

INCH-POUND  
GL-PD-08-81D  
8 November 2017  
SUPERSEDING  
GL/PD-08-81B\C  
21 July 2011

PURCHASE DESCRIPTION  
GLOVES, COMBAT, ARMY

This Purchase Description is approved for use by the all Departments and Agencies of the Department of Defense (DoD).

1. SCOPE

1.1 SCOPE. This Purchase Description (PD) covers the requirements for Army Combat Gloves that provides maximum dexterity, tactility, flexibility, and flame and cut protection. The Combat Gloves are intended to be worn by Army personnel.

1.2. CLASSIFICATION. The gloves will be available in three (3) types and two (2) classes in six sizes:

1.2.1 Type:

Type I            Army Combat Gloves  
Type II           Army Combat Gloves - Capacitive  
Type III          Army Combat Gloves - Capacitive with Gauntlet

1.2.2 Class:

Class 1           Foliage Green 504  
Class 2           Coyote 498

1.2.3 Sizing. The gloves sizes are as follows and will be in accordance with the patterns.

Sizes

Extra-Small    Small            Medium        Large        Extra-Large    Extra Extra-Large

NOTE: The above sizes may be abbreviated as XS, S, M, L, XL, and XXL.

Comments, suggestions, or questions on this document should be addressed to: Department of the Army, Natick Soldier Research, Development and Engineering Center, 10 General Greene Avenue Natick MA 01760. ATTN: RDNS-SES-WC.

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.

## COMMERCIAL ITEM DESCRIPTIONS

A-A-55126 Fastener Tapes, Hook and Loop, Synthetic  
A-A-55195 Thread, Para-aramid, Spun, Intermediate Modulus

## DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-W-5664 - Webbing, Textile, Elastic  
MIL-DTL-32075 - Label: For Clothing, Equipage, and Tentage, (General Use)

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

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.

## ENVIRONMENTAL PROTECTION AGENCY

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

(Copies are available online at <http://www.epa.gov/pesticides>.)

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

- AATCC Evaluation Procedure 9, Visual Assessment of Color Difference in Textiles
- AATCC Test Method 20 - Fiber Analysis: Qualitative
- AATCC Test Method 76 - Electrical Surface Resistance of Fabrics

(Copies of are available on line at <http://www.aatcc.org>.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

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

(Copies are available online at <http://www.asq.org>.)

ASTM INTERNATIONAL

- ASTM D257 - Standard Test Methods for DC Resistance or Conductance of Insulating Material
- ASTM D1610 - Standard Practice for Conditioning Leather and Leather Products for Testing
- ASTM D1814 - Standard Test Method for Measuring Thickness of Leather Units
- ASTM D2096 - Standard Test Method for Colorfastness and Transfer of Color in The Washing of Leather
- ASTM D2209 - Standard Test Method for Tensile Strength of Leather
- ASTM D2322 - Standard Test Method for Resistance of Shoe Upper Leather to Artificial Perspiration
- ASTM D2617 - Standard Test Method for Total Ash in Leather
- ASTM D2807 - Standard Test Method for Chromic Oxide in Leather (Perchloric Acid Oxidation)
- ASTM D2813 - Standard Practice for Sampling Leather for Physical and Chemical Tests
- ASTM D2821 - Standard Test Method for Measuring the Relative Stiffness of Leather by Means of a Torsional Wire Apparatus
- ASTM D3495 - Standard Test Method for Hexane Extraction of Leather
- ASTM D3575 - Standard Test Method for Flexible Cellular Materials made from Olefin Polymers
- ASTM D3776/D3776M - Standard Test Method for Mass Per Unit Area (Weight) of Fabric
- ASTM D3787 - Standard Test Method for Bursting Strength of Textiles – Constant- Rate-of-Transverse (CRT) Ball burst test
- ASTM D3884 - Standard Test Method for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
- ASTM D4075 - Standard Test Method for Stitch Tear Strength of Leather, Double Hole
- ASTM D6076 - Standard Test Method for Shrinkage Temperature of Leather
- ASTM D6193 - Standard Practice for Stitches and Seams
- ASTM D6413/D6413M - Standard Test Method for Flame Resistance of Textiles (Vertical Test)

ASTM F1790 - Standard Test Method for Measuring Cut Resistance of Materials used in Protective Clothing

(Copies of documents are available online at <http://www.astm.org>.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 17075 Chemical Determination of Chromium (VI) Content in Leather – Part 1: Colorimetric Method

(Copies of this document are available online at <https://www.iso.org>)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 1971 - Standard on Protective Ensemble for Structural Fire Fighting and Proximity Fire Fighting

NFPA 1971 - Test Method for Heat and Thermal Shrinkage Resistance

(Copies of this document are available online at <http://www.nfpa.org>.)

