stitches per 2.5 cm (1 in);
  - ii. Have ends fishtailed or bartacked; and
  - iii. When buttonholes are used for water drainage purposes, only the eyelet of the buttonhole is to be cut;
- (h) Hook and loop fastener tape must:
- i. Be stitched around all edges 3.2 mm (0.125 in) gauge, taking care to ensure stitching is formed into the hook and loop portion of the tape;
  - ii. For tapes wider than 2.5 cm (1 in) stitched around all edges and through the centre or have a 'X' enclosed in the box; and
  - iii. For best results, a ball point needle, size 110 (#18) should be used;
- (i) Bartacks, unless specified otherwise, must be 12.7 mm (0.5 in) long and have not less than twenty (20) cover stitches; and
- (j) Button and strap assemblies (where specified) must:
- i. Have buttons threaded with a strap of shell material in accordance with Drawing 8790166 for 30-ligne buttons or Drawing 2811 for 45-ligne buttons; and
  - ii. Have straps as follows:
    - a. Seam type numerical designation 8.06.02 or 8.19.01;
    - b. Finished width of 8 mm (0.3125 in); and
    - c. Attached with bartacks;

### 3.6 Snap Fasteners

When inlaying snap fasteners, reinforcement under the shell material may be added as required. Careful consideration must be given to the attaching force of the snap fastener machine to ensure that all parts of the snap fastener will remain attached and functional for the life of the garment.

### 3.7 Seam Sealing

When specified, seams must be sealed in a manner that will ensure the integrity of the waterproof barrier layer in the garment. The following requirements must be met:

Table 2: Requirements for Visual and Physical Examination

<b>Construction Detail</b>	<b>Test Method</b>	<b>Unacceptable Faults</b>
Seams	Visual Examination	<ul style="list-style-type: none"> <li>– Tape which is not centered across the width of the seam;</li> <li>– Delamination along edges of tape, over seam allowance and stitching or across the width of the tape;</li> <li>– Bubbling;</li> <li>– Blistering;</li> <li>– Puckering;</li> <li>– Melting; and/or</li> <li>– Ends of threads which have not been trimmed.</li> </ul>
Ends and Joins	Visual Examination	<ul style="list-style-type: none"> <li>– Loose ends and corners which have not bonded;</li> <li>– Rough edges or beads at the ends; and</li> <li>– An overlap at a join of less than 19.1 mm (0.75 in).</li> </ul>
Drill holes and stitching lines not in seams	Visual Examination	<ul style="list-style-type: none"> <li>– Left uncovered without a designated exception.</li> </ul>
Stiffness of seamed area	Physical Examination	<ul style="list-style-type: none"> <li>– Marked increase of stiffness.</li> </ul>

### 3.8 Quilting

The nylon lining and the insulation must be quilted together in accordance with the insulation supplier's instructions. Quilt stitching should be kept to a minimum to optimise the thermal value of the insulation. Ideally, the quilt pattern should not be smaller than a 30 cm (12 in) diamond pattern.

### 3.9 Marking and Care Label

The Overalls must include a Marking and Care Label (see Figure 7), in French and English, as follows:

- (a) A label, sized to include all of the information detailed in this section, positioned on the upper part of the bib left front lining and stitched around all edges 1.6 mm (0.0625 in) gauge;
- (b) Light sand in colour with black printing in characters not less than 3.2 mm (0.125 in) nor more than 6.4 mm (0.25 in) in height, with the exception of the size identification which must be twice the height;
- (c) Care symbols in accordance with CAN/CGSB-86.1-2003 including the following:
  - i. Washing – Normal 40°C;
  - ii. Bleaching – Do Not Bleach;
  - iii. Drying – Tumble Dry on Low Heat;
  - iv. Ironing/Pressing – Iron at Low Temperature. Do Not Steam Press; and
  - v. Professional Textile Care – Do Not Dry Clean;
- (d) Marking label in accordance with D-80-001-055/SF-001 including the following:
  - i. Nomenclature in English and French:

OVERALLS, EXTREME COLD WEATHER, MULTICAM®, TYPE I/II  
SALOPETTE, EXTRÊME TEMP FROID, MULTICAM®, TYPE I/II

- ii. NATO Stock Number as required for each size;
  - iii. Size by height and waist;
  - iv. NATO size designation;
  - v. Contract Number;
  - vi. Name of Contractor and/or Sub-Contractor as applicable (no logos or trademarks);
  - vii. Month/Year of manufacture;
  - viii. Fiber content;
  - ix. Care Symbols (in black ink);
  - x. Care instructions in English and French as follows:
    - 1. Machine wash in lukewarm water (not exceeding 40C) / Lavage à l'eau tiède (température maximale de 40C) dans une laveuse;
    - 2. Do not use bleach/Ne pas utiliser d'agents de blanchiment;
    - 3. Tumble dry at low temperature/Séchage en machine à tambour à température basse;
    - 4. Dry clean only when proper laundering fails to remove soil. / Nettoyage à sec lorsque le blanchiment approprié ne parvient pas à enlever la saleté; and
    - 5. Do not stitch or puncture the membrane in this garment. / Ne pas coudre ou perforer la membrane interne imperméable;
  - xi. User Identification;
- (e) Include a bar code in accordance with D-LM-008-002/SF-001, Appendix 3 that identifies the NATO stock number.

