

INCH-POUND

MIL-B-44152C

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SUPERSEDING

MIL-B-44152B

29 May 1990

## MILITARY SPECIFICATION

BOOTS, COMBAT; mildew & water resistant, DMS

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

### 1. SCOPE

1.1 Scope. This document covers the requirements for one type of speed lace mildew and water resistant black leather combat boot with a direct molded sole and heel (DMS).

1.2 Classification. The boots shall be of the following sizes and widths as specified (see 6.2). The schedule of sizes is as listed in Table I.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Personnel Support Center, Clothing and Textiles Directorate, Attn: DPSC-FSSD, 2800 South 20th Street, Philadelphia, PA 19101-8419, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8430

DISTRIBUTION STATEMENT A.

Approved for public release;  
distribution is unlimited.

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TABLE I. Schedule of sizes

Width:	XN	N	NR	R	RW	W	XW
3	-	X	X	X	X	X	X
3-1/2	-	X	X	X	X	X	X
4	-	X	X	X	X	X	X
4-1/2	-	X	X	X	X	X	X
5	X	X	X	X	X	X	X
5 1/2	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X
6-1/2	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X
7-1/2	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X
8-1/2	X	X	-	X	-	X	X
9	X	X	-	X	-	X	X
9-1/2	X	X	-	X	-	X	X
10	X	X	-	X	-	X	X
10-1/2	X	X	-	X	-	X	X
11	X	X	-	X	-	X	X
11-1/2	X	X	-	X	-	X	X
12	X	X	-	X	-	X	X
12-1/2	X	X	-	X	-	X	X
13	X	X	-	X	-	X	X
13-1/2	X	X	-	X	-	X	X
14	X	X	-	X	-	X	X

WIDTHS:

XN - Extra Narrow  
 N - Narrow  
 NR - Narrow Regular  
 R - Regular  
 RW - Regular Wide  
 W - Wide  
 XW - Extra Wide

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification, 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 shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the Solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

A-A-203	-	Paper, Kraft, Untreated
A-A-1249	-	Paper, Wrapping, Tissue
V-L-61	-	Laces, Nylon
V-T-295	-	Thread, Nylon

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- KK-I-570 - Insole, Footwear, Leather, Cattlehide
- TT-C-490 - Cleaning Methods for Ferrous Surfaces and pretreatments for Organic Coatings
- DDD-T-86 - Tape, Textile; Cotton, General Purpose (Unbleached, Bleached, or Dyed)
- GGG-N-350 - Nippers and Pincers
- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-F-320 - Fiberboard: Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes

## MILITARY

- MIL-L-3122 - Leather, Cattlehide, for Footwear Uppers, Chrome Tanned, Fatliquored
- MIL-L-10867 - Leather, Cattlehide, Gusset, Chrome Tanned, Fatliquored
- MIL-C-13924 - Coating, Oxide, Black, for Ferrous Metals
- MIL-L-35078 - Loads, Unit: Preparation of Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; General Specification For
- MIL-L-40051 - Leather, Cattlehide, for Glove Leather
- MIL-C-41814 - Counter, Footwear
- MIL-L-41815 - Lasts, Footwear, Combat, U.S., MIL-5
- MIL-C-43956 - Cloth, Twill, Cotton, 10.0 Ounces (339 g)

## STANDARDS

### FEDERAL

- FED-STD-311 - Leather, Methods of Sampling and Testing
- FED-STD-601 - Rubber: Sampling and Testing
- FED-STD-751 - Stitches, Seams and Stitchings

### MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-147 - Palletized Unit Loads
- MIL-STD-731 - Quality of Wood Members for Containers and Pallets

(Unless otherwise indicated, copies of Federal and Military Specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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**2.1.2 Other Government documents, drawings, and publications.**

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

**DRAWINGS****U.S. ARMY NATICK RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER**

- 2-1-1633 - Sole, Trac-Shun Design for Boots, Combat, Mildew and Water Resistant, DMS
- 2-1-1635 - Speedlacer Assembly

(Copies of drawings are available from the U.S. Army Natick Research, Development, and Engineering Center, ATTN: STRNC-EMSS, Natick, MA 01760-5014.)

**2.2 Non-Government publications.** The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the Solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the Solicitation (see 6.2).

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

- B 36 - Brass Plate, Sheet, Strip, and Rolled Bar
- D 518 - Rubber Deterioration - Surface Cracking
- D 573 - Rubber Deterioration in an Air Oven
- D 1052 - Measuring Rubber Deterioration - Cut Growth Using Ross Flexing Apparatus
- D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber
- D 1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimen)
- D 1630 - Rubber Property - Abrasion Resistance (NBS Abrader)
- D 2240 - Rubber Property - Durometer Hardness
- D 3574 - Method of Testing Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams
- E 18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103-1187.)

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

2.3 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 (see 6.3) in accordance with 4.3.

3.2 Samples. Samples, when furnished, are solely for guidance and information to the contractor (see 6.4). Variation from this Specification may appear in the sample, in which case this Specification shall take precedence. (The standard sample for leather, full grain, low gloss, Black 465, roll number 3218, is available and is applicable for shade and appearance.)