PARACHUTE INDUSTRY ASSOCIATION (PIA)

PIA Test Method 4108 - Strength and Elongation, Breaking; Textile Webbing, Tape and Braided Items

PIA Test Method 6016 - Strength and Elongation Breakage of Cordage; Non-Spliced Specimen Method

(Copies of this document are available online at <http://www.pia.com>.)

OTHER PUBLICATIONS

Repeat Insult Patch Test - Modified Draize Procedure – Principles and Methods of Toxicology, A Wallace Hayes (editor).

(Copies are available on-line at <http://www.taylorandfrancis.com>/ or <https://www.crcpress.com>.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Standard Sample. The finished gloves shall match the standard sample for shade and appearance, and shall, unless otherwise indicated, be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.4).

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

3.4 Materials.

3.4.1 Basic shell material. The basic shell material shall be simplex or interlock knitted cloth consisting of a yarn blend of 96 percent para-aramid and 4 percent conductive anti-stat fiber. The color for the knit cloths shall be Class 1, Class 2 or unless otherwise specified in the contract or purchase order and shall meet the requirements in Table I when tested as specified in 4.4.3.

3.4.1.1 Palm patch inner and welt material. The palm patch inner and welt material shall be simplex or interlock knitted cloth consisting of 100 percent meta-aramid fiber and it shall be Class 1, Class 2 or unless otherwise specified in the contract or purchase order and shall meet the requirements in Table I when tested as specified in 4.4.3.

TABLE I. Material requirements.

CHARACTERISTIC	REQUIREMENT	
	Basic shell material	Palm patch inner and welt material
Fiber identification	Para-aramid/conductive fiber	Meta-aramid
Knit construction	3.4.1	3.4.1.1
Weight, oz/sq yd	10.0 - 11.0	6.5-7.5
Flame resistance, maximum		
After flame, seconds	2.5	2.5
Char length, inches	2.0	3.5
Fabric cut resistance, grams minimum	400	---
Burst strength, pounds minimum	198	---
Color (Visible materials)	Foliage Green 504, Class 1 Coyote 498, Class 2 <u>1/</u>	Foliage Green 504, Class 1 Coyote 498, Class 2 <u>1/</u>

1/ Or color as specified in the contract or purchase order.

3.4.2 Leather. The leather shall be drum-dyed, struck through from grain to flesh. 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. The color of the finished leather shall be a good match to Class 1, Class 2 or color as specified in the contract or purchase order. Variations in color on the flesh side resulting from buffing or shaving are permissible. The leather for all Types shall be treated with a flame resistant treatment and meet the requirements in Table II. Type II and III glove (only) shall also be capacitive and meet the requirements in Table II when tested as specified in 4.4.3.

TABLE II. Leather requirements (all Types).

<b>CHARACTERISTIC</b>	<b>REQUIREMENT</b>
Material identification	Goat/kidskin
Thickness, ounces	1.3 - 2.5
Stitch tear strength, pounds, minimum At least 80% of the specimens tested	12
Elongation, percent, minimum At least 80% of the specimens tested	25
Shrinkage, percent, maximum Temperatures up to 92°C	No shrinkage
Stiffness, Stiffness value: degrees, maximum At least 80% of the specimens tested	60
Perspiration, percent, maximum	15
Area stability to laundering, percent, maximum	20
Color	Foliage Green 504, Class 1 Coyote 498, Class 2 (3.4.2)
Resistivity, ohms per square <sup>1/</sup>	
Grain	10 <sup>3</sup> - 10 <sup>6</sup>
Flesh	10 <sup>3</sup> - 10 <sup>9</sup>
Chemical Analysis (%)	
Chloroform Soluble Material (maximum)	25
Chromic Oxide (minimum)	2.5
Total Ash (maximum)	9
Hexavalent Chromium, ppm (maximum)	10
Flame Resistance (maximum)	
After Flame, seconds	2.0
Char Length, inches	4.5

<sup>1/</sup> For Type II and III Only

3.4.3 Foam. The foam shall be closed cell conforming to 2 pound Volara® or equal and shall meet the requirements of Table IIA when tested in accordance with 4.4.3 (see 6.5.1).

TABLE IIA. Foam requirements (all Types).

<b>CHARACTERISTIC</b>	<b>REQUIREMENT</b>
Density, lbs/ft <sup>3</sup> , (minimum)	2
Tensile strength, psi	
Machine direction, (minimum)	60
Cross-machine direction, (minimum)	39
Compression Set, % of Org. Thickness, (minimum)	28
Thickness, inches	3/16 (±1/16)

3.4.4 Storage loop/cord. Each glove shall have a storage loop/cord which shall be sewn into the hem, centered on the inner palm piece, and extend 1/2-inch (± 1/8) inch beyond the proximal end of the glove. The storage loop can be made from a cord or webbing. The color for the storage loop shall be Class 1, Class 2 or color as specified in the contract or purchase order and shall meet the requirements in Table III when tested in accordance with 4.4.3. The storage loop shall interface with the Molded Locking Carabiner (Part # 110-4100-5674) (see 6.5) used on the Modular Lightweight Load Carrying Equipment (MOLLE). The storage loop shall easily slide over the 0.536-inch by 0.4-inch curved shaft of the carabiner as specified.