3.10 Construction

The Overalls are to be manufactured in accordance with the following requirements:

- (a) **Waist** - The Overall must have an bib-style waist as follows:
- i. Include a bib front closure as follows (see Figure 4):
    - a. With the top end of the slide fastener tape turned under, the slide fastener is seamed to the respective sides of the opening as indicated on the paper patterns as follows:
      - 1. Right side of the slide fastener a double-needle lockstitched 19.1 mm (0.75 in) behind right edge; and
      - 2. Left side of the slide fastener single lockstitched to the left side to effect proper closure with the right edge;
    - b. With the right side of the front closure lapped over the left side, the bottom of the opening is stitched 1.6 mm (0.0625 in) gauge to form a triangle; and
    - c. Horizontal and diagonal bartacks are worked over the topstitching as reinforcement for the stress point on the corner adjacent to the opening;
  - ii. Include a bib top snap closure as follows:
    - a. Two (2) female portions of a snap fastener, button facing outward, are inlaid on the left side, one (1) 2.5 cm (1 in) below the neck edge, and the second 3.8 cm (1.5 in) above the waist seam, both 12.7 mm (0.5 in) behind the left front edge; and
    - b. Two (2) male portions of a snap fastener are inlaid on the right front edge, effecting proper closure with the female snap fasteners on the left side;

- iii. Include belt loops as follows (see Figure 3):
  - a. Have five (5) belt loops made of shell material as follows:
    - 1. Width: 25 cm (1 in);
    - 2. Functional Length (Opening): 6.35 cm (2.5 in); and
    - 3. Made on a looping machine or made manually by folding the piece lengthwise, turning under the raw edge and stitching at 1.6 mm (0.0625 in) gauge;
  - b. Positioned on the waistband as follows:
    - 1. One (1) over the center back seat seam;
    - 2. Two (2) on the back spaced 5 cm (2 in) from the side seams (left and right); and
    - 3. Two (2) centered over the front pieces (left and right);
- (b) **Seams** - The Overalls must have seams as follows:
  - i. Upper and lower back joined as follows:
    - a. With the three (3) back belt loops basted to the waistline, the upper and lower back is seamed together with the belt loops caught between the two;
    - b. The seam allowance is then pressed down and stitched 6.4 mm (0.25 in) gauge excluding the belt loops; and
    - c. The belt loops are turned down and securely bartacked at the bottom;
  - ii. Upper and lower front joined as follows:
    - a. With the left and right belt loops centered and basted to each front waistline, the upper and lower fronts are seamed together with the belt loops caught between the two;
    - b. The seam allowance is then pressed down and stitched 6.4 mm (0.25 in) gauge excluding the belt loops; and
    - c. The belt loops are turned down and securely bartacked at the bottom;
  - iii. The crotch seamed as follows:
    - a. Fronts joined along the crotch below the slide fastener opening; and
    - b. Pressed towards the left front piece and stitched 1.6 mm (0.0625 in) gauge;
  - iv. The back pieces joined along the seat seam with a double-lapped seam;
  - v. The front and back pieces joined along the inseams with a double-lapped seam in one continuous operation, with the front overlapping the back on the outside;
  - vi. Include side openings with a two-way slide fastener, fly cover and fly guard as follows (see Figure 3):
    - a. Fly cover and fly guard as follows:
      - 1. Both made of shell material with one (1) layer of barrier fabric;
      - 2. With right sides together, the flies, including the barrier, are seamed across top and bottom edges, turned right side out and stitched 6.4 cm (0.25 in) gauge along the top, bottom and folded edge; and
      - 3. The slide fasteners may be basted to their respective fly to facilitate joining, and the top stop of the slide fastener is to be positioned at the bottom of the side opening;
    - b. Include snap fasteners as follows:
      - 1. Two (2) female portions of a snap fastener, button facing inward, are inlaid on the fly cover, one (1) 19.1 mm (0.75 in) from the top edge, and the second 6.3 cm (2.5 in) below the first, both 12.7 mm (0.5 in) from the side seam; and
      - 2. Two (2) male portions of a snap fastener are inlaid on the fly guard, effecting proper closure with the female snap fasteners on the left side and ensuring the fly lies flat, without puckering, when closed;

- c. Include waist tabs as follows:
    - 1. Seamed together along sides and pointed end, turned inside out and stitched 6.4 cm (0.25 in) gauge;
    - 2. A female portion of a snap fastener is inlaid 19.1 mm (0.75 in) from the pointed end, button facing outward;
    - 3. The waist tabs are placed on the back piece directly above the waistline, 2.5 cm (1 in) behind the side seam, pressed over and stitched 6.4 mm (0.25 in) gauge;
    - 4. A male portion of a snap fastener is inlaid 2.5 cm (1 in) above the waistline seam, effecting proper closure with the female portion on the waist tab;
    - 5. A second male portion of a snap fastener is inlaid 2.5 cm (1 in) above the front waistline at a distance of 3.8 cm (1.5 in) from the first;
    - 6. Care is to be taken to ensure waist tabs lie flat without puckering when closed;
  - vii. Quilted lining - Front and back quilted lining pieces are seamed and serged along the seat seam, crotch seam and inseam;
  - viii. Barrier seamed as follows:
    - a. The front and back barrier pieces joined together along the seat seam, crotch seam and inseam; and
    - b. Seams to be sealed;
  - ix. The shell, barrier and lining assembled as follows:
    - a. The lining and barrier basted together along the top edge of the bib, centre fronts and the side openings to facilitate handling as one (1) layer;
    - b. With right sides together, the shell, lining/barrier and flys (including slide fasteners) seamed together along the top edge of the bib, centre fronts and the side openings; and
    - c. The Overalls turned right side out, properly worked out and stitched 6.4 mm (0.25 in) gauge along the top edge of the bib, centre fronts and the side openings;
- (c) **Suspenders** - The Overalls must have suspenders constructed from shell material as follows:
- i. With the long edges overlapped and the top raw edge turned under, the ends of the suspenders seamed and turned right side out;
  - ii. The ends of the elastic are inserted into the suspenders and securely double topstitched 3.2 mm (0.125 in) gauge;
  - iii. On the back end of the suspenders, the folded centre edge is then topstitched 1.6 mm (0.0625 in) gauge for 3.8 cm (1.5 in) without stretching the elastic;
  - iv. With the elastic extended, continue to topstitch the folded centre edge 1.6 mm (0.0625 in) gauge for 25 cm (10 in);
  - v. The remaining length of the suspender is then closed by continuing the topstitching 1.6 mm (0.0625 in) gauge;
  - vi. Include suspender buttonholes as follows:
    - a. A vertical buttonhole to fit a 30-ligne button centered on each back end of the suspenders, 9.5 mm (0.375 in) from the end; and
    - b. On the front ends of the suspenders, six (6) vertical buttonholes to fit a 30-ligne button centered along the length of the suspenders, the first one 2.5 cm (1 in) from the end and each subsequent one spaced 19.1 mm (0.75 in) apart;
  - vii. The suspenders are crossed at the back 22.8 cm (9 in) from the end at an angle that allows the suspenders to fasten to the suspender buttons without pulling;
  - viii. The point of intersection is securely stitched together through all plies with a diamond stitch; and

