INCH-POUND
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DETAIL SPECIFICATION

GLOVES, MEN'S AND WOMEN'S, INTERMEDIATE COLD/WET

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

1. SCOPE

1.1 Scope. This specification covers one type of men's and women's intermediate cold/wet glove constructed with stretch fabric on the back of the hand, leather palm, waterproof insert and an insulated lining.

1.2 Classification. The gloves will be of the following sizes as specified (see 6.2).

Schedule of Sizes
- X-Large
- X-Large - Wide
- Large
- Large - Wide
- Medium
- Medium - Wide
- Small

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 of documents cited in sections 3and 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center Philadelphia, Clothing and Textiles Directorate, Attn: DSCP Standardization Team, 700 Robbins Ave., Philadelphia, PA 1911-5096. Since contact information can change, you may want to verify the currency of this address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database at http://assist.daps.dla.mil.

AMSC N/A FSC 8415

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 of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications. standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

FEDERAL SPECIFICATIONS

V-T-295 - Thread, Nylon

COMMERCIAL ITEM DESCRIPTIONS

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-32075 - Label: For Clothing, Equipage, and Tentage, (General Use)
MIL-W-17337 - Webbing, Textile, Woven Nylon

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available online at www.ftc.gov or from the Federal Trade Commission, 600 Pennsylvania Avenue, N.W., Washington, DC 20580-0001.)

BUREAU OF ALCOHOL, TOBACCO AND FIREARMS, DEPARTMENT OF THE TREASURY

Formulas for Denatured Alcohol (27 CFR Part 21)

(Applications for copies of referenced document should be addressed to the Bureau of Alcohol, Tobacco and Firearms, Department of the Treasury, 1200 Pennsylvania Ave., Washington, DC 20226)

ENVIRONMENTAL PROTECTION AGENCY

Regulations for the Enforcement of the Federal Insecticide, Fungicide and Rodenticide Act (40 CFR Part 162)

(Applications for copies of referenced documents should be addressed to the Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC Test Method 8 - Colorfastness to Crocking: AATCC Crockmeter Method
AATCC Test Method 20A – Fiber Analysis: Quantitative
AATCC Test Method 22 - Water Repellency: Spray Test
AATCC Test Method 135 - Dimensional Changes of Fabrics After Home Laundering
AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale
AATCC Evaluation Procedure 9, Visual Assessment of Color Difference in Textiles Opt A

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

ASTM INTERNATIONAL

ASTM D 471 – Standard Test Method for Rubber Property-Effect of Liquids
ASTM D 629 - Standard Test Method for Quantitative Analysis of Textiles
ASTM D 751 – Standard Test Method for Coated Fabrics
ASTM D 1117 – Standard Guide for Evaluating Nonwoven Fabrics
ASTM D 1388 – Standard Test Method for Stiffness of Fabrics
ASTM D 1424 – Standard Test Method for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus
ASTM D 1777 – Standard Test Method for Thickness of Textile Materials
ASTM D 1814 – Standard Test Method for Measuring Thickness of Leather Units
ASTM D 1876 – Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
ASTM D 2209 – Standard Test Method for Tensile Strength of Leather

ASTM D2261 – Standard Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure, (Constant-Rate-of-Extension Tensile Testing Machine)
ASTM D 2594 – Standard Test Method for Stretch Properties of Knitted Fabrics Having Low Power
ASTM D 2617 – Standard Test Method for Total Ash in Leather
ASTM D 2807 – Standard Test Method for Chromic Oxide in Leather (Perchloric Acid Oxidation)
ASTM D 2810 – Standard Test Method for pH of Leather
ASTM D 2821 – Standard Test Method for Measuring the Relative Stiffness of Leather By means of a Torsional Wire Apparatus
ASTM D 3495 – Standard Test Method for Hexane Extraction of Leather
ASTM D 3511 – Standard Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Brush Pilling Tester
ASTM D 3776 – Standard Test Method for Mass Per Unit Area (Weight) of Woven Fabric
ASTM D 3787 – Standard Test Method for Bursting Strength of Textiles-Constant-Rate-of-Traverse(CRT)Ball Burst Test
ASTM D 3884 – Standard Test Method for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
ASTM D 3886 – Standard Test Method for Abrasion Resistance of Textile Fabrics (Inflated Diaphragm Method)
ASTM D 4705 – Standard Test Method for Stitch Tear Strength of Leather, Double Hole
ASTM D 4966 – Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)
ASTM D 5035 – Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
ASTM D 5052 – Standard Test Method for Permeability of Leather to Water Vapor
ASTM D 6076 – Standard Test Method for Shrinkage Temperature of Leather
ASTM D 6193 – Standard Practice for Stitches and Seams
ASTM E 96 – Standard Test Method for Water Vapor Transmission of Materials
ASTM F 392 – Standard Test Method for Flex Durability of Flexible Barrier Materials
ASTM F 903 – Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids

(Copies of documents are available online at www.astm.org or from the ASTM INTERNATIONAL, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN SOCIETY FOR QUALITY

ASQC Z1.4 - Sampling Procedures and Tables for Inspection of Attributes

(Copies are available online at http://www.asq.org or from the American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

OTHER PUBLICATIONS:

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

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

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

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

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

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

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

3.3 Material.

3.3.1 Goatskin leather. The leather shall be full grain, chrome tanned, goatskin.

3.3.1.1 Thickness. The thickness of the goatskin leather shall be 2.0 + 0.25, -0.50 ounces when tested as specified in 4.4.4. (Note: 1 ounce = 1/64 inch).

3.3.1.2 Color. The color of the finished leather shall be Foliage Green 504, and shall be drum dyed, struck through from grain to flesh when tested as specified in 4.4.4.

3.3.1.3 Colorfastness to crocking. The leather shall show colorfastness to dry and wet crocking equal to or better than the standard sample. When no standard sample is available the (leather) shall show a minimum rating of 4.0 for dry crocking and minimum of 3.0 for wet crocking using AATCC Evaluation Procedure 8, AATCC 9 Step Chromatic Transference Scale. Testing shall be as specified in 4.4.4.

3.3.1.4 Finish. The leather shall be soft and pliable. Application of a finish to the grain surface shall be prohibited. If necessary, the flesh side of the leather shall be dry buffed and shaved to obtain a smooth, clean surface and uniform thickness in all areas. Variations in color on the flesh side resulting from buffing or shaving are permissible.

3.3.1.5 Water resistant. The leather shall be treated with a water resistant compound.

3.3.1.6 Stitch tearing strength. At least 80 percent of the specimens tested shall have a stitch tearing strength of not less than 17 pounds for the leather when tested as specified in 4.4.4.

3.3.1.7 Elongation. At least 80 percent of the specimens tested shall have an elongation of not less than 25 percent at a load of 25 pounds. Any specimen which ruptures or exhibits grain crack below 25 pounds shall be reported as a failing specimen. Testing shall be tested as specified in 4.4.4.

3.3.1.8 Shrinkage temperature. The leather shall not shrink before the temperature reaches 98°C ± 0.5°C, nor shall the leather shrink when subjected to a temperature of 98°C ± 0.5 °C for a period of 30 seconds when tested as specified in 4.4.4.

3.3.1.9 Stiffness. At least 80 percent of the specimens tested shall have maximum stiffness values of 120 degrees before soaking and 135 degrees after soaking when tested as specified in 4.4.4.

3.3.1.10 Water absorption resistance. At least 80 percent of the specimens tested shall gain not more than 20 percent of their weight by water absorption when tested as specified in 4.4.4.

3.3.1.11 Moisture Vapor Transmission Rate. The leather must meet component requirements for Moisture Vapor Transmission Rate (MVTR). At least 80 percent of the specimens tested shall have a MVTR value of not less than 500 grams/square meter/24hours when tested as specified in 4.4.4.

3.3.1.12 Chemical requirements. The leather shall conform to the chemical requirements in Table I when tested as specified in 4.4.4.

Table I. Chemical requirements

Characteristics	Minimum	Maximum
Hexane soluble material, percent 1/		25.0
Chromic oxide, percent 1/	3.0	
pH value	3.3	
Total ash, percent 1/		9.0

1/ Calculated on moisture-free basis.