3.3 Material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this Specification.

3.3.1 Leather. All leather components shall be treated with an approved fungicide and shall meet the appropriate fungicide concentration requirements. (Test in accordance with MIL-L-1322.) All leather components shall contain one of the following fungicides: not less than 0.18 percent, nor more than 0.70 percent paranitrophenol; not less than 300 parts per million (ppm), nor more than 500 ppm of the active ingredient Diiodomethyl-p-polysulfone; or not less than 1.6 percent, not more than 3.0 percent ortho phenyl phenol preparation.

3.3.1.1 Upper leather. The upper leather shall conform to MIL-L-3122 treatment A and treatment B, with a mellow temper, except that the leather shall be full grain only, the thickness shall be as specified in 3.8.1, and the piece of leather to be used for conducting tests shall be 8 inches by 12 inches with the 12 inch dimension parallel to the backbone. A fine hair cell embossed pattern may be applied to the grain surface of the side. If embossed, the leather shall match the standard sample for fine hair cell pattern. Printed leather shall not be permitted.

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The counterpocket/backstay may be split to the specified thickness. The break for vamp and quarters shall not be more than a break pattern of 4 when examined as specified in 4.4.3. The leather shall be drum dyed black with a grain surface finish such that when scuffed it may be restored to uniformity by simple brushing or application of commercial wax polish. The finish of the tanner and boot manufacturing shall be compatible with each other to insure a low gloss level. The leather shall match the standard sample for shade, finish, and gloss (see 6.4).

3.3.1.2 Gusset-tongue leather. The gusset-tongue leather shall conform to MIL-L-10867, Treatment A with a soft temper. The color shall be Black.

3.3.1.3 Collar leather. The collar leather shall conform to Type I, Class a, Treatment A of MIL-L-40051 with the following exceptions: The thickness of the leather shall be 2.5 ounces  $\pm$  0.5 ounce, the leather shall have a maximum stiffness value of 180 degrees before soaking and 235 degrees after soaking, the stitch tearing strength shall be a minimum of 10 pounds, and the elongation requirement of not less than 25 percent at 25 pounds load shall not apply. Rupture and grain crack minimum requirements at 25 pounds shall remain applicable. Testing for fungicide concentration shall be as specified in 4.4.1.

3.3.1.4 Leather insoles. The leather insoles shall conform to Type I, tannage a or b, Class 1 of KK-I-570. The insoles shall be 7 irons in thickness and shall contain no channel area.

3.3.2 Counters. Counters shall conform to the requirements of MIL-C-41814 for Boots, combat, leather, black, DMS and conform to Government furnished patterns. Size schedule is contained in 3.8.6.2.

### 3.3.3 Fabrics.

3.3.3.1 Backseam tape. The backseam tape shall conform to Type I, Class 3, 1/2 or 17/32 inch width of DDD-T-86. The color shall be black.

3.3.3.2 Vamp lining. The vamp lining shall be cut from cotton twill cloth conforming to Class 2 of MIL-C-43956.

3.3.4 Box toe material. The box toe material shall be a laminate of 0.020  $\pm$  0.002 inch virgin ionomer resin (surlyn) sandwiched between two layers of non-woven polyester saturated with polystyrene. The total thickness shall be 0.056  $\pm$  0.005 inch. The box toes shall be cut to the pattern provided and shall be skived 3/8  $\pm$  1/8 inch wide at the breast. Testing shall be as specified in 4.4.1.

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3.3.5 Foam rubber. The foam rubber for the padded collar shall be 1/4 inch thick, chemically blown open cell sponge rubber. The foam rubber shall have a compressibility of 2 to 5 psi (defined as compression to deflect 25 percent) when tested as specified in 4.4.1.

3.3.6 Metal.

3.3.6.1 Steel shank. The steel shank shall be constructed from 19 gage,  $0.0418 \pm 0.0030$  inch cold rolled carbon steel with a hardness ranging from 47 to 54 Rockwell C scale and shaped to conform to the arch of the MIL-5 last (MIL-L-41815). The width of the shank for boot sizes 3 through 6-1/2 all widths, and 7 through 8-1/2 XN, N, NR, and R widths shall be  $5/8 \pm 1/32$  inch and for all other sizes and widths shall be  $1 \pm 1/32$  inch. The shank shall be made with two ribs for the 5/8 inch width and three ribs for the 1 inch width and overall height of each rib shall be 0.080 to 0.125 inch. Each rib shall taper off to end within  $1 \pm 1/8$  inch from the toe end and within  $1 \pm 1/8$  inch from the heel end. The 1 inch shank shall have two prongs and the 5/8 inch shank shall have one or two prongs 3/16 inch inward, and both shank widths shall have two prongs 3/32 inch long downward into the inner-sole. The steel shank shall have a zinc electro-plated coating with dull or bright finish, or a zinc coating, completely and uniformly applied to the base metal following a thorough cleansing by any method of TT-C-490. Steel shanks with black oxide coating conforming to Class 1 of MIL-C-13924 or steel shanks with zinc phosphate coating may be used in lieu of shanks with zinc coating. The shank length grading shall be as specified in Table II. Testing shall be as specified in 4.4.1.