- ix. Include button and strap assemblies as follows (see Figure 4):
  - a. A 30-ligne button and strap assembly attached to the lining side of each bib front, with the strap parallel to the top edge; and
  - b. Two (2) 30-ligne button and strap assemblies centered 11.4 cm (4.5 in) apart on the shell side of the back bib, with the straps parallel to and 2.5 cm (1 in) below the top edge;
  
- (d) **Pockets** - The Overalls must have pockets as follows:
  - i. **Handwarmer Pockets** - Fleece lined pockets on the front hips as follows:
    - a. Include a pocket bag as follows:
      - 1. Constructed from one (1) ply of Handwarmer Fleece on the outer (top) side and one (1) ply of Cloth, Plain Weave, Nylon material on the inner (bottom) side;
      - 2. Stitched into the front side seam and waistline seam and hangs between the shell fabric and the lining; and
      - 3. Have a slide fastener closure with a functional opening of 17.8 cm (7 in) and a slide that closes upwards;
  - ii. **Cargo Pockets** - Cargo pockets with a covered-buttoning flap closure located on each front thigh as follows:
    - a. Include a pocket bag as follows:
      - 1. Constructed from one (1) ply of shell material and one (1) ply of nylon material;
      - 2. Both layers seamed together along the upper edge, turned inside out and stitched 6.4 mm (0.25 in) gauge;
      - 3. Outer edges serged together;
      - 4. Bellows cuts seamed and serged; and
      - 5. Include a drainage type buttonhole placed in the lower edge of the pocket, as indicated on paper patterns;
    - b. With back and bottom edges of the pocket folded under, the pocket is stitched 1.6 mm (0.0625 in) gauge beginning 2.5 cm (1 in) from the back top edge and ending 3.2 cm (1.25 in) from the front pocket edge;
    - c. With the front pocket edge turned under and the front corner pleated to form a bellows, the pocket is stitched 1.6 mm (0.0625 in) gauge beginning 2.5 cm (1 in) from the front top edge and ending 3.2 cm (1.25 in) behind the front pocket edge;
    - d. The free top side edges of the pocket are then stitched to the sides of the flap 3.2 mm (0.125 in) gauge to form an envelope fold, with the stitching secured with a bartack on both sides;
    - e. Include a covered buttoning flap as follows:
      - 1. Consist of two (2) parts, a covering flap and a buttoning flap , both constructed from shell material;
      - 2. With right sides together, the buttoning flap and buttoning flap facing seamed along the buttoning opening, turned inside out with corners properly worked out and stitched 3.2 mm (0.125 in) gauge;
      - 3. A vertical buttonhole to fit a 45-ligne button is then placed 15.8 mm (0.625 in) from pointed end;
      - 4. With right sides together, the buttoning flap and buttoning flap facing is then seamed along each side of the flap facing 9.5 mm (0.375 in) gauge ensuring only the facings are caught in the stitching;
      - 5. A bartack is then placed at each corner of the opening;
      - 6. With right sides together, the flap is then seamed along the outer edges to the flap facing with the buttoning flap assembly sandwiched between the