3.3.1.13 Toxicity. The finished glove shall not present a health hazard when used as intended and tested as specified in 4.4.4.

3.3.2 Fabric, back of hand. The fabric shall be made of a highly water repellent, 4 way stretch material consisting of 91% Nylon and 9% Spandex. The finished cloth shall conform to the requirements specified in Table II when tested as specified in 4.4.4. The color for the fabric, back of hand, shall be Foliage Green 504. (See 6.5)

Table II. Fabric, back of hand, requirements

Characteristic	Requirement
Weight	6.50 oz/yd^2 ± 5 %
Stretch	
Warp	10-13 %
Filling	12-15 %
MVTR	
Proc B	1,500 min.
Proc BW	11,000 min.
Abrasion Class 5	30,000 cycles
Colorfastness to Crocking	
Wet	4.0 min.
Dry	4.0 min.
Water Repellency	100, 100, 90 min.
Tear Strength	
Warp	25 lbs min.
Filling	9 lbs min.

1/ AATCC Evaluation Procedure 8, AATCC 9 – Step Chromatic Transference Scale

3.3.3 Lining.

3.3.3.1 Backing and Facing lining fabrics. The backing fabric shall be a 2-bar tricot knitted with nylon monofilament. The facing fabric shall be a fabric consisting of microdenier polyester and Hydrophil® nylon or equal. The fabric shall meet the requirements in Table III when tested as specified in 4.4.4. The polyester facing fabric shall be against the hand and shall be napped in such a way that is comfortable and not clinging to the hand.

3.3.3.2 Index finger lining fabric. The index finger shall be lined with a thin fabric lining conforming to the requirements for the facing fabric in 3.3.3.1 and Table III except for weight, which shall be 4.0 – 6.5 oz/yd². The index finger shall have no insulation batt; facing fabric may be laminated to itself for the index finger lining fabric. Testing shall be as specified in 4.4.4.

Table III. Lining fabrics requirements

Characteristic	Requirement		
	Backing	Facing	Index Finger
Color	Beige	Black	Black
Weight (oz/yd²)	0.4 – 0.8	2.5 - 3.0	4.0- 6.5
Bursting Strength, pounds (min.)	20	40	40
Abrasion		4.0 min. 9000 cycles	4.0 min. 9000 cycles
Pilling		4.0 min. 9000 cycles	4.0 min. 9000 cycles

3.3.3.3 Finished Lining. The finished lining (backing fabric / insulation batt/ facing fabric laminate) shall be constructed by bonding the backing fabric to one side of the insulation batt and bonding the unnapped side of the facing fabric to the other side of the insulation batt. The finished lining shall meet the requirements in Table IV when tested as specified in 4.4.4.

Table IV. Finished lining requirements

Characteristic	Minimum	Maximum
Thickness (in.) @ 0.002 psi	0.25	0.33
Drape stiffness, inches:		
Machine		2.5
Cross Machine		2.5
Water vapor transmission grams/square meter/24 hours	650	

3.3.4 Waterproof insert. The waterproof insert shall be constructed from a waterproof, moisture vapor permeable, two or three-layer laminate (see 3.3.4.1 and 3.3.4.2). The insert shall be properly sized to fit around the glove insulation. The insert shall be designed so that it can be securely affixed inside the glove, such that it cannot be pulled out when the hand is removed. The finished insert shall be manufactured in such a way that it meets the requirements in Table V when tested as specified in 4.4.4. Take special note that the insert has no distinction between face and back and may be accidentally inverted in use; refer to end item for proper side to test. (See 6.6).

3.3.4.1 Two-layer laminate. The two-layer laminate shall consist of a non-woven textile layer and a membrane layer.

3.3.4.2 Three-layer laminate. The three-layer laminate shall consist of a non-woven textile layer, a membrane layer, and a non-woven textile layer.

Table V. Waterproof insert requirements

Characteristic	Requirement
Weight	3.3 oz/yd.^{2} max.
Thickness	0.022 inches max.
Moisture Vapor Transmission Rate Method B (hand-side to water) Method BW (hand-side to water)	 600 g/m^2/day min. 5000 g/m^2/day min.
Trapezoidal Tear Strength Warp Fill	 8 lbs min. 5 lbs min.
Cut Strip Break Strength Warp Fill	 10 lbs min. 10 lbs min.
Seam Strength	6 lbs min.
Water Permeability after Cold Gelbo Flex	5,000 cycles (0^{o}F), no leakage
Water Permeability after Wet Flex	24 hours, no leakage

Table V. Waterproof insert requirements

Mullen Hydrostatic Resistance Initial After DEET (diethyltoluamide) insect repellent reagent	 20 psi min. 16 psi min.
Chemical Penetration Resistance	No leakage
Water Permeability after Universal Wear Abrasion Test	150 cycles, no leakage
Water Permeability after DEET (diethyltoluamide) insect repellent reagent	No leakage

3.3.5 Curved tension lock 3/4 inch. The 3/4 inch curved tension lock shall be ITW Nexus, Part number GT LL 3/4 or equal. The color of the tension lock shall be Foliage Green 504. Testing shall be as specified in 4.4.4. (See 6.7).

3.3.6 Tape Wrist Strap. The tape for the wrist strap shall be 3/4 inch wide conforming to Class 2 of MIL-W-17337. The long wrist strap shall be folded 1-3/4 ± 1/4 inch on one end and stitched at both ends of the fold. The unfolded raw end shall be stitched into the glove. The short wrist strap shall be folded in half and the raw edges stitched into the glove. The tape shall be cut in sufficient lengths to meet the specified finished lengths in Table VI. (See Figures 2 and 3). All tape raw edges shall be seared. The color shall be Foliage Green 504.

Table VI. Wrist strap lengths

	Long wrist strap finished length (inches)	Short wrist strap finished length (inches)
X-Large – Wide	7-3/8	1-1/2
X-Large	7	1-1/2
Large – Wide	7-3/8	1-1/2
Large	6-7/8	1-1/2
Medium - Wide	7	1-1/2
Medium	6-1/2	1-1/2
Small	6-1/2	1-1/2
Tolerance	± 1/4	± 1/8

3.3.7 Glove hook. The glove hook shall be ITW Nexus, Part number 106-0100 or equal. The color shall be Foliage Green, 504. Testing shall be as specified in 4.4.4. The glove hook shall be placed on the side of the 1st digit on the right hand, and it shall be placed on the side of the 5th digit on the left hand. They shall be placed 1/2-3/4 inch from top of gauntlet. (See 6.8).

3.3.7.1 Hook attachment material. A 3/8 inch wide ribbon or leather shall be used to attach the glove hook. The cut length shall be 2 inches ± 1/4 inch, with 1/4 inch seam allowance. The distance of glove seam to glove hook on end item shall be 1/2 inch maximum ± 1/4 inch.

3.3.8 Elastic. The elastic take up for on the wrist side shall be 3/4 inch and placed across the entire wrist piece of leather, 1/2 inch from base of leather. The elastic shall provide proper cinch for snug fit (not too tight) at wrist and allows for easy don/doff. See 3.11.1.3 for stitch type.

3.3.9 Thread. The thread for stitching and hemming shall be nylon conforming to V-T-295, Type II, Class B, with approved nonwicking finish, Size B, Foliage Green 504 in color. The thread for stitching the lining unit and for attaching the lining to the waterproof insert shall be nylon conforming to V-T-295, Type I or II, Class B, with approved non wicking finish, Size B, natural in color. As an alternate, cotton-covered polyester thread conforming to of A-A-50199, Tex Number 36-45 (Ticket #50) may be used for stitching the lining.

3.3.10 Nosewipe. The composition of the nosewipe material shall consist of a 100% Nylon facing fabric and a base material made of 50% polyester 50% cotton. The color for the nosewipe material shall be Foliage Green 504. The nosewipe material shall meet the requirements in Table VII when tested as specified in 4.4.4. (See 6.9).

Table VII. Nosewipe composition material requirements

Characteristic	Requirement
Weight	6.6 oz/sq^2
Colorfastness to Crocking	
Wet	4.0 min. 1/
Dry	5.0 min. 1/
Tear Strength	3 lbs min.
Surface Abrasion	500 cycles, pass
Water Repellency	100, 100, 90 min.