3.4.4.1 Trimming materials (pull tab, webbing, and cord). Materials used shall meet the requirements of Table III when tested in accordance with 4.4.3. All visible materials shall meet the color requirement of Class 1, Class 2 or color as specified in the contract or purchase order.

TABLE III. Trimming requirements (all Types).

<b>CHARACTERISTIC</b>	<b>REQUIREMENT</b>
<b>(All Trims)</b>	
<b>Cord</b>	
Tensile strength, pounds, (minimum)	85
<b>Webbing</b>	
Tensile strength pounds, (minimum)	85

3.4.5 Thread. Para-aramid thread, Tex Size 35/40, shall comply with A-A-55195, Type II, high performance, and have a minimum break strength of 9 pounds, shall be used for all seaming and stitching. All seams and stitching shall be in accordance with standard commercial practice. The color of the thread shall be a good match to the basic knit material as specified (see 3.4.1). As an alternate, 100% expanded polytetrafluoroethylene (ePTFE) thread, size TEX 140 (1400 denier), with a minimum 9 pounds break strength, color Clear, Class 1, Class 2 or color as in contract may be used on both needle/looper threads (see 6.5). The finished thread shall have no chemical finishes or treatments, other than those meeting the requirements in above paragraph commonly used on commercial threads.

3.4.5.1 Hook and loop. The hook and loop for the wrist closure system shall be A-A-55126, Type II, Class 1 or 4 flame retardant (FR) treated. The FR treated hook and loop shall pass the Federal Aviation regulation 25.853, Appendix F of 12 second vertical burn with flame time not to exceed 15 seconds. Burn length not to exceed 8-inches and flaming drip not to continue more than 5 seconds after falling off when tested as specified in 4.4.3.6.

3.4.5.2 Elastic webbing. The elastic webbing for the wrist shall be cotton or nylon, 3/8-inch in width and shall conform to MIL-W-5664, Class 1, except the width tolerance shall be (+0, - 1/8)-inch. Cut lengths shall be as follows: XS; 3-inches, S; 3-1/4-inches, M; 3-1/2-inches, L; 3-3/4-inches, XL; 4-inches, and XXL; 4-1/4-inches. All elastic cut lengths shall have a tolerance of ( $\pm 1/8$ ) inch. The elastic webbing shall be stitched to the inside of the leather 1/8 ( $\pm 1/16$ ) inch from the raw edge and shall extend from the side seam to the welt. The elastic shall be completely covered on the inside by the hem.

3.4.6 Labels. Each glove shall have identification label (Class 1), a size label (Class 2), and instruction label (Class 3) or a combination size, identification and instruction label (Class 14) conforming to Type VI of MIL-DTL-32075. The label shall be sewn into the hem and centered on the inner palm piece. The color of the labels shall be white. The following instruction information shall be included in the printing for the labels for the gloves.

3.4.6.1 Identification and care label (Type I only, and all Classes). The Type I label shall include the following information:

GLOVES, COMBAT, ARMY

Laundering Instructions

1. Hand wash cool water
2. Air dry away from heat

CAUTION

DO NOT IRON  
DO NOT USE BLEACH

DO NOT REMOVE THIS LABEL

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3.4.6.2 Identification and care label (Type II and Type III only, and all Classes). The Type II and Type III label shall include the following information:

CAPACITIVE, GLOVES, COMBAT, ARMY

Laundering Instructions

1. Hand wash cool water
2. Air dry away from heat

CAUTION

DO NOT IRON  
DO NOT USE BLEACH

DO NOT REMOVE THIS LABEL

3.4.6.3 Bar code label. When specified (see 6.2), the bar code label for each item shall be individually bar-coded with a paper tag for personal clothing items. The paper used for the tags shall be a standard bleached sulfate having a basis weight of 100 pounds with a smooth finish to accept thermal transfer and direct printing. The tags shall have a hole and be attached to each item by a fastener, clearly legible and readable by scanner. The bar code element shall be a 13 digit national stock number (NSN). There shall be a twelve digit Universal Product Code (UPC) assigned for all NSNs by the Government. The initials "UPC" shall appear beneath code. The bar codes for NSN and UPC shall be a medium to high density and shall be located so that they are completely visible on the item when it is folded and or packaged as specified. The label's location shall cause no damage to the item.