Table II. Shank lengths

All widths boot sizes	3 to 6-1/2	7 to 8-1/2	9 to 10-1/2	11 to 12-1/2	13 to 14
Shank length, inches ( $\pm 1/32$ inch tolerance)	4-1/8	4-3/8	4-5/8	4-7/8	5-1/8

3.3.6.2 Tacks and staple wire. The heel seat lasting tacks shall be brass or steel. The brass tacks shall be cut from alloy No. 6 or No. 8 of ASTM-B 36. The side lasting staples and toe lasting staples shall be steel. Tacks shall be of sufficient length to attach the parts through which they are driven and clinch on the insole.

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3.3.6.3 Speed lace assembly. The speed lace assembly shall be of a three piece construction consisting of gloss finish nylon coated brass speedlacer, brass eyelet, and a nylon coated full tubular rivet in accordance with Drawing 2-1-1635.

3.3.6.3.1 Speed lace assembly (alternate). As an alternate, the speed lace assembly shall be of a two-piece construction consisting of nylon coated brass speed lacer and nylon coated alternate full tubular rivet in accordance with Drawing 2-1-1635.

3.3.7 Rubber compounds.

3.3.7.1 Rubber compound for sole and heel. The rubber compound for the sole and heel shall conform to the following requirements when tested as specified in 4.4.1 and 4.4.4.

a. Color. The color shall be Black non-marking producing only a slight erasable mark on white paper.

b. Abrasive index. The abrasive index shall be not less than 450 before and after aging for 70 hours at 100°C.

c. Hardness. The Shore A durometer hardness shall be  $60 \pm 5$ . After accelerated aging for 70 hours at  $100^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , the durometer hardness shall change no more than 10 points from the original.

d. Hardness and hardness change at -18°C. The hardness after 1 hour exposure in a cold chamber at -18°C shall be 80 maximum, and shall not exceed the hardness at room temperature by more than 20 points.

e. Cut growth. The cut growth after accelerated aging for 70 hours at  $100^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , shall not be greater than 200 percent after 50,000 cycles.

f. Ozone resistance. There shall be no sign of cracking after the test for ozone resistance.

g. Volume swell. The volume swell shall not be greater than 60 percent in medium #6 fuel.

h. Bond strength. The bond strength (at the ball) shall be not less than 135 pounds except that one specimen out of five tested may be below 135 pounds, but shall be not less than 120 pounds. If any specimens in the sample show clear evidence of tearing into the leather or outer-sole rubber below 135 pounds, those specimens shall be discarded and new ones selected for the test. Testing shall be as specified in 4.4.4.



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i. Polyvinyl chloride exclusion. The rubber shall contain no polyvinyl chloride (PVC).

j. Specific gravity. The specific gravity shall not be greater than 1.12.

k. Adhesion at toe. The bond strength at the toe area of the sole shall be not less than 50 pounds except that one specimen out of the five tested may be below 50 pounds, but shall be not less than 40 pounds. Any specimen that slips from the apparatus without breaking the bond may be tested an additional two times and the highest score obtained may be used as the average. Testing shall be as specified in 4.5.4.

3.3.7.2 Heel fillers. The dimensions of the heel fillers shall be as specified below.

Heel filler size (inches)

<u>Designation</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
Heel curve					
radius	9/16	11/16	13/16	15/16	1-1/16
Width	1-1/8	1-3/8	1-5/8	1-7/8	2-1/8
Length	1-3/4	2	2-1/4	2-1/2	2-3/4
Thickness	19/32	19/32	19/32	19/32	19/32
Tolerance	± 1/32	± 1/32	± 1/32	± 1/32	± 1/32

3.3.8 Thread, nylon, nonwicking. The thread shall be nylon non-wicking conforming to Type I, Class B, Size E of V-T-295. Nonwicking thread conforming to the requirements for Type II, Class B, Size E of V-T-295, which has been approved (see 6.7), may also be used. The color of the thread shall be black. Colorfastness requirements shall not apply. The maximum thread elongation for all thread shall be 32 percent.

3.3.9 Adhesives. The adhesives used for bonding the various leather and fabric components of the boots shall be of the following types:

- a. Natural rubber latex
- b. Synthetic rubber latex (including chloroprene)
- c. Natural rubber solvent cement
- d. Synthetic rubber solvent cement
- e. Synthetic resin cement
- f. Polyurethane rubber solvent cement

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3.3.10 Seam sealant. Seam sealant shall be Dow Corning 477 silicone solution diluted to a 20 to 25 percent solution using a suitable compatible solvent or equal. No detergents shall be present in the diluting solvent.

3.3.11 Finishing materials for the leather uppers. Finishing materials used shall be compatible with the leather silicone wetting agents and cause no adverse effect on water resistance of the leather or boots.