1/ AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale

3.3.11 Fleece snow cuff. The fabric for the fleece snow cuff shall be a polyester/nylon stretch fleece consisting of a fiber blend of a blend of 56% polyester, 35% nylon and 9% spandex. The fabric shall be treated with durable water repellency finish. The color shall be Foliage Green 504. The fabric shall meet the requirements in Table VIII when tested as specified in 4.4.4.

Table VIII. Fleece snow cuff requirements

Characteristic	Requirement
Weight	12.5 - 13.5 oz./liner yard
Colorfastness to Crocking	
Wet	3.0 min. 1/
Dry	4.0 min 1/
Stretch	.
Width	75% min.
Length	99% min.
Dimensional Stability	
Length	5% max
Width	5% max
Pilling	4 min.
Water repellency	80, 80, 80 min.

1/ AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale

3.4 Thermoregulation. The finished glove shall have a minimum overall insulation (clo) value of 1.20 when tested as specified in 4.4.4.

3.5 Liner retention. The finished glove shall have no detachment/failure of the liner or waterproof insert when tested for retention of the glove liner as specified in 4.4.4.

3.6 Whole glove leak test requirement. The finished glove shall pass the whole glove leak test when tested as specified in 4.4.4.

3.7 Label. Each glove shall have a combination size and identification label, sewn-in at the wrist cuff, conforming to Type VI, Class 4 of MIL-DTL-32075. The label shall show colorfastness to laundering as specified therein. The label shall include the following information:

Gloves, Men's and Women's Intermediate Cold/Wet
Contract No.:
Contractor's Name:
Size:

3.8 Instruction slip. A printed slip of thin paper containing instructions as indicated below shall be inserted in each right hand glove.

Instructions

1. Gloves are not designed for heavy work such as rappelling or barbed wire handling, for hot work such as welding or changing machine gun barrels, or for use by POL handlers. Use other handwear for such activities.
2. Wear gloves alone or with Glove Inserts, Cold Weather, Lightweight. Do not wear with thicker inserts.
3. Fit gloves snugly but not tightly over the inserts.
4. Adjust strap for snug but not tight fit.
5. Gloves are available in 7 sizes: S – XL-WIDE.
6. Gloves have waterproof/"breathable" linings but may become wet from perspiration - change glove inserts when damp, and dry wet gloves and glove inserts away from flames or extreme heat.
7. Clean shells by placing gloves on hands and washing outside with cold water and mild low-suds soap (such as liquid Woolite®), rinsing thoroughly. Do not machine wash. Do not use detergents, solvents or bleach.
8. Treat outside of shells with fluorocarbon spray (such as Scotchgard® Leather Protector, Nikwax); do not use oils, wax, polish, or silicone.

3.8.1 Bar code label/tag. Each item shall be individually bar coded with a paper tag for personal clothing items. The paper tag shall be standard bleached sulfate having a basis weight of 100 pounds. The paper used for the tags shall have a smooth finish to accept thermal transfer and direct printing. The tags shall have a hole and shall be attached to each pair of gloves by a fastener. The tags shall be clearly legible and readable by scanner. The bar coding element shall

be a 13 digit national stock number (NSN). There shall be a 12 digit UPC number assigned for all NSN's by the contracting activity. The initials "UPC" must appear beneath the code. The bar code for NSN and UPC type shall be a medium to high density and shall be located so that it is completely visible on the glove when it is folded and/or packaged as specified and so it causes no damage to the glove. This UPC code must also be placed on all shipping cartons on which the NSN appears.

3.9 Design. The gloves have a stretch fabric on the back of the hand, leather palms, waterproof inserts and an insulated lining. The gloves shall be slip-on, inseamed fourchette design with a two pattern piece thumb and a fleece snow cuff, containing a leather/fabric shell, waterproof/moisture vapor permeable insert, microfiber insulation with brushed polyester/ nylon lining, buckle/strap adjustment on the back of the wrist with an elastic take up opposite, and a hook and dee for attaching gloves to each other.

3.10 Patterns. The government shall furnish a complete set of patterns or a master pattern with grade rules, to maintain uniformity and consistency in manufacturing. The government patterns shall be used to create the contractor's working pattern. Minor modifications are permitted to accommodate manufacturing procedures, however, the design and finished measurements shall be maintained. (See 6.4).

3.10.1 List of pattern parts. The components of the glove shall be cut from materials specified in accordance with the parts specified in Table IX.

Table IX. List of pattern parts

Material	Pattern abbreviation	Nomenclature	Cut
Insulation	INSPB	Insulation Palm Back	2 (mirror)
	INSD3D4	Insulation D3 D4	2 (mirror)
	INSTPB	Insulation Thumb Palm Back	2 (mirror)
	INSTD2	Insulation Thin D2	2 (mirror)
Leather	D1PALM	D1 Palm	2 (mirror)
	D2D3F	D2 D3 Fourchette	2 (mirror)
	D3D4F	D3 D4 Fourchette	2 (mirror)
	D4D5F	D4 D5 Fourchette	2 (mirror)
	D5F	D5 Fourchette	2 (mirror)
	PALM	Palm	2 (mirror)
	PALMP	Palm Patch	2 (mirror)
Fabric	GAUPALM	Gauntlet Palm	2
(Cut Fill)	GAUPBACK	Gauntlet Back	2
	D1BACK	D1 Back	2
	BACK	Back	2
Nosewipe material	NOSEWIPE	Nose Wipe	2 (mirror)
Fleece (Cut warp)	WRISTLET	Wristlet	2

3.11 Construction.

3.11.1 Stitches, seams, and stitching. Stitches, seams, and stitching types shall conform to ASTM D 6193. Seam allowances shall be maintained with seams sewn so that raw edges, twists, pleats, or puckers will not result. All seams shall start and finish evenly. Ends of a continuous line of stitching shall be overlapped not less than 1/2 inch.

3.11.1.1 Type 301 stitching. Ends of all external seams and stitching, when not caught in other seams or stitching, shall be backtacked not less than 1/4 inch. Thread tension shall be maintained so that there will be no loose stitching resulting in loose bobbin or top thread, or excessively tight stitching resulting in puckering of the materials sewn. If not backstitched, then separate 1/4 inch bartacking can be used to prevent unraveling.

3.11.1.1.1 Repairs of type 301 stitch. Repairs of type 301 stitching shall be as follows:

a. When thread breaks or bobbin run-outs occur during sewing, the stitching shall be repaired by restarting the stitching a minimum of 1/2 inches back of the end of the stitching. When making these repairs, the ends of the stitching are not required to be backstitched.

b. Thread breaks or two 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 1/4 inch 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 material and restitching in the required manner.

3.11.1.2 Type 401 stitching. As an alternate, lining package (interior) can be sewn using Type 401 stitch. Ends of all external seams and stitching, when not caught in other seams or stitching, shall be backtacked not less than 1/4 inch. Thread tension shall be maintained so that there will be no loose stitching. If not backstitched, then separate 1/4 inch bartacking can be used to prevent unraveling. All repairs shall be made in accordance with 3.11.1.1.1 a. and b. Repairs to Type 401 stitching may be accomplished by use of stitch Type 301.

3.11.1.3 Zigzag stitching. A 3/4 inch nominal double 304 type stitch shall be used to secure the elastic take up on the back of the wrist.

3.11.2 Stitches per inch. Use of Type 301 or 401 stitch shall have 9–12 stitches per inch.

3.12 Manufacturing operations requirements. The manufacturer may adjust their manufacturing operations to meet their need but shall adhere to the Government furnished patterns.

3.12.1 Use of automated apparel equipment. Automated apparel equipment may be used to perform any of the operations provided that the seam and stitch type are as specified and the

finished item meets the government requirements, no trimmer attachments, other than a thread undertrimmer, shall be permitted.

3.13 Figures. Figures 1-3 are furnished for information purposes only. If there are any inconsistencies between the specification and the figures, the specification shall govern.