3.5 Design. The matched pair of gloves for Type I and II shall be made from a combination of leather and inherently flame resistant textile materials according to the patterns as specified in 3.6 and finished dimensions in Table VI and Figure I. Pattern parts and finished dimensions for Type III glove will be provided at a later date. The gloves (Type I and II) shall be slip-on style with adjustable tabs (hook and loop) at the wrist containing a combination of knit cloth, leather palm and knuckle reinforcements on the back of the hand and storage loop/cord. Closed cell foam shall be used for the knuckle guard and palm patch as specified in 3.4.3. The combat glove knit material for the basic shell shall be a good match to Foliage Green 504 for Class 1 and Coyote 498 for Class 2 or color as specified in the contract or purchase order (see 3.4.1), and the leather shall be a good match to Foliage Green 504 for Class 1 and Coyote 498 for Class 2 or color as specified in the contract or purchase order (see 3.4.2).

3.6 Patterns. The Government will provide a complete set of patterns for (Type I & Type II) as specified in 3.6.1 which show size, directional lines, placement marks, and notches for assembly. The patterns generally provide for a 1/8-inch seam allowance except for topstitching on patches. The Government patterns shall be used to create a working pattern. The Government patterns shall not be altered. Minor modifications are permitted to the working pattern where necessary when using automatic equipment or to accommodate a manufacturing

process. These modifications shall not alter the dimensional, serviceability, or appearance requirements cited in this specification. Patterns for Type III to be determined.

3.6.1 Pattern parts. The component parts of the Army combat gloves shall be cut from materials as specified and in accordance with the number of parts required as specified in Table IV.

TABLE IV. Pattern parts list (Type I & Type II only).

<b>Material <u>1/</u></b>	<b>Pattern Nomenclature <u>1/</u></b>	<b>Cut Parts <u>2/</u></b>
<b>Basic shell material</b>		
Para-aramid	Fourchette 1	2
Para-aramid	Fourchette 2	2
Para-aramid	Fourchette 3	2
Para-aramid	Palm Outer	2
<b>Palm patch inner and welt material</b>		
Meta-aramid	Palm Patch Inner	2
Meta-aramid	Welt	2
<b>Leather</b>		
Leather	Binding	2
Leather	Flanger 1	2
Leather	Flanger 2	2
Leather	Flanger 3	2
Leather	Flanger 4	2
Leather	Flanger 5	2
Leather	Flanger 6	2
Leather	Knuckle Pad	2
Leather	Palm Inner	2
Leather	Thumb Crotch	2
Leather	Thumb Inner	2
Leather	Thumb Outer	2
Leather	Tip 1	2
Leather	Tip 2	2
Leather	Tip 3	2
Leather	Tab Outer	2
<b>Foam</b>		
Foam	Knuckle	2
Foam	Palm Patch	2
<b>Hook and Loop</b>		
Hook	Tab Inner	2
Loop	Tab Outer	2

1/ Type III patterns to be determined

2/ Pattern may be used for production of this glove in conjunction with Army combat glove contracts only.

### 3.7 Construction.

3.7.1 Stitches, seams, and stitching. Stitches, seams, and stitching types shall conform to ASTM D6193. Seam allowances shall be maintained with seams sewn so that 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 unless otherwise specified. Seam allowance on all inseam stitching shall be 1/8 ( $\pm$  1/16) inch unless otherwise specified. The leather pattern pieces as specified in Table IV for the knuckle pad, palm inner, thumb crotch, tips 1, 2 and 3 and the secondary shell fabric (meta-aramid) for the palm patch inner shall be double top stitched no less than 1/32-inch and no more than 3/16-inch from the raw edge at trigger finger joint to the basic shell material (para-aramid). The hem for the welt shall be 1/4 ( $\pm$  1/16) inch and the hem for the glove shall be 3/8 ( $\pm$  1/16) inch.

3.7.1.1 Stitching. Stitching shall be no less than 9 stitches per inch and no more than 12 stitches per inch and the ends of all seams and stitching, when not caught in other seams or stitching, shall be backstitched not less than 1/4-inch unless otherwise specified. Thread tension shall be maintained so that there shall be no loose stitching resulting in loose bobbin or top thread, or excessively tight stitching resulting in puckering of the materials sewn.

3.7.1.2 Repairs of stitching. Repairs of 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-inch 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 of two (2) or more consecutive skipped or run-off stitches noted during inspection of the item shall be repaired by overstitching. The stitching shall start a minimum of 1/4-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 re-stitching in the required manner.

c. Regardless of the type of stitching, repairs shall ensure that the seam integrity shall be comparable to a non-repaired seam.

3.7.2 Pressing. Each glove shall be heat set on a heated hand form of the correct size in relation to the size of the glove. The glove should first be steamed or a steaming heated hand form should be used.

3.7.3 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, except that trimmer attachments, other than thread under trimmer, are not allowed.

3.7.4 Manufacturing operations requirements. The gloves shall be manufactured in accordance with good commercial practices. Contractor shall conform to the Government furnished patterns.