3.3.11.1 Repairers. Repairers shall be crayon or paste applied by hand. The color shall match the upper leather and give sufficient coverage to correct minor surface imperfections.

3.3.11.2 Top finish. The top finish shall be applied by either a sponge or spray and shall be of synthetic resin and wax base to even out the tannery finish, but not to cover or change its natural appearance. It shall dry to a low gloss.

3.3.12 Removable cushion insert. The removable cushion shall be a medium brown microcellular urethane foam, with an integral skin laminated to a thermo-formed cross-link polyethylene heel cup/arch support. The polyurethane cover shall have a thickness of 0.110 inch  $\pm$  10 percent, and shall include an active organic anti-microbial agent. The top cover shall be perforated. The polyurethane foam shall conform to the following properties:

<u>Properties</u>	<u>Requirements</u>
Density	17 $\pm$ 2, -1 pound per cubic foot
Tensile strength	115 pounds per square inch (min.)
Compression set	10 percent (max.)
Compression set after hydrolysis	10 percent (max.)

The size and width of each insole (*insert*) shall be legibly stamped on the bottom (foam side) of the insole (*insert*) in the shank area in number and letters not less than 5/16 inch in height. The size of the cushion (*insert*) shall be that needed to cover the last bottom of the whole boot and shall be used in such size boot and the next larger half size (size 9R insole to be used in 9R and 9-1/2R). There shall be three widths only, in Regular, Narrow, and Wide. The Narrow (N) shall be used in XN and the Wide (W) in XW. The Regular (R) shall be used in the NR and the W shall be used in the RW. The insoles (*inserts*) shall be cut in such a manner that the full contoured portion of the heel area and arch support will be included. The total thickness of the insole (*insert*) shall be 0.130 to 0.155 inch forward of the instep arch and 0.190 to 0.215 inch elsewhere (see 6.9).

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The size shall be stamped in numbers and the width in letters (see 6.9). The polyurethane foam shall conform to the following properties:

<u>Properties</u>	<u>Requirements</u>
Density	17 +2, -1 pounds/cubic foot
Tensile strength	115 psi (minimum)
Compression set	10 percent (maximum)
Compression set after hydrolysis <u>1/</u>	5 percent (maximum)

1/ Less than 5% after 5 hours exposure to saturated steam at 15 psi.

3.3.13 Laces. The laces shall conform to Type III, Class 1 of V-L-61. The color of the laces shall be Black. The length of the laces shall be a minimum of 72 inches for sizes 3 through 6-1/2, 87 inches for size 7 through 11, and 97 inches for sizes 11-1/2 through 14.

3.4 Design. The design shall consist of a partial speed lace closure system with grain out leather upper, plain toe, cloth lined vamp, polystyrene coated surlyn box toe, one-piece leather counterpocket/backstay, inside padded collar and direct molded sole and heel. (See Figure 1.) The sole and heel design shall conform to Drawing 2-1-1633. Sole thickness shall be as specified on the drawing and shall match within 1/16 inch between the left and right boots.

3.5 Patterns and dies. The height of the finished boot, measured upward on the outside from tread area at breast of heel to top of boot, shall be  $10\frac{7}{8} + \frac{1}{4}$  inches on size 9-R and shall graduate up and down between sizes and widths as indicated by patterns. A standard set of paper patterns and markers will be loaned by the Government as a basis from which the contractor's dies and patterns shall be made. The patterns and contractor's cutting dies and patterns shall consist of the component parts specified in Table III. The contractor shall include "width out" nicks on all cutting dies. The government patterns shall be followed except for lasting allowance, which shall be determined by the contractor to provide a minimum of 1/2 inch lasting allowance.

3.5.1 Stitched uppers. The stitched uppers may be sized up or down 1/2 size over/under the last size to accommodate variations in leather temper and maintain proper lasting margins. The boots shall have their size markings adjusted accordingly.

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TABLE III. Contractor's dies and patterns

Parts	
Vamp <u>1/</u>	Whole and half sizes, all widths
Quarter	Whole and half sizes, all widths
Counter	Eight sizes, all widths
Counterpocket/ backstay (one piece)	Whole and half sizes, all widths
Gusset tongue	Whole and half sizes, all widths
Vamp lining <u>1/</u>	Whole sizes, all widths
Insole	Whole and half sizes, all widths
Collar leather <u>2/</u>	Two sizes, one width
Collar filler (foam) <u>2/ 3/</u>	Two sizes, one width
Box toe	Four sizes, all widths

1/ Half size grading is permitted.

2/ Whole size grading is permitted.

3/ A plus or minus 1/16 inch tolerance for width of collar filler is acceptable.

3.6 Lasts and markers. The boots shall be lasted on the MIL-5 last conforming to MIL-L-41815. All necessary sizes will be loaned to the contractor by the Government. A marker set consisting of all parts for the boots, in whole and half sizes, all widths, will be loaned to the contractor by the Government. As an alternate, the contractor may use quarter line marking for vamp stitch row and speed lace positioning.