3.14 Finished measurements. The finished measurements for the glove shall be as specified in Table X.

Table X. Dimensional Measurement of gloves (inches)

Size	Overall length 1/	Width 2/
X-Large Wide	12-3/8	5-1/2
X-Large	12	5-1/8
Large Wide	11-1/2	5-3/8
Large	11-1/8	4-3/4
Medium Wide	10-3/8	5-1/8
Medium	10-3/4	4-3/4
Small	10-1/4	4-1/2
Tolerance	± 1/4	± 1/4

1/ The glove length shall be measured from tip of middle finger to edge of stretch fabric cuff, at the seam attaching the snow cuff. Do not include the snow cuff in the length measurement. The glove shall be gently stretched lengthwise and then allowed to return to its natural state before measuring.
2/ The glove width shall be gently stretched out and measured across the width on the hand/palm portion, 1/2 inch down from the base of the little finger.

3.15 Workmanship. After completion of the final assembly, the glove shall be thoroughly cleaned and all thread scraps, lint and foreign matter shall be removed. The gloves shall not contain any fabric defects. The gloves shall be uniform in quality and shall be free from irregularities or defects which could adversely affect performance, reliability or durability. The gloves shall conform to the quality established by this specification.

4. VERIFICATION

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

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

4.2 First article inspection. A first article inspection when required (see 3.1) shall be inspected for the measurements listed in Table X, the defects in Table XI and tested for the characteristics in Table XII.

4.3 Conformance inspection. Conformance inspection shall be performed on production lot articles, and shall include the examinations in 4.4.2, 4.4.3 and end item testing specified 4.4.4.

Sampling for inspection shall be performed in accordance with ASQC Z1.4, and with quality acceptance limits as specified in the contract and/or order except where otherwise indicated.

4.4 Component and material inspection.

4.4.1 In-process inspection. Inspection shall be made at any point or during any phase of manufacturing to determine whether the components are as specified or operations and/or assemblies are accomplished as specified. The Government reserves the right to exclude from consideration for acceptance any material or service for which in-process inspection has indicated non-conformance.

4.4.2 End item visual examination. The finished gloves shall be examined for the defects listed in Table XI and for the dimensional measurements examination in 4.4.3. The lot size shall be expressed in units of gloves. The sample unit shall be one pair of gloves and selection shall be by pairs. Defects for pairing shall be classified as a single defect.

Table XI. End item visual defects

Examine	Defect	Classification Critical	Major	Minor
Glove				
Pairing	Not matched and paired, right and left not same size, wide variation in appearance		101	
	Not tacked or joined together as specified			201
Shell or lining design	Not as specified (incorrect material, pattern, etc.)		102	
	Poorly shaped			202
	Bartacks missing, insecure, misplaced, not specified size, stitches loose or broken, bartack not serving intended purpose		103	
Cleanness	Spots or stains clearly noticeable affecting appearance			203
Leather				
	Not specified color		104	
Color	Color not uniform on grain side			204
	Color does not completely penetrate leather from grain side through flesh side		105	
Finish	Not full grain Flesh side not smooth or contains areas of coarse loose fiber		106	
	Grain surface has application of finish		107	
	Embossing other than a fine hair cell pattern		108	
	Printed design on leather		109	
	Does not match standard sample for fine hair cell pattern		110	205
Quality of leather	Not clean; stain or foreign matter 1/		111	
	Hard, boney, loose, spongy leather, hard scar, cut, hole (except a pinhole or needle hole), brittle, thin spot, brand, scratch, deep fat wrinkle, or grain damage which causes more than a 12 percent in total area of a side or more than a 6 percent loss in total area of a skin 1/		112	

Table XI. End item visual defects cont'd.

Examine	Defect	Classification Critical	Major	Minor
Fabric	Not specified color, streaky, shaded from side to side		113	
	Any run, dropped stitch, snag, pull or slubby yarn,		114	
	Broken end		115	
	Lacking elasticity, too tight or loose		116	
Membrane insert	Delaminating		117	
Lining	Facing delaminated			206
Tape	Not type or color specified		118	
	Hole, cut, tear or rip, float, smash or other defects			
	- affecting function		119	
	- not affecting function			207
Fleece Snow cuff	Hole, cut, tear, smash, burn, drill hole, run, thin place, dye streak, color not as specified, misweave affecting appearance or serviceability		120	
Glove hook	Not properly oriented		121	
	Not functional		122	
	Having any cracks, splits, or slices		123	
Construction, and workmanship; general (applicable to all components unless otherwise indicated herein)	Component misplaced, operation omitted, or operation not properly performed		124	
	Lining reversed so that tricot backing is oriented toward hand		125	
	Component missing or not securely affixed		126	
	Mend in leather or fabric (i.e., patch- not applicable to restitched seam repair)		127	
	Needle chews likely to develop into a hole		128	
Seams and stitching	Open seam 2/			
	- in single stitched seam		129	
	- in any row of a double stitched seam		130	
	- not repaired as specified (when applicable)			208
	Not specified seam type		131	
	Not specified stitch type		132	
	Row of stitching omitted		133	
	Loose stitch tension resulting in a loosely secured seam		134	
	Tight stitch tension resulting in cutting of leather or breaking of stitches when normal pull is applied		135	
	Ends of stitching not secured as specified			209
	Gage of stitching irregular or not as specified, affecting appearance		136	
	Part caught in unrelated row of stitching		137	
	One or two stitches per inch less than specified			210

Table XI. End item visual defects cont'd.

Examine	Defect	Classification Critical	Major	Minor
Seams and Stitching cont'd	Three or more stitches per inch less than specified		138	
	Not backstitched where required		139	
	More than the specified maximum number of stitches per inch:			
	- damaging materials		140	
	- not damaging materials			211
Assembly detail	Glove not neatly laid off:			212
	- wrinkles in shell		141	
	- fingers not completely opened		142	
	Inseam construction not where specified		143	
	Seam at fingertip, special attention to detail		144	
	Fourchettes missing from any finger or thumb		145	
	Shell more than 1/4 inch longer than lining in any finger when on hand form		146	
	Poorly assembled seriously affecting serviceability (finger distorted or twisted affecting comfort of wearer or seam of finger may come in contact with object, buckle backwards, etc.) 3/		147	
	Waterproof insert and/or lining not securely fastened to shell fingertips		148	
	If adhesive is used, improper application of adhesive in fingertips:			
	- affecting dexterity or comfort (lumps, lining twisted, wrinkled or bunched, etc.)			213
	- affecting appearance (stains on shell, etc.)		149	
	Lining and/or insert not caught in cuff hem			214
	Thread ends not trimmed throughout glove			215
	Not constructed with specific number of pieces		150	
	Difference in overall length between front and back of glove is more than 1/2 inch		151	
Label and Instruction Slip	Omitted, incorrect, illegible, or misplaced; size and identification label not securely sewn in wrist hem			216
Label/tag	Causes damage to the glove		152	
	Label missing, incorrect, or illegible			217
	Bar code omitted or not readable by scanner;			218
	Human-readable interpretation (HRI) omitted or illegible;			219
	Bar code not visible on folded, packaged item; bar code causes damage to the item			220

1/ Light well healed scratches or grub holes, light fat wrinkles, or slight stains shall not be classified as defects.

2/ A seam shall be classified as open when one or more stitches joining a seam are broken or when two or more consecutive skipped or run-off stitches occur.
3/ Any construction defect that results in a malformed glove such as a twisted finger or thumb resulting in any seam lying in the palmar area of the finger or thumb is a minor defect. When a finger or thumb is twisted and the seam is rotated to less than 45 degrees from the vertical and does not lie in the palmar area, it is a minor defect.

4.4.3 Dimensional measurement examination. The finished glove shall be examined for the finished dimensional measurements specified in Table X.