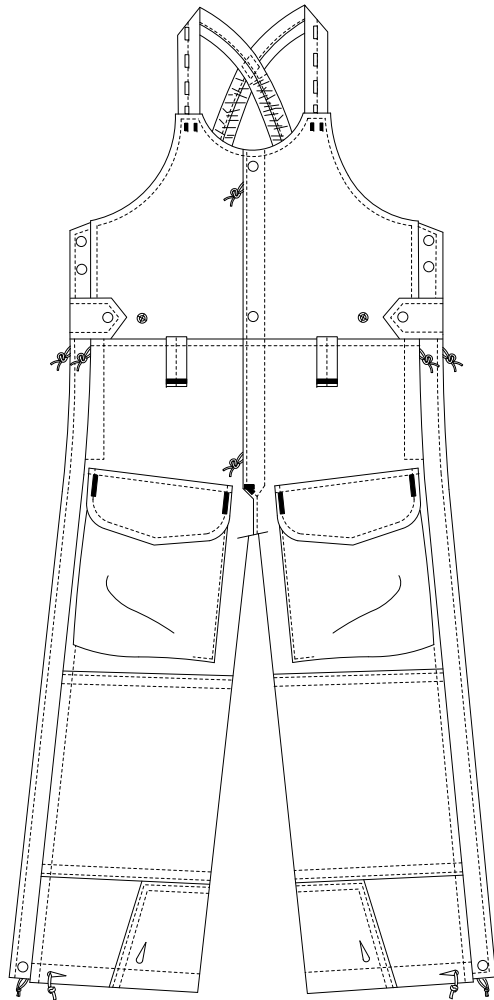


- flap pieces during this operation such that they are partially caught in the seam; and
7. The flap assembly is then turned inside out and stitched 6.4 mm (0.25 in) gauge;
  8. The flap assembly is placed above the pocket as indicated on the paper patterns, seamed, turned down and stitched 6.4 mm (0.25 in) gauge ensuring the flap effects proper closure with button assembly on pocket; and
  9. Include a 45-ligne button and strap assembly as follows:
    - a. Centered on the outside of the pocket 8.9 cm (3.5 in) from the top edge to effect proper closure with flap with the strap perpendicular to the top of the pocket opening; and
    - b. Bartacked on both ends;
- (e) **Seat Reinforcement Patches** – The Overalls must have seat reinforcement patches as follows:
- i. Constructed of one (1) ply of shell material; and
  - ii. With the outer edges folded under, the patches to be placed on the outsides of the back panels and stitched 1.6 mm (0.0625 in) and 6.4 mm (0.25 in) gauge, or double-needle stitched;
- (f) **Knee Reinforcement Patches** – The Overalls must have knee reinforcement patches as follows:
- i. Constructed of one (1) ply of shell material; and
  - ii. With the outer edges turned under, the patches to be placed on the fronts, as indicated on paper patterns, and stitched 1.6 mm (0.0625 in) and 6.4 mm (0.25 in) gauge, or double-needle stitched;
- (g) **Leg bottom** - The Overalls must have bottom leg portions with storm cuffs as follows (see Figure 6):
- i. Include bottom leg reinforcement patches, on the front and back inner sides of the leg bottom, as follows:
    - a. Constructed from one (1) ply of Cloth, Plain Weave, Nylon material;
    - b. With the outer edges turned under, the bottom leg reinforcements to be placed on the bottom front and back pieces, as indicated on paper patterns, and stitched 1.6 mm (0.0625 in) and 6.4 mm (0.25 in) gauge, or double-needle stitched; and
    - c. Include a drainage type buttonhole on lower outer corners of the front and back reinforcement patches;
  - ii. Include storm cuffs as follows:
    - a. Bottom edge of the storm cuff pieces turned inside with raw edge turned under and stitched 1.6 mm (0.0625 in) gauge, to form a finished casing 19.1 mm (0.75 in) wide for the elastic;
    - b. The elastic, which is 2/3 the length of the storm cuff, is then threaded through the casing and stitched securely at the ends of the casing;
    - c. The bottom front and bottom back leg facings are then seamed and serged together along the inseam; and
    - d. The storm cuff and the bottom leg facings are seamed to the bottom edge of the lining, with storm cuff placed on the inside of the garment and facings caught between the shell and the storm cuffs;
  - iii. Include leg bottoms as follows:
    - a. Two (2) buttonholes for drawcord outlets are placed on the outside of the leg bottom hem, as indicated on paper patterns, reinforced with either twill tape, shell material or barrier fabric;

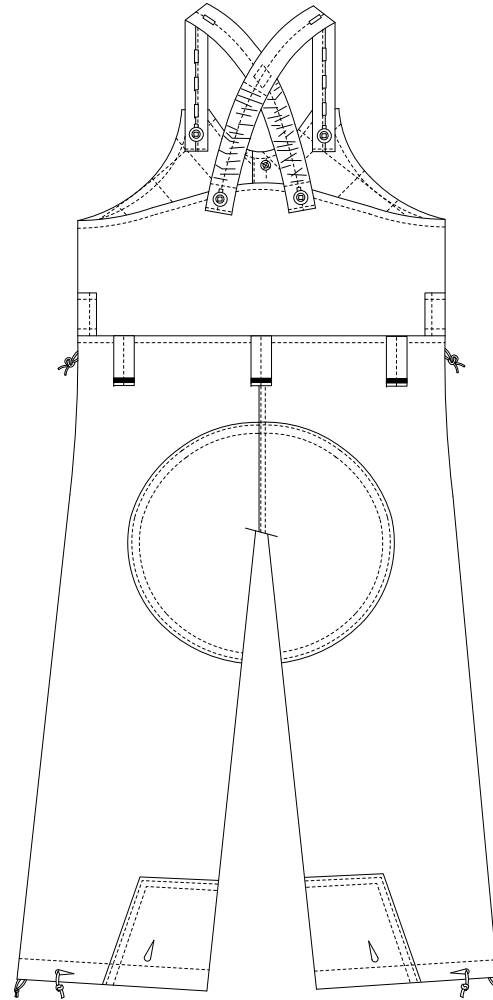
- b. Only the eyelets of the buttonholes to be cut;
  - c. Include a drawcord threaded through each of the draw cord outlets, securely stitched down at the opposite end of the casing and the ends of the draw cord knotted and fused;
  - d. Leg bottom is then turned up over the drawcord, the raw edge turned under and stitched 1.6 mm (0.0625 in) gauge to form a finished casing of 3.8 cm (1.5 in) wide; and
  - e. When the casing is fully extended, the drawcord is extend from the buttonholes by 5 cm (2 in);
- iv. Include a leg bottom closure as follows:
- a. A male portion of a snap fastener is placed on the back portion of the leg bottom, below the slide fastener tape and facing outward; and
  - b. A female portion of a snap fastener is placed at the leg bottom of the front fly cover, below the slide fastener with the button facing outward such that proper closure is effected with the male portion;
- (h) **Slide Fastener Thongs** - Each slide fastener must have a thong as follows:
- i. A length of drawcord threaded through each slide fastener pull, tied with a single knot at the pull tab and knotted again at the thong end;
  - ii. Ends of the drawcords fused to prevent ravelling; and
  - iii. Finished functional length: 6.3 cm (2.5 in).