3.8 Toxicity (basic shell knit material and the palm patch inner and welt material only). The basic shell knit material and the palm patch inner and welt material shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 4.4.3.1. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.9 Service life. The combat glove shall provide a minimum service life of 90 days (when tested in accordance with 4.4.3.2 and meet all of the requirements of Tables I, II, IIA, and III.

3.10 Heat and thermal shrinkage resistance. The entire glove and all components excluding the hook and loop shall be heat and thermal shrinkage resistant exhibiting no ignition, melting or dripping when tested in accordance with 4.4.3.5.

3.11 Figures. Figure 2 is furnished for information purposes only. If there are any inconsistencies between the specification and the figure the specification shall govern.

3.12 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 in accordance with 3.1 shall be inspected, examined for appearance, color and for the defects listed in Table V, glove dimensions in Table VI and tested for the characteristics in Table VII.

4.3 Conformance inspection. Conformance inspection shall include examination for shade and appearance, inspection of components in 4.4.3 that cannot be inspected in the component testing specified in 4.4.3.1 to 4.4.3.6. Sampling for inspection shall be performed in accordance with ANSI/ASQ Z1.4, except where otherwise indicated (see 6.2).

4.4 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with all the requirements of referenced documents, unless otherwise excluded,

amended, modified or qualified in the specification or applicable procurement documents (see 6.2).

4.4.1 End item visual examination. The finished gloves shall be examined for the defects listed in Table V. The lot size shall be expressed in units of gloves. The sample unit shall be one (1) pair of gloves and selection shall be by pairs. Defects for pairing shall be classified as a single defect.

TABLE V. Material and end item visual examination.

Examine	Defect Description	Major	Minor
<b>Glove</b>			
Glove pairing	Not matched and paired, right and left glove not good matches in color, texture, and sizing. Not tacked or joined together as specified	101	201
Knuckle guard	Not properly double top stitched Overlaps palm patch leather Not smooth; distorted Knuckle guard misplaced (does not cover knuckles as intended) Stitching not uniform and is less than 1/32-inch from edge or greater than 3/32-inch from edge	102	202 203 204 205
Shell design	Not as specified (incorrect material, pattern, etc.). Not specified size, stitches loose or broken	103 104	
Cleanness	Spots or stains clearly noticeable affecting appearance		206
<b>Leather</b>			
Color	Not specified color. Miss-matched shade on single or pair of gloves Color not uniform on grain side. Color not completely penetrating the leather from grain side through flesh side.		207 208 209 210
Finish	Not full grain. Flesh side not smooth or containing coarse areas. Printed design on leather.	105 106 107	
Quality	Not clean; stain or foreign matter Hard, boney, loose, spongy leather, hard scar, cut, hole (including a pinhole or needle hole outside of the normal stitching line), brittle, thin spot, brand, scratch, deep fat wrinkle, or grain damage.	108	211
<b>Fabric</b>			
	Not as specified Not specified color, streaky, or shaded from side to side. Any run, dropped stitch, snag, pull, slubby yarn. Lacking elasticity, too tight or loose	109 110 111	212

TABLE V. Material and end item visual examination. - Continued

Examine	Defect Description	Major	Minor
<b>Construction</b>			
(applicable to all components unless otherwise indicated herein)	Component misplaced, operation omitted, or general operation and /or workmanship improperly performed. Component missing or not securely affixed. Mend in leather or fabric (i.e., patch- not applicable to restitched seam repair). Needle chews likely to develop into a hole	112 113 114 115	
Seams and stitching	An open seam in single stitched seam or in either stitching row of a double stitched seam. Not repaired as specified (when applicable) Stitching not within tolerance of 9-12 stitches per inch. Loose stitch tension resulting in a loosely secured seam or tight stitch tension resulting in cutting of leather or breaking of stitches when donning or doffing. Unsecured stitching ends. Gage of stitching irregular affecting appearance. Part caught in unrelated row of stitching. Not backstitched where required. Row of stitching omitted	116 117  118 119 120 121 122	213    214
Assembly detail	Glove not neatly laid off (wrinkles or folds in shell or puckering in the cradle reinforcement). Poorly assembled and affecting serviceability (finger distorted, twisted, or not properly rounded at tip affecting comfort of wearer). Three (3) or more untrimmed thread ends exceeding 3/8-inch Not constructed with the specified materials. Difference in overall length between front and back of glove is more than 1/2-inch	123  124  125 126	215
Labels and instruction slip	Omitted, incorrect, illegible, or misplaced; size and identification label not securely sewn in wrist hem	127	
Hook and Loop	Hook not properly oriented (not parallel to cuff hem) Hook and Loop not properly aligned (loop tab is not aligned to hook tab) Not specified color		216 217 218
Closure tab	Not properly edged stitched (inconsistent edge stitching, loose stitch tension resulting in stitches being caught by hook) Not properly secured/attached to glove	128	219