3.7 Molds. The molds shall be made so as to produce a TRAC-SHUN outsole and heel conforming to Drawing 2-1-1633.

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**3.8 Construction.**

**3.8.1 Cutting uppers.** The uppers shall be cut from grain out leather. The leather shall conform to the thickness specified in Table IV. Except for the one piece counterpocket/backstay, none of the upper parts shall be split or shaved. No parts cut off stretch shall be accepted. Vamps shall be cut from the bend area of the side leather.

**TABLE IV. Thickness of upper leather**

Part	Thickness ounces	
	Minimum	Maximum
Vamp	5	6
Quarter	4-1/2	6
Counterpocket/backstay (one piece)	4	6
Gusset	2-3/4	3-1/2

**3.8.1.1 Replacement of defective components.** During the spreading, cutting, and manufacturing process, components having material defects or damages that are classified as defects in 4.4.2.2, 4.4.2.3, 4.4.2.4, and 4.4.3; shall be removed from production and replaced with non-defective and properly matched components.

**3.8.1.2 Skiving.** The skiving of upper leather parts shall conform to the requirements specified in Table V.

**TABLE V. Skiving requirements**

Part	Side	Location	Scarf width (inches)	Scarf edge thickness, millimeters ± 0.3 mm
Quarter	Flesh	Lasting edge 1/	5/8 ± 1/8	1.5
Quarter	Flesh	Vamp margin 1/	3/16 ± 1/32	1.5
Vamp	Flesh	Throat & Wings	3/16 ± 1/32	1.2

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TABLE V. Skiving requirements (continued)

Part	Side	Location	Scarf width (inches)	Scarf edge thickness, millimeters ± 0.3 mm
Vamp	Flesh	Toe <u>1</u> /	$3/4 \pm 1/8$	1.5
Counter- pocket/ backstay	Flesh	Lasting <u>1</u> / <u>2</u> /	$5/8 \pm 1/8$	1.5
Counter- pocket/ backstay	Flesh	Stitch	$3/16 \pm 1/32$	1.3
Counter- pocket/ backstay	Flesh	Top edge	$5/8 \pm 1/8$	1.5

1/ Skiving of the lasting edge of the counterpocket/backstay, toe vamp, quarter and quarter vamp margin is optional.

2/ When the one-piece counterpocket/backstay is 4 to 5 ounces thick, the skiving of the lasting counterpocket/backstay edge and stitch edge of the one piece counterpocket/backstay shall not apply.

3.8.2 Vamp crimping. The vamps may be crimped, if necessary to insure tight lasting.

3.8.3 Marking.

3.8.3.1 Marking, permanent identification. The inside quarter of each boot shall be marked on the grain side with the correct size and width, the contractor identification symbol, and the month and year (expressed numerically) of the date of contract. This marking shall be impressed into the grain side of the leather in such a manner as to be permanently visible without cutting through at any point, and shall be placed approximately in the center of the inside quarter, and between collar stitching, except that for sizes 3 and 3-1/2 all widths, the grain side of the tongue instead of the quarter may be marked not less than 3/4 inch and not more than 1 inch from the top center of the tongue. Figures shall be Arabic and letters Gothic. The figures and letters shall be a minimum of 9/32 inch and a maximum of 3/8 inch in height. The contractor's symbol shall be in a block as shown by the following example: 10W/AB/6-86. The outersole shall be marked as shown on Drawing 2-1-1633.

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3.8.3.2 Instruction tags. Instruction tags, to be tied to the finished boots shall be printed using the data specified below. The tags shall be printed 5-1/4 by 6-1/2 inch tag stock folded in the middle to form four 5-1/4 by 3-1/4 inch printed pages in book form. The back page shall contain 4-step lacing instructions for the speed laces in accordance with Figure 2. A punch hole shall be made in the top near the folded edge for insertion of the lace.

INSTRUCTION TAG  
BOOTS, COMBAT, MILDEW AND WATER RESISTANT,  
DIRECT MOLDED SOLE  
INSTRUCTIONS FOR USE

1. Wear with: 1 pair of socks, wool, cushion sole.  
1 pair of insoles.
2. Sizes. The boots are supplied in whole and half sizes 3 through 14 and widths: XN, N, NR, R, RW, W, and XW; except for XN width in sizes 3 through 4-1/2 and NR and RW widths in sizes above 8. In some instances it may be necessary to select a slightly larger size than normally worn in order to allow for normal swelling of the feet and the use of insoles.
3. Pull on boots, seating heel firmly into place, then lace. Boots should fit snugly, but not tightly. There should be approximately 1/2 inch additional length at toe.
4. Trouser should be worn outside the boots.
5. Carry extra socks. Change socks often, at least once daily. Remove boots and dry feet as often as possible. Neglect of feet can make you a casualty.
6. To clean insoles, remove and wash in warm (not boiling) soapy water. Shake-out excess water and dry.
7. Brush mud and excessive dust off boots. To prevent leather from getting hard and stiff, wax often with shoe polish containing silicone.
8. Wipe inside of boots occasionally with a moist soapy rag and let dry.
9. Dry boots and insoles in the sun or indoors at room temperature. do not place near intense heat as this will damage the boots.
10. Before putting on boots in snake, insect, scorpion, or spider infested areas, carefully inspect the inside of the boots.