**APPENDIX 1 LAYOUT SKETCHES**

Figure 1: Front and Back View



**FRONT**



**BACK**

Figure 2: Finished Hip and Cargo Pockets Measurements

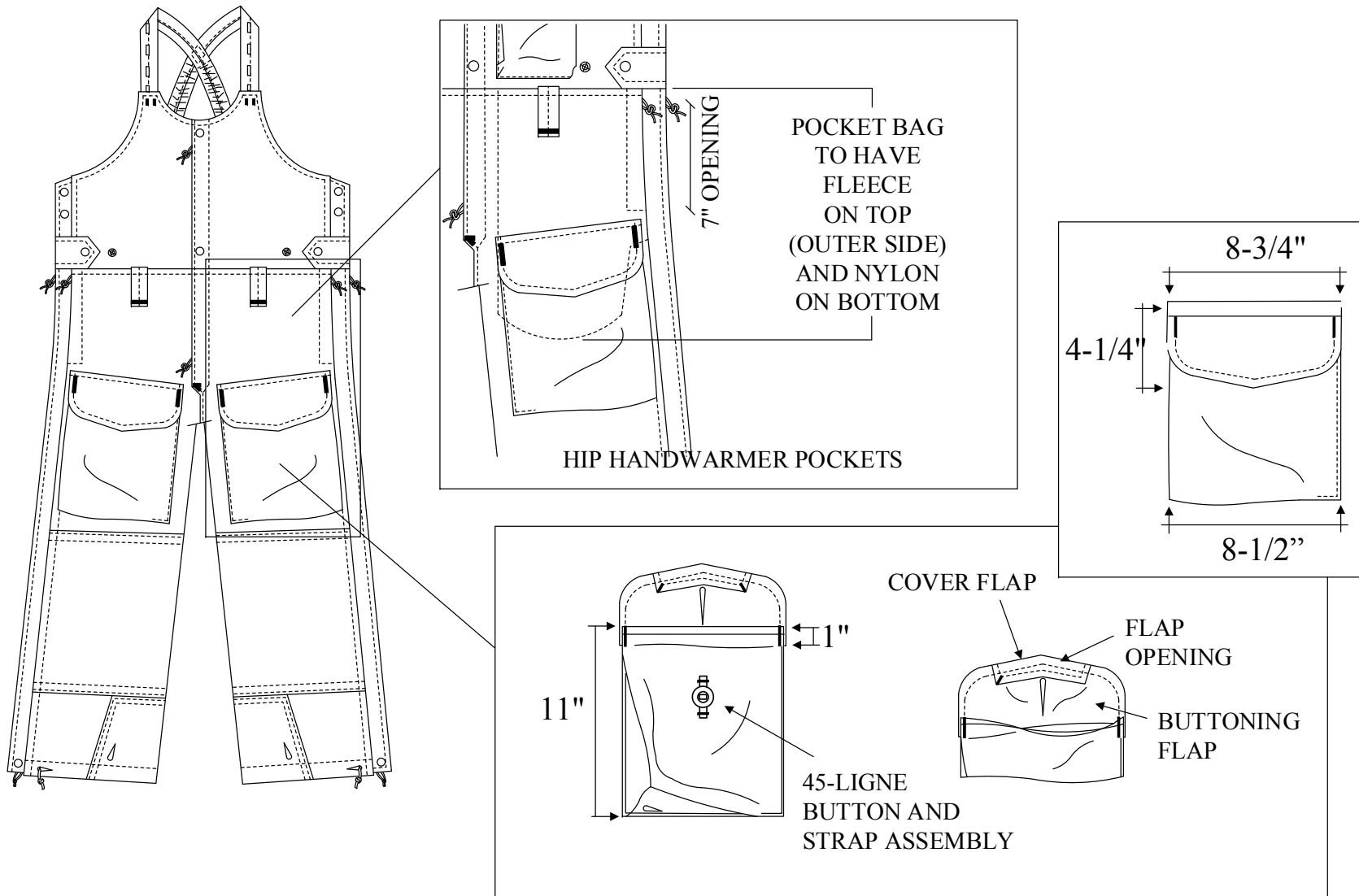