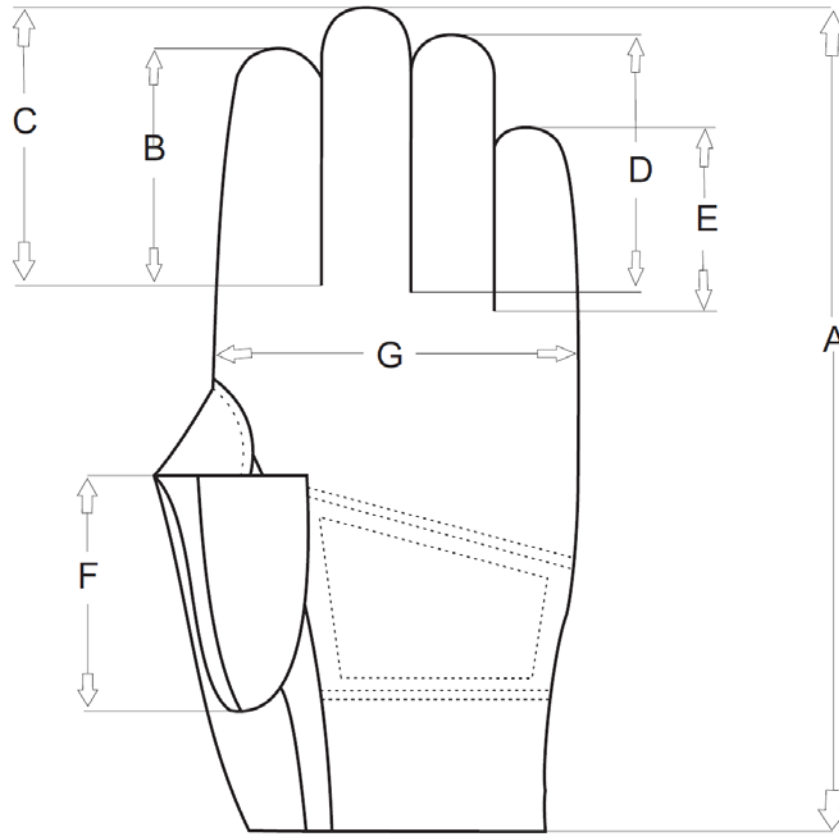
4.4.2 Dimensional examination. The finished glove shall conform to the dimensional measurements specified in Table VI. The measurements shall be taken on the palm side of the glove in accordance with the locations specified in Figure 1. The finished measurements of paired gloves shall vary no more than 1/4-inch from each other.

TABLE VI. Finished glove dimensions (inches).

Location	X-Small	Small	Medium	Large	X-Large	XX-Large	Tolerance
A	8-1/2	8-3/4	9	9-1/4	9-1/2	9-3/4	± 1/8
B	2-3/4	2-7/8	3	3-1/8	3-1/4	3-3/8	± 1/16
C	3-1/8	3-1/4	3-3/8	3-1/2	3-5/8	3-3/4	± 1/16
D	2-3/4	2-7/8	3	3-1/4	3-1/4	3-1/2	± 1/16
E	2	2-1/8	2-1/4	2-3/8	2-1/2	2-5/8	± 1/16
F	2-3/8	2-1/2	2-5/8	2-3/4	2-7/8	3	± 1/16
G	3-3/4	3-7/8	4-1/8	4-3/8	4-5/8	4-3/4	± 1/16

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FIGURE 1. Dimensional measurement locations.



NOTE: Measuring method: All measurements are taken with glove palm-side up, smooth and flat, but not stretched.

Location of Measurement	Measuring Method
(A)	Measure from lowest point of crotch to top of first finger
(B)	Measure from lowest point of crotch between first and second finger to top of second finger
(C)	Measure from lowest point of crotch between second and third finger to top of third finger
(D)	Measure from the lowest point of crotch between third and fourth finger to top of fourth finger
(E)	Measure from the lowest point of crotch between thumb and first finger to top of thumb
(F)	Measure from folded edge to folded edge just above thumb crotch piece



4.4.3 End item and component testing. The knit cloth, foam, and trimming materials for the gloves shall be tested for the characteristics listed in Table VII. The methods of testing as specified wherever applicable and as listed in Table VII shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The sample unit shall be 2.5 continuous yards full width of the finished knit cloth, foam, and trimming material for all physical and chemical tests. The lot shall be unacceptable if one (1) or more sample units or the lot average fail to meet any requirement specified. The sample size shall be in accordance with the following:

<u>Lot size (yards)</u>	<u>Sample size (sample units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

The leather shall be tested for the characteristics listed in Table VII. The methods of testing as specified wherever applicable and as listed in Table VII shall be followed. The sampling location from which the sample unit is to be obtained shall be in accordance with ASTM D2813, except the sample unit shall be 10 X 10 inches. Fifteen units of product shall be selected at random from each lot for the purpose of testing unless otherwise specified. For lots consisting of less than 15 units of product, each unit shall be sampled for testing. The sample(s) required for testing the lot for physical and chemical characteristics shall be selected from the samples for visual or dimensional examination. The pieces shall be marked to indicate the side that is parallel to the backbone and to indicate the root of the tail. All test reports shall contain the individual values utilized in expressing the final result. The lot shall be rejected if more than three (3) specimens for any characteristic fail to meet the specified requirements in Table VII for leather.