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**3.8.4 Upper leather fitting.** Line marking patterns shall be used for all upper fitting. Inserts in cutting dies for stitch line impression or die stab marking will not be allowed. Needles used for all fitting shall be no larger than size 18 (see 6.6), except for automatic vamping (see 3.8.4.6). Quarters shall be closed at the back using stitch type 304, 404, or 503 of FED-STD-751. The back seam shall be closed with the stitching closely positioned to the edge of the quarters on the grain side. The quarters shall then be rubbed open so that the quarters butt rather than lap and the seam is reinforced on the flesh side with back seam tape using stitch type 301. All other upper stitching shall be done using stitch type 301. All upper stitching shall be 8 to 10 stitches per inch.

**3.8.4.1 One-piece counterpocket/backstay fitting.** The one-piece counterpocket/backstay shall be stitched to quarters with two rows of stitching spaced  $1/16$  to  $1/8$  inch between rows on the side edges with the first row of stitching spaced  $1/16 \pm 1/32$  inch from the edge to the top of the boot. The counterpocket/backstay shall be reinforced with two additional inside rows of stitching around the counterpocket and extending to the backstay in conformance with the curvature of the backstay area as indicated by the marker patterns. The inside rows of stitching shall be spaced  $1/16$  to  $1/8$  inch between rows. The use of single or double needle machine is permitted.

**3.8.4.2 Gusset tongue fitting.** The gusset tongue shall be stitched to the vamp grain side out, with two rows of stitching. One row not more than  $1/8$  inch from the edge of the tongue and a second row placed not more than  $5/32$  inch from the edge of the vamp. Both of these rows to include stitching through the vamp lining. The tongue shall be stitched to the quarter eyerow and trimmed flush to  $1/8$  inch undertrim.

**3.8.4.3 Attaching speed lace assembly and eyeletting.** On each quarter, there shall be two nylon coated double A eyelets for all sizes spaced evenly from blucher nose to the first speed lace loop and centered between the eyerow stitching. The edge of each eyelet shall be  $3/16$  to  $5/16$  inch from the edge of the quarter. The speed lace loops shall be equally spaced on each quarter, five on sizes 3 through  $6-1/2$ , six on sizes 7 through  $9-1/2$ , and seven on sizes 10 through 14. The speed lace loops shall be placed perpendicular to each other, and shall be securely riveted  $1/4 \pm 1/32$  inch from the center of the rivet to the edge of the quarter.

**3.8.4.3.1 Lacing for lasting.** The machine lasting or hand inserted clip(s) for lasting shall provide for an opening, after lasting, of  $1-3/8 \pm 1/8$  inch. The quarter shall be laced or clipped in the two lower pairs of eyelets.



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3.8.4.4 Foam padding and collar fitting. The collar cover shall be stitched flush out even with the top edge of the quarter with one row of stitching  $1/16$  inch from the edge. The foam rubber padding shall be cemented flush to the top edge of the quarter, placed so that it extends to the second eyerow stitching on each side of the gusset. The collar shall be turned over the padding and stitched with one row not more than  $1/4$  inch from the edge and this stitching shall be extended to secure the end of the collar  $1/8$  inch from the edge of the eyerow stitching and end with a two-stitch backtack at the eyerow edge at both ends of the collar. Excess collar leather shall be cut off flush to the eyerow edges.

3.8.4.5 Seam daubing. All upper stitching lying below the first speed lace loop from the bottom of the boot shall be daubed on the outside with the seam sealant liberally applied for full saturation. After air drying for a minimum of 1 hour, a second coating of the solution shall be applied in the same manner.

3.8.4.6 Vamping, barring. Vamping shall be done with two rows of stitching,  $1/16 \pm 1/32$  inch from the vamp-wing edge, plus two rows of stitching  $1/16 \pm 1/32$  inch from the quarter edge. Spacing between the two double rows shall be  $5/32$  to  $1/4$  inch. The vamp lap shall extend beyond the second two space rows, but not more than  $3/16$  inch. The bar row shall be placed above and parallel to the two rows of vamping. The vamp bar shall consist of two rows and shall be  $5/8 \pm 1/16$  inch long on each blucher ear. The barring shall be done by single or double needle, or by the automatic method with tying or locking ends. As an alternate, when an automatic stitching machine is used for vamping, a size 20 needle may be used.

3.8.5 Insoles. The insoles shall be sorted and cased for even weight. Insoles shall be fleshed and buffed on the flesh side. A tolerance of  $+ 0, - 1/16$  inch from Government loaned insole patterns will be allowed around the periphery of the insole.