Figure 3: Dimensions of Garment Components

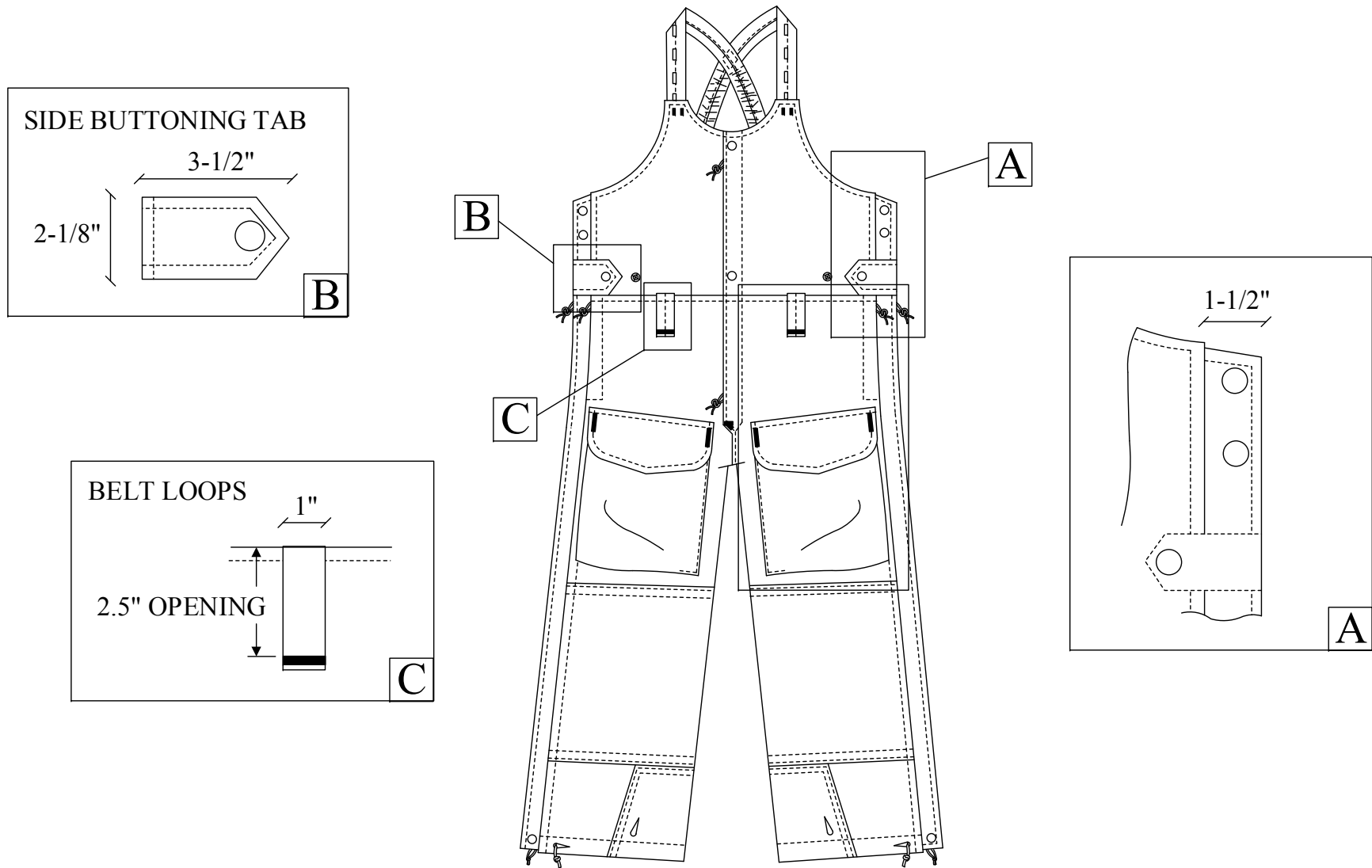
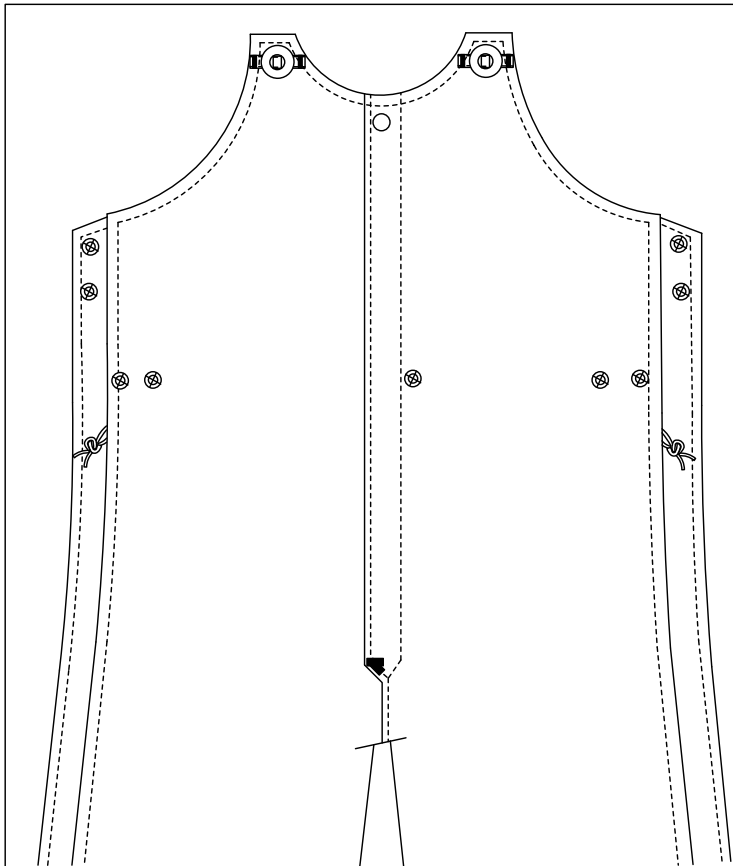
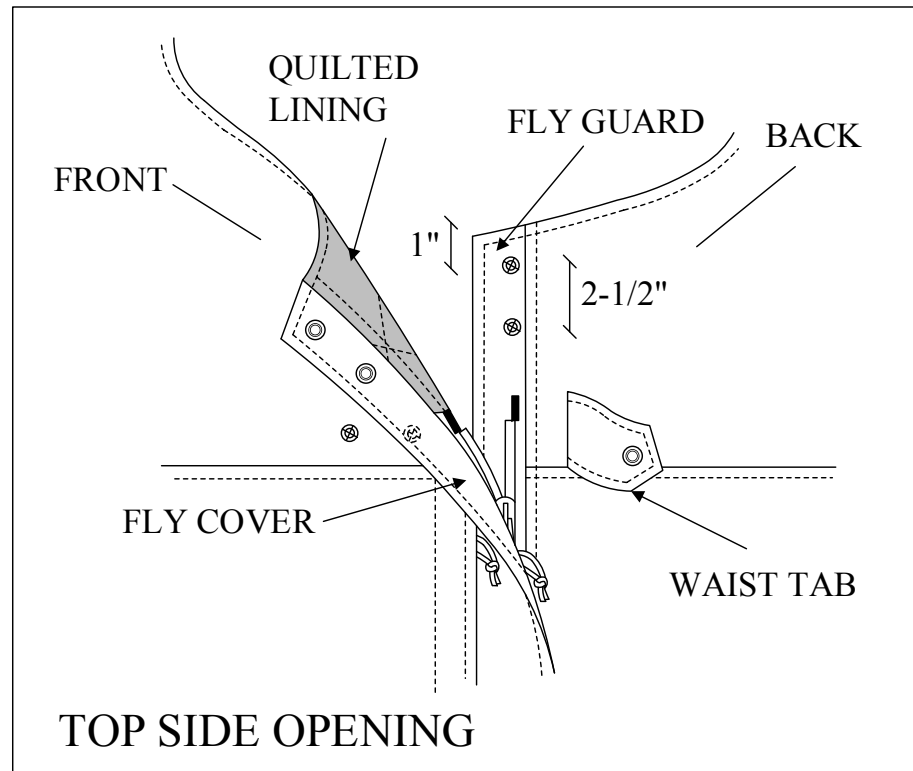