4.4.4 End item testing. The finished glove shall be tested for the characteristics listed in Table XII. The methods of testing as specified wherever applicable and as listed in Table XII shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The lot shall be unacceptable if one or more sample units or the lot average fail to meet any requirement specified. The sample unit shall be one (1) pair of finished gloves and selection shall be by pairs. The sample size shall be in accordance with the following:

Lot size (units)	Sample size
Under 800	2
800 – 22,000	5
22,001 and above	8

Table XII. End item testing

Material	**Characteristic**	**Requirement Paragraph**	**Test Method**
Goatskin	Thickness	3.3.1.1	ASTM D-1814
	Color	3.3.1.2	1/
	Colorfastness to crocking	3.3.1.3	AATCC-8
	Stitch tear strength	3.3.1.6	ASTM D-4705
	Elongation	3.3.1.7	ASTM D-2209
	Shrinkage Temperature	3.3.1.8	ASTM D-6076
	Stiffness	3.3.1.9	ASTM D 2821, 4.5.1
	Water absorption resistance	3.3.1.10	4. 5.2
	MVTR	3.3.1.11	ASTM D-5052
	Hexane soluble material	3.3.1.12	ASTM D-3495
	Chromic oxide	3.3.1.12	ASTM D-2807
	pH value	3.3.1.12	ASTM D-2810
	Total ash	3.3.1.12	ASTM D-2617
	Toxicity	3.3.1.13	4.5.3
Fabric, back of hand	Fiber Identification	3.3.2	ASTM 629 or AATCC 20A
	Weight	3.3.2	ASTM D-3776
	Stretch	3.3.2	ASTM D-2594
	MVTR:		
	Proc B	3.3.2	ASTM E-96
	Proc BW	3.3.2	ASTM E-96

Table XII. End item testing (cont'd).

Material	Characteristic	Requirement Paragraph	Test Method
	Abrasion	3.3.2	ASTM D-4966
	Colorfastness to crocking	3.3.2	AATCC-8
	Water repellency	3.3.2	AATCC-22
	Tear Strength	3.3.2	ASTM D-1424
Backing & Facing lining	Fiber Identification	3.3.3.1	ASTM 629 or AATCC 20A
	Color	3.3.3.1	1/
	Weight	3.3.3.1	ASTM D 3776
	Bursting strength	3.3.3.1	ASTM D 3787
	Abrasion	3.3.3.1	ASTM D 4966
	Pilling	3.3.3.1	ASTM D 3511
Index finger lining	Fiber Identification	3.3.3.1	ASTM 629 or AATCC 20A
	Color	3.3.3.2.	1/
	Weight	3.3.3.2	ASTM D 3776
	Bursting strength	3.3.3.2	ASTM D 3787
	Abrasion	3.3.3.2	ASTM D 4966
	Pilling	3.3.3.2	ASTM D 3511
Finished lining	Thickness (in.) @ 0.002 psi.	3.3.3.3	2/
	Drape Stiffness, inches Machine and cross machine	3.3.3.3	ASTM D 1388 Opt A
	Water vapor transmission	3.3.3.3	ASTM E 96
Waterproof Insert (laminate)	Weight	3.3.4.2	ASTM D 3776, 3/
	Thickness	3.3.4.2	ASTM D 1777, 4/
	MVTR:		
	Method B	3.3.4.2	ASTM E 96, 5/
	Method BW	3.3.4.2	ASTM E 96 6/
	Trapezoidal Tear strength	3.3.4.2	ASTM D 1117, Section 14
	Cut Strip Break strength	3.3.4.2	ASTM D 5035
	Seam Strength	3.3.4.2	ASTM D 1876, 7/
	Water Permeability after Cold Gelbo Flex	3.3.4.2	ASTM F 392, 8/ ASTM D 751, 9/
	Water Permeability after Wet Flex	3.3.4.2	ASTM D 751, 9/ 10/
	Hydrostatic Resistance		
	Initial	3.3.4.2	ASTM D 751, 11/
	After DEET	3.3.4.2	ASTM D 751, 11/ and 4.5.4
	Chemical Penetration Resistance	3.3.4.2	ASTM F 903, 12/
	Water Permeability after Universal Wear Abrasion Test	3.3.4.2	ASTM D 3886, 13/ ASTM D 751, 9/
	Water Permeability after DEET	3.3.4.2	ASTM D 751, 9/ and 4.5.4
Tension lock	Color	3.3.5	1/

Table XII. End item testing (cont'd).

Tape (wrist strap)	Color	3.3.6	1/
Glove hook	Color	3.3.7	1/
Thread	Color	3.3.9	1/
Nosewipe	Fiber Identification	3.3.10	ASTM 629 or ASTM 20A
	Color	3.3.10	1/
	Weight	3.3.10	ASTM D 3776
	Crocking	3.3.10	AATCC-8
	Tear Strength	3.3.10	ASTM D-2261
	Surface Abrasion	3.3.10	ASTM D-3884
	Water repellency	3.3.10	AATCC-22
Fleece snow cuff	Fiber Identification	3.3.11	ASTM 629 or ASTM 20A
	Color	3.3.11	1/
	Weight	3.3.11	ASTM D-3776
	Colorfastness Crocking	3.3.11	AATCC-8
	Stretch	3.3.11	ASTM D-2594
	Dimensional Stability	3.3.11	AATCC-135
	Pilling	3.3.11	ASTM D-3511
	Water repellency	3.3.11	AATCC-22
Thermo-regulation	Clo, finished glove	3.4	4.5.5
Liner retention	Liner retention test	3.5	4. 5.6
Leakage	Whole glove leak test	3.6	4. 5.7

1/ For Visual shade matching, the color and shade shall match the standard sample when viewed using AATCC Evaluation Procedure 9, Option A, with sources simulating artificial daylight D75 illuminant with a color temperature of 7500K ± 200K, with illumination of 100 ± 20 foot-candles and shall be a good match to the standard sample under incandescent lamplight at 2300K ± 200K.

2/ The finished lining 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).

3/ Five 3.5 inch diameter circle specimens shall be tested. The individual and mean weight of the five specimens shall be reported to the nearest 0.1 ounces per square yard.

4/ Five 3.5 inch diameter circle specimens shall be tested. Pressure foot shall be 1.129 inches diameter applying a load of 0.125 lbs/in^2. The individual and mean thickness of the five specimens shall be reported to the nearest 0.001 inches.

5/ The hand side of the insert shall face the water. [Please note the insert may be inverted in use; please refer to end item.] The free stream air velocity shall be 550 ± 50 fpm as measured two inches above the fabric specimen. The airflow shall be measured at least 2 inches from any other surface. The test shall be run for 24 hours and weight measurements shall be taken at only the start and completion of the test. At the start of the 24-hour test period, the air gap between the water surface and the back of the specimen shall be 3/4 ± 1/16 inch. Five specimens shall be tested.

6/ The hand side of the insert shall face the water. [Please note the insert may be inverted in use; please refer to end item.] The free stream air velocity shall be 550 ± 50 fpm as measured 2 inches above the fabric specimen. The airflow shall be measured at least 2 inches from any other surface.

The test shall run for 2 hours and weight measurements shall be taken at only the start and completion of the test. Five specimens shall be tested. The specimen shall be sealed in any manner which prevents wicking and/or leaking of water out of the cup.

7/ A minimum of three specimens shall be tested. Reference ASTM D 1876 with the following modifications: Specimens (1 inch x 6 inch) shall be cut from palm of insert to include sealed seam in center of specimen, no conditioning required, tension testing machine head speed 10 inches/minute, report maximum peeling load only.

8/ One specimen, 8 inches by 12 inches, shall be cut from the sample unit with the eight inch side in warp direction and one specimen with the eight inch side in the fill direction. The specimen shall be conditioned at 0 °F for one hour and flexed as specified in ASTM F 392 except the specimen shall not be aged, the short edges shall not be heat sealed or otherwise joined, and the specimen shall be flexed for 5,000 cycles. At the end of the flexing, the specimen shall be removed from the test chamber and conditioned prior to testing for water permeability. Test two sites for leakage at completion of flex using same conditions and inspection criteria as Footnote 9.

9/ The water permeability shall be tested in accordance with ASTM D 751, Hydrostatic Resistance, Procedure B, with a fixed hydrostatic head of 50 cm minimum shall be held for 3 minutes minimum, testing (come into contact the water) the side of the sample (insert) facing the shell. [Please note the insert may be inverted in use; please refer to end item.] Three specimens minimum shall be tested. The report shall include only measurement of the appearance of the water droplets. Leakage is defined as the appearance of one or more droplets anywhere within the 3-1/2 inch minimum diameter test area. In order to use Suter Hydrostat tester after abrasion, one will have to fabricate a specimen holder with 3-1/2 inch minimum diameter.