TABLE VII. End item and component testing.

<b>CHARACTERISTIC</b>	<b>Requirement Paragraph</b>	<b>TEST METHOD</b>
<b>Component Testing</b>		
<b>Basic shell material and palm patch inner and welt material</b>		
Fiber identification	Table I	AATCC 20
Knit construction	3.4.1	3.4.1.1
Weight, oz/sq yd	Table I	ASTM D3776/D3776M Option C
Flame resistance, maximum After flame, seconds Char length, inches	Table I	ASTM D6413/D6413M
Fabric cut resistance, grams minimum	Table I	ASTM F1790
Burst strength, pounds minimum	Table I	ASTM D3787
Color (visible materials)	Table I	Visual <u>I</u> /

TABLE VII. End item and component testing. - Continued

CHARACTERISTIC	Requirement Paragraph	TEST METHOD
<b>Component Testing - Continued</b>		
<b>Leather</b> 3.4.2		
Material identification	Table II	Visual
Thickness, ounces	Table II	ASTM D1814
Stitch tear strength, pounds, minimum At least 80% of the specimens tested	Table II	ASTM D4705
Elongation, percent, minimum At least 80% of the specimens tested	Table II	ASTM D2209
Shrinkage, percent, minimum Temperatures up to 92°C	Table II	ASTM D6076
Stiffness, Stiffness value: degrees, maximum At least 80% of the specimens tested	Table II	ASTM D2821
Perspiration, percent, maximum	Table II	ASTM D2322
Area stability to laundering, percent, maximum	Table II	ASTM D2096
Resistivity, ohms per square, <u>2/</u> Grain Flesh	Table II	4.4.3.3
Chemical Analysis (%) Chloroform Soluble Material, maximum Chromic Oxide, minimum Total Ash, maximum Hexavalent Chromium, ppm., maximum	Table II	ASTM D3495 ASTM D2807 ASTM D2617 ISO 17075
Flame Resistance	Table II	ASTM D6413/D6413M <u>3/</u>
Color	Table II	Visual <u>1/</u>
<b>Foam</b> 3.4.3		
Density, lbs/ft <sup>3</sup>	Table IIA	ASTM D3575
Tensile strength, psi	Table IIA	ASTM D3575
Compression Set, % of Org. Thickness	Table IIA	ASTM D3575
Thickness	Table IIA	Visual <u>4/</u>
<b>Trimming materials: 3.4.4 and Table III</b>		
Cord Tensile Strength, pounds, minimum	Table III	PIA Test Method 6016
Webbing Tensile Strength, pounds, minimum	Table III	4.4.3.4
<b>End Item Testing</b>		
Heat and thermal shrinkage resistance, minimum	Table III & 3.10	4.4.3.5

1/ The color and appearance of the glove shall match the standard sample when viewed using the AATCC Evaluation Procedure 9, Option A, with sources simulating artificial daylight D75

illuminant with a color temperature of 7500K ( $\pm 200$ ) illumination of 100 ( $\pm 20$ ) foot candles, and shall be a good match to the standard sample under incandescent A illuminant with a color temperature of 2856K ( $\pm 200$ ).

2/ Type II and Type III only

3/ Except the char length shall be measured without puncturing the specimen or applying the tearing force. Only one 3 by 10 inch specimen shall be tested for each 10 by 10 inch sample unit.

4/ Using a scientific calibrated ruler

4.4.3.1 Toxicity test. When required, (see 6.2), an acute dermal irritation study and a skin sensitization study shall be conducted on laboratory animals. When the results of these studies indicate the gloves are not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure (see 2.3). If the toxicity requirement (see 3.8) can be demonstrated with historical use data, toxicity testing may not be required (see 6.2).

4.4.3.2 Service life. The combat glove service life shall be verified through technical evaluation of calculations, computations, models, or analytical solutions to determine if the gloves conform to the specified requirements in 3.9.

4.4.3.3 Resistivity test procedure (Type II and Type III only). Testing shall be in accordance with AATCC 76 using an electrical resistivity detector for surface resistivity. The leather shall be conditioned according to ASTM D1610 prior to removing any physical or chemical test specimen. For each sample unit of a colored, tanned leather hide, both grain and flesh side of the hide shall be tested at three (3) locations scattered throughout the 10 X 10 hide sample, and all surface resistivity readings shall pass the resistivity test for the hide to be accepted for the lot.