Figure 4: Top Side Opening



FRONT - INSIDE



TOP SIDE OPENING

Figure 5: Suspenders Dimensions

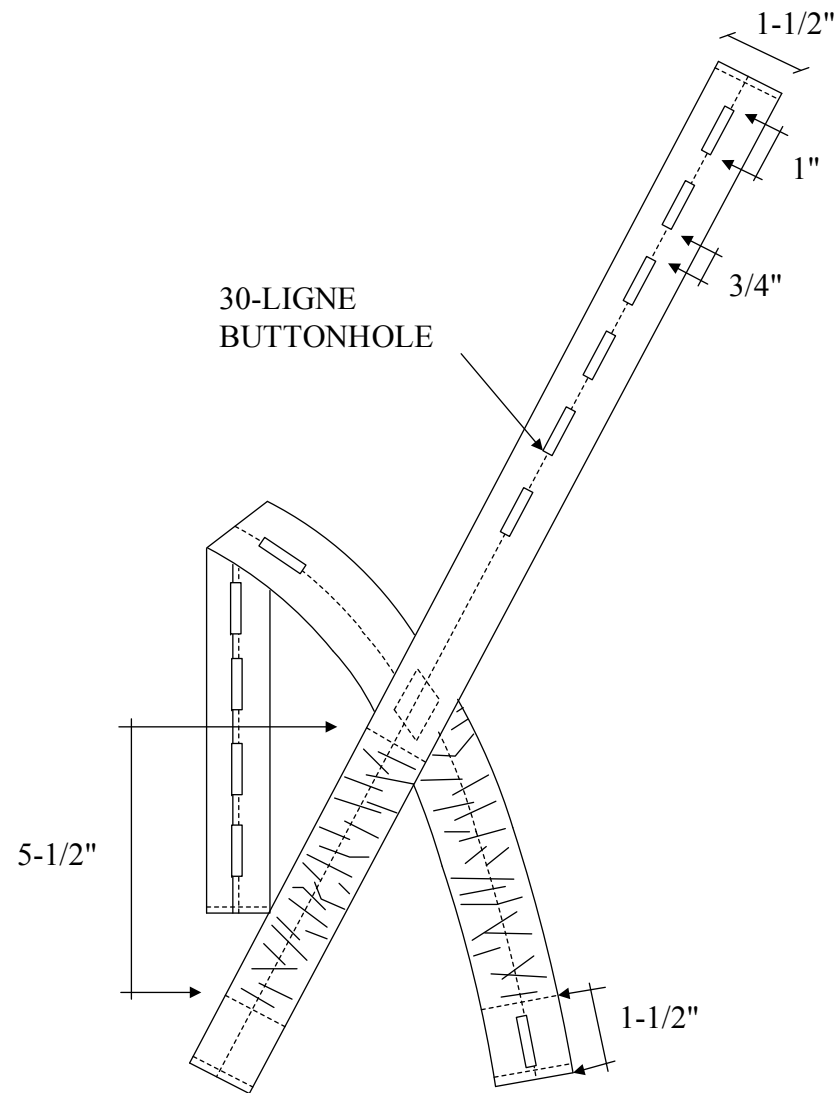


Figure 6: Bottom Side Opening and Storm Cuff

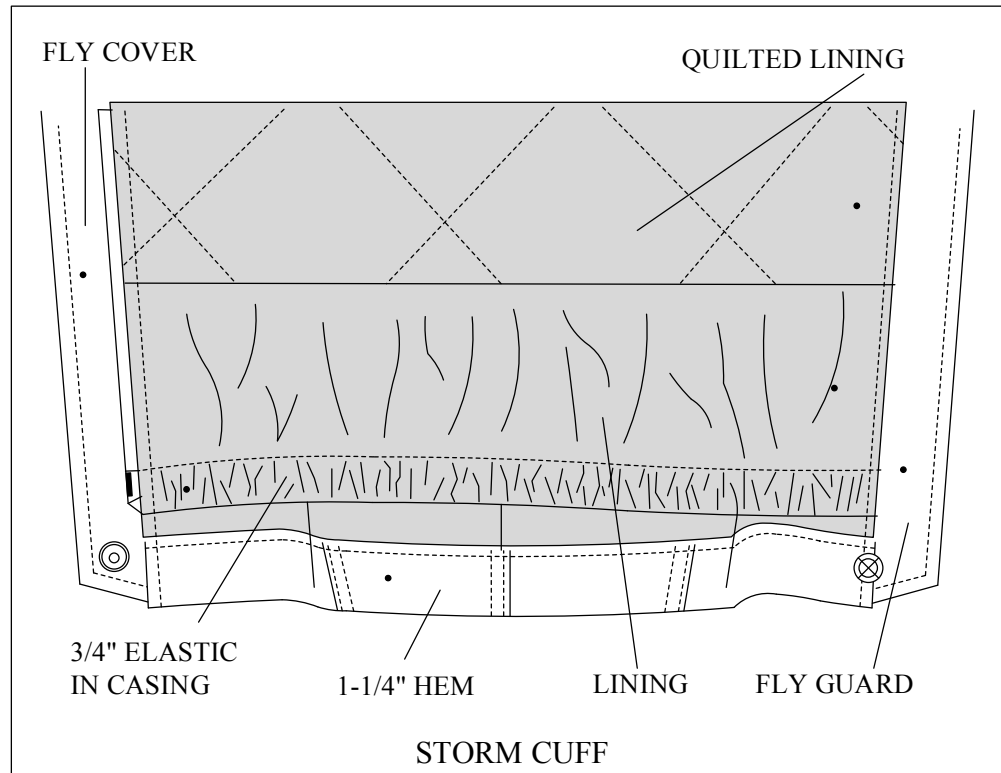
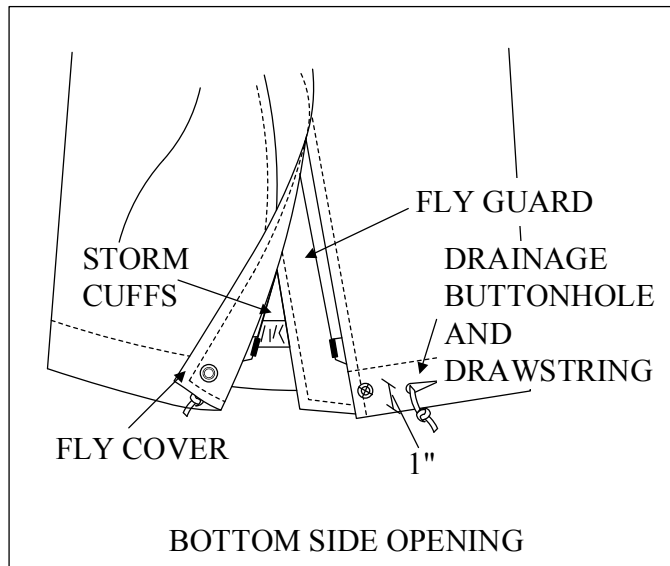
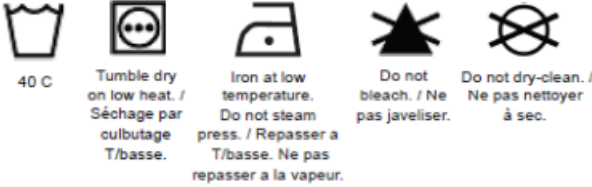