10/ Test one sample, 14 inches x full width (28” minimum). Specimen shall be agitated using the “normal” cycle in an automatic home laundering machine except that the machine shall be capable of continuous agitation [AATCC Test Method 135, without soap. The water level shall be maintained at 16 ($\pm$ 0.5) gallons and water temperature shall be 32 ($\pm$-9) °C. Additional fabric shall be added to create a load of 2 ($\pm$ 0.2) pounds.] Upon completion, the specimen shall be air dried prior to testing for leakage in accordance with Footnote 9.

11/ Test five samples. ASTM D 751 (Hydrostatic Resistance Procedure A1). No restraining or supporting fabrics are to be used during the testing. Test the side of the sample (insert) facing the shell. [Please note the insert may be inverted in use; please refer to end item.]

12/ Test 5 samples using exposure Procedure C. Expose shell side of laminate. Surrogate gasoline Fuel C as defined by ASTM D 471.

13/ Test 5 samples abrading the side of insert facing shell. The abrasion test shall be conducted in the multidirectional mode using 0 grit emery paper as the abradant. Use a solid rubber diaphragm without electrical contact (grounding) pin. The diaphragm shall have a smooth surface without bumps. Use diaphragm inflated to 4 $\pm$ 0.25 psi. A load of 1 lb. shall be applied to the abradant. The test mode shall be 100 double strokes per revolution. Do not change the abradant paper. Once abrasion is complete, specimens shall be tested using Water permeability test method as described in Footnote 8.

4.5 Methods of inspection.

4.5.1 Stiffness test.

a) Degree of Stiffness before soaking. Tested according to ASTM D 2821 except the specimens shall be pre-flexed as follows:

1. Loosen knob (G). Using knob (H) slowly rotate the top dial (K) in a counterclockwise direction until the specimen clamp indicator (I) shows that the specimen has been twisted 90°. Use a uniform rate of rotation that will take 4 to 5 seconds to twist the specimen through 90°.

2. Reverse rotation to the clockwise direction and continue rotating slowly until the specimen clamp indicator (I) has passed the original reference line indicated on the lower dial (J) by approximately 45°. Again reverse the direction of rotation and slowly realign the specimen clamp indicator (I) with the original reference line indicated on the lower dial (J).

3. Lock top dial (K) by turning knob (G) until tight, then reset dial (K) to read 270°.

4. Repeat the flexing operation by following steps 1, 2, and 3. When the second flexing cycle is completed, loosen knob (G), turn upper dial (K) slowly (4 to 5 seconds for 90° rotation) in a counterclockwise direction, using knob (H), until the specimen clamp indicator (I) shows 90° twist. Read the angle of torsion from the upper dial (K) and record the value to the nearest 5 degrees. The angle of torsion of each specimen shall be reported to the nearest 5 degrees.

b.) Degree of Stiffness after soaking. If the stiffness requirements specified for before soaking are not met, then do not test for stiffness after soaking. Any individual specimen exceeding the maximum stiffness values specified for before soaking shall not be tested for stiffness after soaking. The specimens shall be immersed in 1,000 mL of distilled water at 140 °F $\pm$ 5 °F for 20 hours $\pm$ 2 hours. Complete immersion of the specimens shall be accomplished by placing a floating cover on the vessel used for the immersion of the specimens. After the required immersion period, the specimens shall be removed from the water and reconditioned in accordance with standard atmospheric conditions as specified in ASTM D 2821. The reconditioned specimens shall be placed flesh side down on a rule graduated in decimal inches and the distance between the bench marks shall be measured to the nearest 0.05 inch. If the distance is 3.4 to 3.6 inches, test the specimen in accordance with ASTM D 2821 and the exceptions. If the distance is 3.2 inches or less, the specimen shall be reported as a test failure. If the distance between benchmarks is 3.25 to 3.35 inches, the specimen shall be stretched before testing. To stretch the specimen, place the specimen on the rule and align one of the benchmarks with a division line on the rule. Hold the specimen against the rule by placing the fingertip of one hand on the aligned benchmark. With the thumb and index finger of the other hand, lightly grip the specimen near the aligned bench mark, then slide the finger and thumb along the specimen to the other bench mark while exerting pressure on the specimen that is sufficient to obtain the required distance between the bench marks. If the required distance between the benchmarks has been obtained (3.4 inches to 3.6 inches), test the specimen in accordance with ASTM D 2821 and the exceptions (see Footnote 3). If the distance between the benchmarks is greater than 3.6 inches discard the specimen and test a new specimen selected from the same 12 x 12 inch test sample of

leather from which the discarded specimen was obtained. The new specimen shall be tested for stiffness before and after soaking. The test results obtained when the discarded specimen was tested for stiffness before soaking shall not be reported.

4.5.2 Water absorption resistance test. One 3-inch diameter specimen shall be tested from each 12 x 12 inch test area. Prior to testing, the specimen shall be allowed to reach moisture equilibrium in the standard conditions environment. A stainless steel 500 mL, 3-inch diameter, 5-inch long container with a rubber gasket and cover shall be used to test the specimen. The specimen shall first be weighed (to the nearest 0.01 g) and then shall be placed inside the cover with the flesh side of the specimen next to the inside of the cover. Place the rubber gasket inside the cover and against the grain surface of the leather specimen. Add 100 mL of distilled or deionized water at 23 °C to the container. Secure the cover with the specimen and gasket to the container. Invert the container so the water is against the grain surface of the specimen. Place the inverted container on a flat surface and allow it to remain in the inverted position for 30 minutes. At the end of 30 minutes place the container upright, remove the cover, and place it on a flat surface. The inside of the cover shall face the flat surface. Tilt the cover so the outer edge of the bottom is raised 1-1.5 inches from the flat surface, and allow it to drain for 5 minutes. After 5 minutes immediately remove the specimen from the cover, hold the specimen by its edge and shake briskly once to remove any free moisture from the surface of the specimen. Immediately re-weigh the specimen to the nearest 0.01 g, and calculate the percent water absorption as follows:

$$\text{Percent water absorption} = \frac{(W2 - W1) \times 100}{W1}$$

W1 = Original weight of conditioned specimen
W2 = Weight of specimen after being subject to water

4.5.3 Toxicity test. The contractor shall furnish information, which certifies that the finished product is composed of materials, which have been safely used commercially or provide 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 shall be conducted under the supervision of a qualified dermatologist using at least 100 free-living individuals.

4.5.3.1 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 shall not be used.

4.5.4 Water absorption and hydrostatic resistance after DEET. The specimen, 4 inches minimum by 4 inches minimum, shall be laid flat on a glass plate. Three drops of the test liquid DEET shall be applied to the center of the specimen. Test the side of the sample (insert) facing the shell. A glass plate of the same dimensions shall be placed on the specimen and a four-pound weight placed in the center of the glass plate of the assembly. After 16 hours, remove the specimen and test immediately for hydrostatic resistance or water permeability, as required.

4.5.4.1 (DEET) Insect Repellent reagent. The insect repellent reagent should be a solution of 75% by weight (min.) of diethyltoluamide and the remainder denatured alcohol. The diethyltoluamide component of the solution shall be a technical grade and contain N, N-diethyl-m-toluamide of not less than 95% purity and the remainder shall consist of entirely or a mixture of ortho or para isomers of N, N-diethyltoluamide. The denatured alcohol component of the solution shall be ethanol, U.S.P. 94.9% by volume and denatured in accordance with Code of Federal Regulations 27 CFR 21, Formula 40 (see 2.2.2). The insect repellent shall be registered with the U.S. Environmental Protection Agency in accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) 40 CFR Part 162 (see 2.2.2). See 6.11.

4.5.5 Thermal insulation test. Three separate samples of the test handwear item shall be evaluated and the average value is reported. "R" values can be converted to the more familiar clo unit to allow ranking order of standard for procurement purposes. Test size shall be right hand, Size X-Large. A life-sized biophysical model of the human hand that measures localized and total thermal resistance shall be used. Insulation values for the total hand model and its 7 individual regions are calculated by an internal program during 30 minutes of steady state data collection. The surface of the hand model is controlled at 30 °C. Regional thermal resistance (R1) to heat exchange is calculated in the test conditions stated in Table XIII and using:

$R1=(A1)(\hat{}T)(P^{-1})$

A = area of regional segment, m^2
^T = temperature gradient between the hand model surface and ambient air temperature, °C.
P = regional power input, Watts.