3.8.6 Lasting. Uppers may be conditioned by any suitable means except dipping in water. Insoles of the correct size and width shall be tacked to the last with four tacks. One of the four tacks shall be in the center of heel seat, one at shank, one in the ball, and one at the toe. Staples in lieu of tacks may be used for attaching the insole to the last. Care shall be taken that the edge of the insole is flush with or not more than  $1/16$  inch from the last bottom edge at all points and does not extend beyond the last at any point. The counters shall be assembled in accordance with size schedule (see 3.8.6.2) so that they will fill the counterpockets. The counter shall be seated to the insole and anchored with one or two tacks near the back end of the counter flange. The tack shall be driven through the counterpocket and insole and clinched against the heel seat plate. Steel tacks may be used for lasting operations. Counters shall be

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well cemented on both sides within 1/2 inch from counter flange. The counter shall be turned over the last at the bottom  $1/2 \pm 1/16$  inch. The correct size of box toe specified in 3.3.4 shall be conditioned and inserted between the vamp lining and vamp. A light coating of latex adhesive specified in 3.3.9 shall be applied between the vamp and vamp lining rearward of the box toe. When cementing vamp lining to vamp, a concave surface simulating the last instep cone surface shall be used. Prior to toe lasting, the box toes shall be heat conditioned with a steam or dry heat until box toe is in temper for toe lasting. Uppers of the correct size and width shall be assembled to the lasts in a manner to provide for a wiped-in-heel seat of not less than 7/16 inch, nor more than 3/4 inch. Uppers shall be drawn with care over the lasts with proper tension on the pulling-over machine to assure that the quarters at the blucher points and the vamps are down to the last, and that the blucher noses are even. Care shall be taken that the vamp lining is pulled smooth and tight without any tears. The heel seat shall be wiped-in, tacked and shall be flat and free from wrinkles. The toe shall be firmly and smoothly wiped-in and securely attached by staples. The sides shall be cemented before or in conjunction with side lasting and stapled on a side stapling machine. The staples shall be adjusted and spaced to securely hold the upper in place through the vulcanization operation.

**3.8.6.1 Time allowance on last.** The boots shall remain on the last for 24 hours to thoroughly dry the counters and uppers. As an alternate, the use of a heat setting machine may be used to thoroughly dry the counters and uppers. (The heat setting time to be approved by the contracting officer.)

**3.8.6.2 Counter size schedule.** The counter size schedule shall be as follows:

TABLE VI. Counter size

Size	XN	N	NR	R	RW	W	XW
1	--	3-3-1/2	--	--	--	--	--
2	5-6-1/2	4-5-1/2	3-4-1/2	3-4-1/2	3-4-1/2	3-4-1/2	3-3-1/2
3	7-8-1/2	6-7-1/2	5-6-1/2	5-6-1/2	5-6-1/2	5-6-1/2	4-5-1/2
4	9-10-1/2	8-9-1/2	7-8	7-8-1/2	7-8	7-8-1/2	6-7-1/2
5	11-12-1/2	10-11-1/2	--	9-10-1/2	--	9-10-1/2	8-9-1/2
6	13-14	12-13-1/2	--	11-12-1/2	--	11-12-1/2	10-11-1/2
7	--	14	--	13-14	--	13-14	12-13-1/2
8	--	--	--	--	--	--	14

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3.8.7 Tack and staple pulling. All insole tacks and staples shall be removed with care taken that no broken tack points remain.

3.8.8 Preparation of bottom. The bottom shall be prepared in accordance with the procedures detailed in 3.8.8.1 or 3.8.8.2.

3.8.8.1 Roughing. The edges of the lasted uppers shall be roughed with a cylindrical steel brush,  $6.25 \pm 0.25$  inches in diameter and 1 or 2 inches in width, revolving at a speed of  $2500 \pm 400$  revolution per minute. The bristles shall have a diameter of  $0.015 \pm 0.003$  in. ch. As an alternate, the bottom roughing may be performed with an automatic roughing machine or other suitable automatic roughing equipment. The first stage shall rough the outer edge (featherline) to the extent that the roughed surface will mold to the nip line of the outersole mold, but will not be evident above the nip line. The second stage shall rough the remainder of the overlay in such a way as to remove the grain and leave the fibers rough. Wheel roughing prior to wire brush roughing may be performed. Care shall be taken not to rough through the overlay. All loose particles of dust shall be completely removed from the roughed bottom with the use of a stiff bristle brush or compressed air.

3.8.8.2 Skiving and roughing. As an alternate to the procedure detailed in 3.8.8.1, the lasted grain side overlay portion of the quarters and counterpocket/backstay shall be skived in a sufficient width to assure the skived surface will mold to the nip line of the outersole mold, but will not be evident above the nip line. The scarf edge thickness shall be  $1.5 \pm 0.3$  mm. The entire skived edges, except the area where the stitches overlay the insole, shall be roughed in accordance with 3.8.8.1. The overlay portion of the vamp area shall be roughed in accordance with 3.8.8.1.

NOTE: When this alternate method is used, the skiving of the flesh side of the quarters and counterpocket/backstay shall not be permitted.