Figure 7: Care and Marking Label.

ITEM & CONTRACT INFO	ARTICLE INFO SUR LE CONTRAT	<p>OVERALLS, EXTREME COLD WEATHER, MULTICAM®                  SALOPETTE, EXTRÊME TEMPS FROID, MULTICAM®                  NSN/NNO: 8415-20-XXX-XXXX</p> <p><b>SIZE/TAILLE 7034</b></p> <p>NATO SIZE/TAILLE OTAN: XXXX-XXX                  CONTRACT NO./NO. DE CONTRAT: WXXXX-XXXXXX                  CONTRACTOR NAME/NOM D'ENTREPRENEUR: Jones &amp; Company                  DATE OF/DE MANUFACTURE: MM/YY                  FIBRE CONTENT: XXXXXXXXXX</p>
CARE SYMBOLS	SYMBOLS D'ENTRETIEN	 <p>40 C Tumble dry on low heat. / Séchage par culbutage T/basse. Iron at low temperature. Do not steam press. / Repasser a T/basse. Ne pas repasser a la vapeur. Do not bleach. / Ne pas javeliser. Do not dry-clean. / Ne pas nettoyer à sec.</p>
CARE INSTRUCTIONS	CONSIGNES D'ENTRETIEN	<p>1. MACHINE WASH IN LUKEWARM WATER (NOT EXCEEDING 40C).                  2. DO NOT USE BLEACH.                  3. TUMBLE DRY AT LOW TEMPERATURE.                  4. DRY CLEAN ONLY WHEN PROPER LAUNDERING FAILS TO REMOVE SOIL.                  5. DO NOT STITCH OR PUNCTURE THE MEMBRANE IN THIS GARMENT.</p> <hr/> <p>1. LAVAGE A L'EAU TIEDE (TEMPERATURE MAXIMALE DE 40C).                  2. NE PAS UTILISER D'AGENTS DE BLANCHIMENT.                  3. SECHAGE EN MACHINE A TAMBOUR A TEMPERATURE BASSE.                  4. NETTOYAGE A SEC LORSQUE LE BLANCHIMENT APPROPRIÉ NE PARVENT PAS A ENLEVER LA SALETÉ.                  5. NE PAS COUDRE OU PERFORER LA MEMBRANE INTERNE IMPERMÉABLE.</p>
USER ID	ID DE L'UTILISATEUR	<p>I.D. _____</p>

**APPENDIX 2 SCALE OF MEASUREMENTS**

MEASUREMENTS OF BODY					MEASUREMENTS OF GARMENT							
SIZES BY HEIGHT AND WAIST	HEIGHT WITHOUT SHOES		WAIST	NATO SIZES	WAIST AT WAIST SEAM (CLOSED)	SEAT IN LINE WITH BOTTOM OF FLY	OUTSEAM FINISHED	INSEAM FINISHED	THIGH 2" BELOW CROTCH (CLOSED)	WIDTH AT BOTTOM (CLOSED)	SIDE SEAM SLIDE FASTENER LENGTH	SLIDE FASTENER LENGTH AT FLY
6426	5'1" to 5' 3 1/2"	X-SHORT	23-26	7075-6070	36	44	43	24	28	21 1/2	35	19
6430			27-30	7075-7080	40	48			30	22		
6434			31-34	7075-8090	44	52			32	22 1/2		
6730	5'4" to 5'6 1/2"	SHORT	27-30	7580-7080	40	48	46	26	30	22	38	20
6734			31-34	7580-8090	44	52			32	22 1/2		
6738			35-38	7580-9000	48	56			34	23		
6742			39-42	7580-0010	52	60			36	23 1/2		
7030	5'7" to 5'9 1/2"	REG	27-30	8085-7080	40	48	49	28	30	22	41	21
7034			31-34	8085-8090	44	52			32	22 1/2		
7038			35-38	8085-9000	48	56			34	23		
7042			39-42	8085-0010	52	60			36	23 1/2		
7046			43-46	8085-1020	56	64			38	24		
7330	5'10" to 6'1/2"	TALL	27-30	8590-7080	40	48	52	30	30	22	44	22
7334			31-34	8590-8090	44	52			32	22 1/2		
7338			35-38	8590-9000	48	56			34	23		
7342			39-42	8590-0010	52	60			36	23 1/2		
7346			43-46	8590-1020	56	64			38	24		
7634	6'1" to 6'3 1/2"	X-TALL	31-34	9095-8090	44	52	55	32	32	22 1/2	47	23
7638			35-38	9095-9000	48	56			34	23		
7642			39-42	9095-0010	52	60			36	23 1/2		
7646			43-46	9095-1020	56	64			38	24		
TOLERANCE PLUS OR MINUS					1/2	3/4	3/4	1/2	1/2	1/2	0	0