Table XIII. Thermal hand testing conditions

Condition	Value
Ambient temperature	15.0 °C
Hand temperature	30.0 °C
Wind speed	2-3 meters/sec and turbulent

NOTE: Gloves submitted may be tested by the Government. (See 6.10). Testing at alternate facilities shall require side-by-side comparison due to chamber wind speed differences that cannot be controlled that will affect the total measured values.

4.5.6 Liner retention test. Test a minimum of three finished gloves. Each digit of the glove shall be tested in accordance with 4.5.6.1 and 4.5.6.2.

4.5.6.1. Liner retention test apparatus. Liner retention shall be evaluated with the use of locking forceps and a force-measuring gauge.

4.5.6.2 Test procedure. The locking forceps shall be attached to the inner liner of the digit to be tested ensuring that an unattached liner or the outer shell is not grabbed. The hook of the force gauge shall be looped around the locking bridge of the forceps. The digit of the glove shall be gripped ensuring the inner liner is not impeded. The force gauge shall be pulled until 6 lbf

registers on the dial and then released. Each digit shall be inspected for indication of detachment of inner liner and/ or waterproof insert. Results shall be recorded and reported as pass or fail. Failure of any digit of any glove shall constitute failure. Glove shall be permitted to be cut open to verify detachment.

4.5.7 Whole glove leakage testing. The finished glove shall be tested for leakage in accordance with 4.5.7.1 and 4.5.7.2. The lot size shall be expressed in units of gloves. The sample unit shall be one glove, and the selection shall be by pairs. Any test failure shall be cause for the rejection of the lot.

4.5.7.1 Testing apparatus. The test apparatus shall consist of a 3 inch inside diameter tubular rigid polyvinyl chloride test chamber approximately 12 inches in length. The chamber shall be capped approximately 2 inches from the bottom with the cap having a 1/2 inch diameter plastic air escape tube approximately 3 inches long. The test chamber shall be oriented vertically and placed in a container filled with approximately 1 inch of water such that the escape tube vents to the outside of the chamber, with the end of the tube under the water. The top of tube shall be beveled at a 45° angle on the inside. The top plug shall consist of polyethylene, approximately 4 inches in height, and 4 inches in diameter at the top tapering to approximately 2 inches in diameter at the bottom. An air passage shall be provided vertical through the plug and connected via nominal 1/2 inch tubing through a gage and air regulator to an oil-free compressed air source. A mechanism shall be provided that is capable of reproducibly clamping the plug into the end of the tube such that a seal is provided. An equivalent to the apparatus as mentioned above shall be qualified by US Army, Natick Soldier Center (see 6.13).

4.5.7.2 Testing procedure. The glove shall be inserted into the test chamber to near the cuff. The plug shall be inserted into the cuff of the glove and clamped such that a seal that holds not less than 4 psi is formed with the beveled edge of the test chamber. Air shall be provided to the chamber to a level of 4 psi for a period of not less than 5 seconds. Appearance of air bubbles at 5 seconds constitutes failure.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Department 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 gloves are intended as protection from environmental conditions for the hands of soldiers performing their mission in intermediate cold and wet climates encompassing approximately a 0 °F to 40 °F temperature range. They may be worn alone or over lightweight glove inserts. The gloves are not intended for heavy work.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Size required (see 1.2).
c. The specific issue of individual documents referenced (see 2.2).
d. When a first article is required (see 3.1, 4.2 and 6.3).
e. Inclusion of specific instructions regarding arrangement for examinations, quantity, testing and quality acceptance limits for approval: (see 4.3).
f. Packaging requirements (see 5.1).

6.3 First article. When a first article is required, (see 3.1) it will be inspected and approved under the appropriate provision of Federal Acquisition Regulation (FAR) 52.209-4. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Standard samples. For access to samples and patterns drawings address the contracting activity issuing the invitation for bids or request for proposal. Standard samples are also available at DSCP through http://warfighter.dla.mil under tab “Vendor Info” then “Specifications/Pattern Request” under “Special Instructions” provides color shade, roll number and solicitation/contract number).

6.5 Fabric, back of hand. Fabric found to meet the requirements for the back of the hand is available from: Tweave, Inc., 38 Barrows Street, P.O. Box AV, Norton, MA 02766 (see 3.3.2).

6.6 Waterproof insert. The waterproof insert must be securely affixed inside the glove, such that it cannot be pulled out when hand is removed. Each finger shall be inspected for indication of detachment of inner liner and/or waterproof insert. To ensure non-detachment, the waterproof insert may be sewn to insulation package using the integral tabs that exist at the fingertips and along side the thumb (digit one) and pinky (digit five). The insert is then inverted over the insulation package and is affixed inside the glove shell using pressure sensitive adhesive tabs, glue, etc. If pressure sensitive adhesive tabs are used, then it is recommended to place tabs at each finger tip and along side the base of the trigger finger (digit two). This extra tab near the base of the trigger finger keeps the seam of the insert aligned with the side of the finger and out of the way of the finger pad area.

6.7 Curved tension lock 3/4 inch. Curved tension lock meeting the specified requirements is available from: ITW Nexus, 195 Algonquin Ave, Des Planes, IL 60016. Military Sales (see 3.3.5).

6.8 Glove hook. The glove hook meeting the specified requirements is available from: ITW Nexus, 195 Algonquin Ave, Des Planes, IL 60016. Military Sales (see 3.3.7).

6.9 Nosewipe. Nosewipe material meeting the specified requirements is available from: Spectro Coating Corp., 101 Scott Drive, Leominster, MA 01453. (See 3.3.10).

6.10 Thermal Insulation. The US Navy Clothing and Textile Research Facility at the US Army Soldier Systems Center, Natick, MA USA is capable of performing the required test. (See 4.5.6).

6.11 Diethyltoluamide (DEET) Insect Repellent reagent. DEET insect repellent conforming to A-A-59104 has been used successfully as a reagent in testing. (See 4.5.5.1).

6.12 Nujol. Nujol is a mineral oil available in most drug stores and has been found to be suitable for use in testing the leather for oil absorption resistance. Nujol is the trademark of Plough, Inc. (See 4.5.3).

6.13 Testing apparatus. Note that the Whole Glove Leak Tester is covered by US Patent 4,776,209 through July 13, 2007. Gore Enterprise Holdings is the owner by assignment of this patent. A non-royalty-bearing license (only) for gloves manufactured per MIL-DTL-44419 for the US Government may be obtained by contacting W.L. Gore & Associates, Inc. (Contact: Military Inside Sales/Glove Products (410) 392-3600.) Descriptions and drawings for constructing the tester are contained in the patent.

6.14 Subject term (key word) listing.

Handwear
Hand protection
Waterproof

6.15 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issues, due to the extensiveness of the changes.

Concluding material:

Custodians:
Army - GL
Navy - NU
Air Force – 11

Preparing activity:
DLA - CT

Project No. 8415-2005-004

Review activities:
Army - MD

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST Online database at http://assist/daps.dla.mil.