4.4.3.4 Tensile strength test for storage loop/cord. The storage loop when made with webbing it shall be tested in accordance with PIA 4108 with the exception of using a 6-inch sample and flat surface clamps.

4.4.3.5 Heat and thermal shrinkage resistance test. The entire glove and all components shall conform to National Fire Protection Association (NFPA) 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (Heat and Thermal Shrinkage Resistance Test). The test report shall state any melting characteristics on all components of the glove including findings and closures, and whether the glove is still donable and flexible after heat exposure.

4.4.3.6 Flame retardant treated hook and loop. The flame retardant treated hook and loop shall be tested in accordance with the Federal Aviation Regulation 25.853, Appendix F, Part (a)(1)(ii) and meet the requirements stated in 3.4.5.1.

## 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. These gloves are intended for light work duty with flame and cut protection.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this Purchase Description.
- b. Type, Class and Size required (see 1.2)
- c. The specific issue of individual documents referenced (see 2.2 and 2.3).
- d. When a first article is required (see 3.1, 4.2 and 6.3).
- e. Bar coding requirements if applicable (see 3.4.6.3).
- f. When toxicity testing is required (see 3.8 and 4.4.3.1)
- g.. Conformance inspection acceptance quality limits (see 4.3).
- h. Inspection conditions if applicable (see 4.3.1)
- i. Packaging (see 5.1).

6.3 First article. When a first article inspection is required (see 3.1), it will be inspected and approved under the appropriate provisions of 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 Samples. For access to samples and patterns address the contracting activity issuing the invitation for bids or request for proposal.

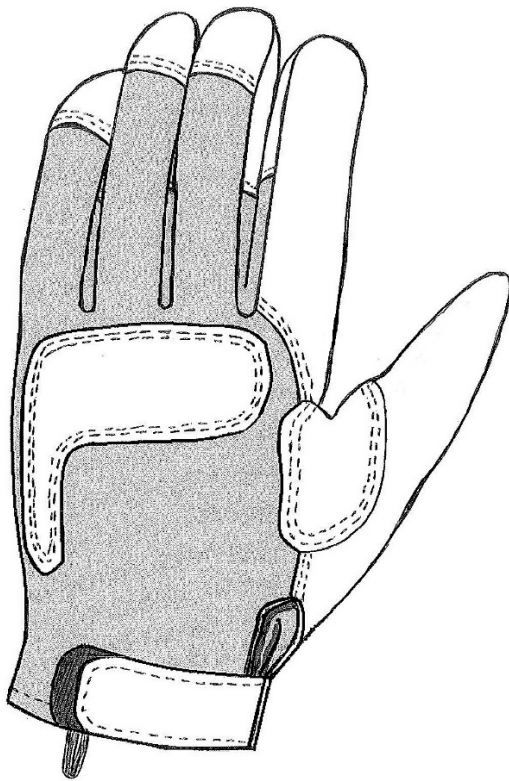
6.5 Known sources.

6.5.1 Volara® is a trademark of Sekisui Voltek LLC <http://www.sekisuivoltek.com>.

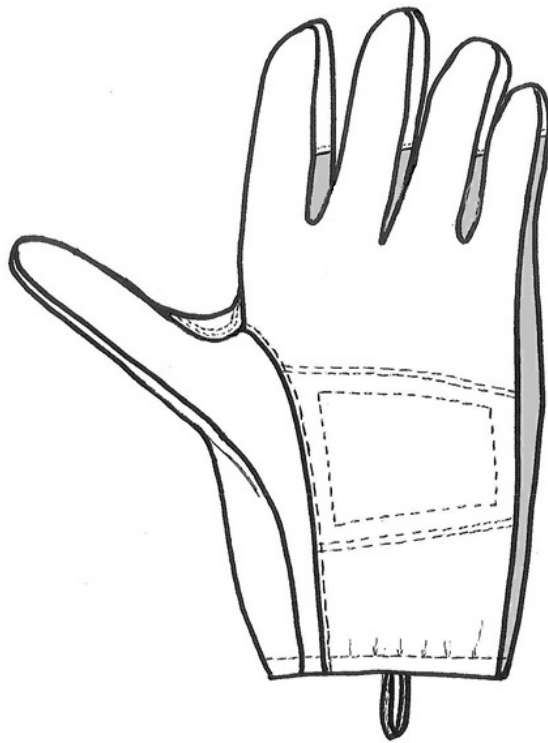
6.5.2 Alternate thread. Expanded PTFE TENARA®, (ePTFE) style TRBL, Part No. M1000KTR, 1400 denier. W.L. Gore and Associates, Inc. <http://www.gore.com>

6.6 Subject term (key word) listing.

Capacitive  
Cut protection  
Flame protection  
Gauntlet  
Handwear  
Light work duty  
Touchscreen



Back View



Front (Palm) View

FIGURE 2. Glove, Army Combat

Custodian:  
GL

PREPARING ACTIVITY:  
GL-Army