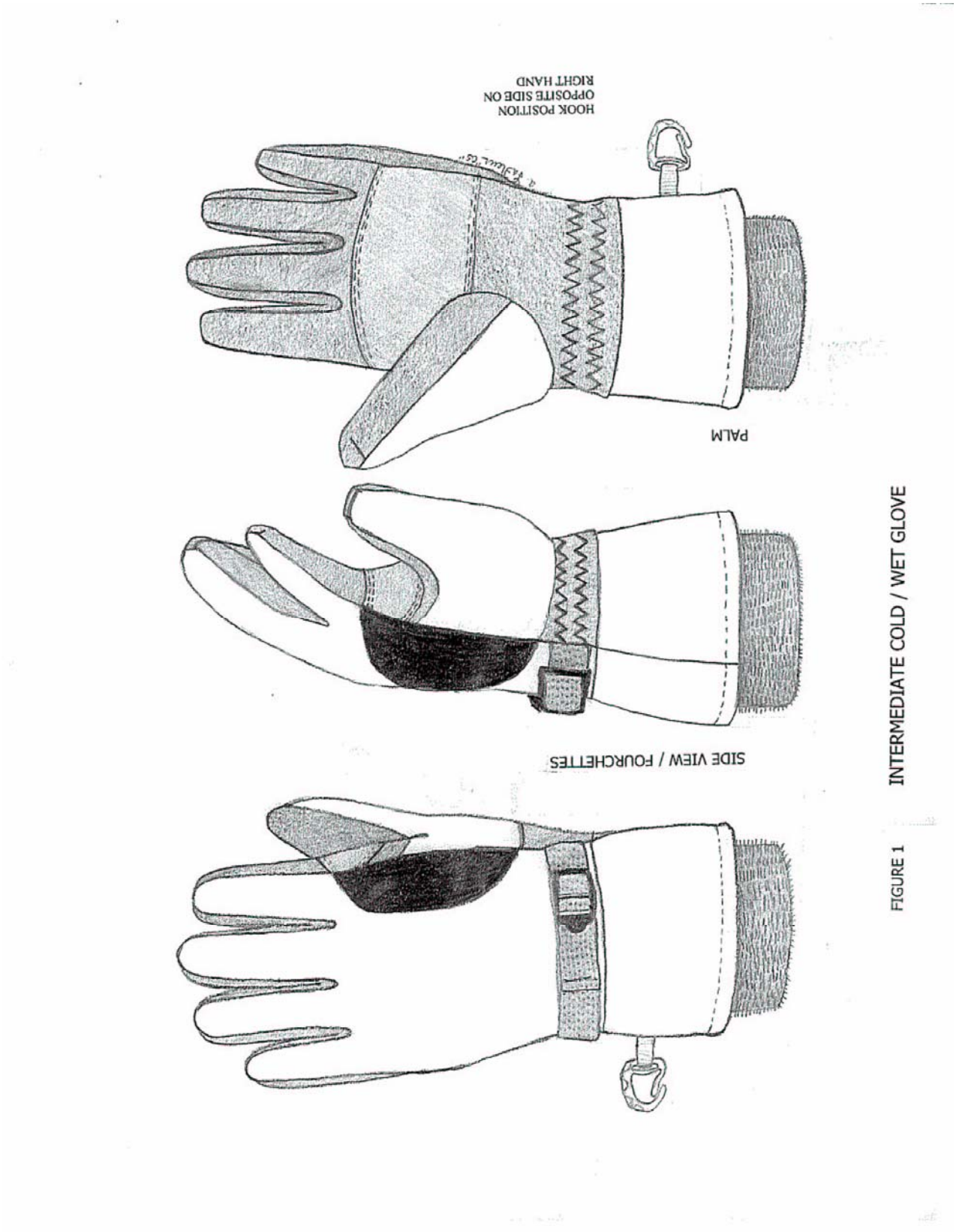
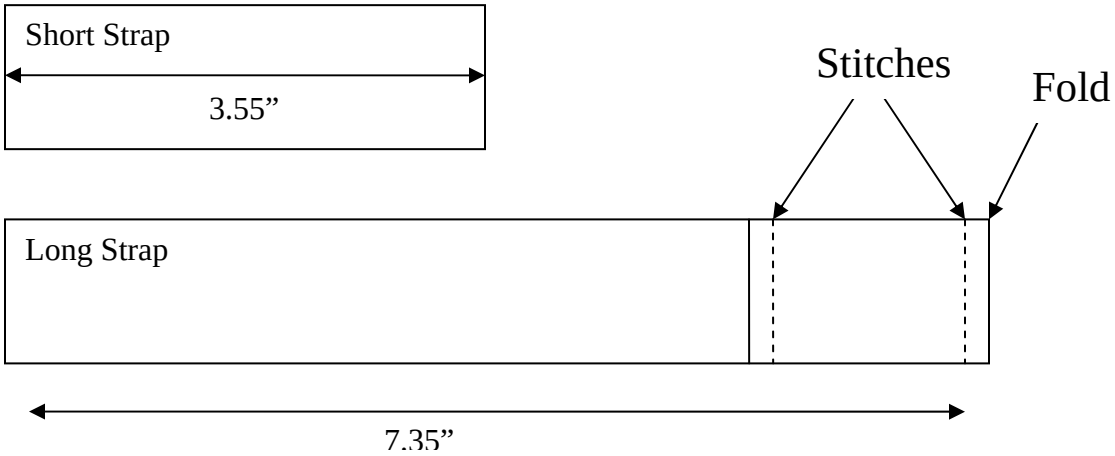


FIGURE 1 INTERMEDIATE COLD / WET GLOVE

Sizes XL Wide & Large Wide



Sizes Large

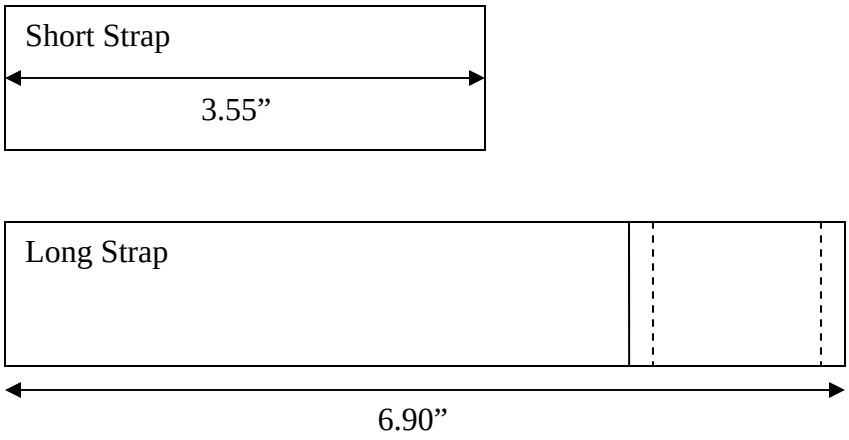
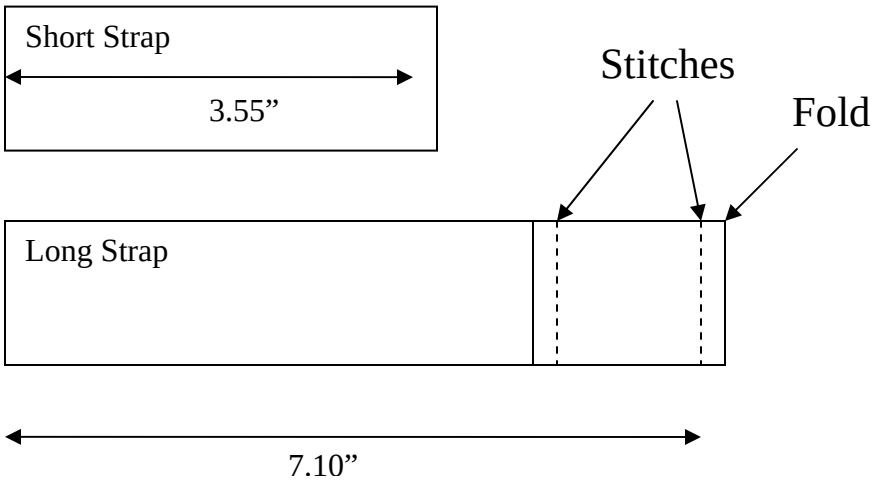


FIGURE 2. TAPE, WRIST STRAP
(Figures not to scale)

Sizes XL & Medium Wide



Sizes Small & Medium

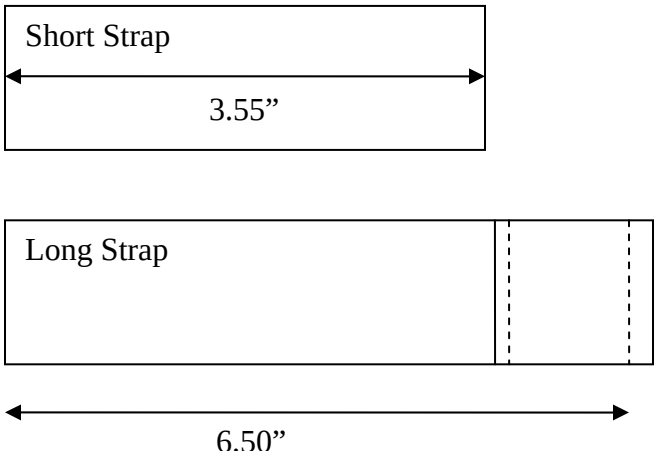


FIGURE 3. TAPE WRIST STRAP
(Figures not to scale)