3.8.9 Bottom adhesion.

3.8.9.1 Application of adhesive. A liberal amount of adhesive as specified in 3.3.9 shall be applied with a hand brush to the roughed area and to the exposed part of the insole. After allowing the adhesive to dry for a minimum of 15 minutes, a second coat of the same adhesive shall be applied to the same roughed area and allowed to dry for a minimum of 40 minutes.

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3.8.9.2 Rubber interface. An optional, black, rubber interface of nitrile rubber-based composition of the same color as the outer sole compound specified in 3.3.7.1a may be inserted prior to outsole molding. This interface shall have a maximum thickness of 1/8 inch and shall cover the entire roughed area of the bottom of the boot from the forward end of the shank to the toe.

3.8.10 Relasting for vulcanization. The boots shall be relasted using proper size and width metal lasts on the direct molded machine. The proper proper size steel shank shall be attached while the boot is on the metal last, with the forward end of the shank approximately 1-1/8 inches rearward of the ball line.

3.8.11 Use of mold release. Coating of the exposed portions of the metal mold with release compound shall be permitted as required.

3.8.12 Molding method. The outersole rubber shall consist of one or more pieces cut or extruded, so as to blend together during the molding cycle into a finished sole of the specified dimensions. The heel filler shall be securely keyed to the steel shank, allowing a minimum margin of 5/8 inch between the periphery of the heel filler and the outer perimeter of the lasted upper.

3.8.12.1 Molding conditions. The molding equipment shall be operated so as to exert a minimum pressure of 250 pounds per square inch (psi) on the compound. The sole mold and side mold shall be heated to a temperature not to exceed 375°F, except the side mold is not to exceed 300°F in the box toe area. The dwell time at these temperatures during vulcanizing shall be between 12 and 15 minutes. The boots shall be molded with the use of metal lasts which shall conform to the measurements contained in MIL-L-41815. The heel fillers shall be as specified in 3.3.7.2 in five sizes (A, B, C, D, and E) and shall be applied to the boots in accordance with the Schedule in Table III.

TABLE VII. Heel filler size schedule

Boot size	Boot width						
	XN	N	NR	R	RW	W	XW
3, 3-1/2, 4, 4-1/2	-	A	A	A	A	A	A
5, 5-1/2, 6, 6-1/2	A	A	A	A	A	A	A
7, 7-1/2, 8, 8-1/2, 9, 9-1/2	B	B	B	B	B	B	B
10, 10-1/2, 11, 11-1/2, 12, 12-1/2	C	C	-	C	-	C	C
13, 13-1/2, 14	D	D	-	D	-	D	D

As a alternative, the heel fillers may be used one size up in all widths.

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3.8.13 Heel and edge scouring. The heel and sole edge shall be made smooth and uniform and any flash edge of the sole shall be removed by scouring. The sandpaper or carbide wheel used for final scouring shall not be coarser than 46 grit. Care should be taken so that edge extension is not reduced less than the measurements specified on Drawing 2-1-1633. The use of a knife for trimming spew is prohibited at the upper leather edge.

3.8.14 Tacks, nails, or staples. Tacks, nails, or staples, that have been left protruding through or around the insole and cannot be pulled out, shall be cut close to the surface and shall leave no protruding stumps.

3.8.15 Upper finishing.

3.8.15.1 Preparation. The boots shall be cleaned by removing accumulated dirt including wax or cement, and the surface of the leather shall be conditioned to receive further application of the finish. All thread ends shall be trimmed. Any grub or tick damage, scars/scratches, brands or bony leather, fat wrinkles, flanky leather, coarse grain or veins, etc.; that appreciably affects appearance/serviceability. (\*) Asterisk defect.

3.8.15.2 Treeing. All wrinkles shall be removed. No material shall be used that may injure the leather or thread.

3.8.15.3 Final finish. The boots shall be repaired and filled. All raw edges, including vamp line, counterpocket/backstay, and top and front edges shall be stained to match the upper leather. Materials and methods shall be as specified in 3.3.

3.8.15.4 Material and method. Fillers where used, shall be capable of providing a suitable foundation for the application of the top finish and shall be applied by sponge or spray method.

3.8.16 Pairing and lacing. The boots shall be paired. A lace shall be inserted through the top speed lace loop of the outside quarter of each boot, and the two laces for each pair shall be tied firmly together.

3.8.17 Inserting removable cushion insert. A removable cushion insert as specified in 3.3.12 shall be inserted in each boot.

3.8.18 Instruction tag. One instruction tag containing the information specified in 3.8.3.2 shall be attached to each pair of boots.

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

a. When thread breaks or bobbin run-outs occur during stitching, the stitching shall be repaired by restarting the stitching, one stitch in back of the end of the stitching.

b. Thread breaks or two or more consecutive skipped stitches noted during inspection of the item (in-process or end item) shall be repaired by over-stitching. The stitching shall start one stitch in back of the defective area, and continue one stitch beyond the defective area onto the existing stitching.

c. Vamp or counterpocket/backstay stitching damaged or missing at the junction of the outersole shall be repaired with a minimum of two stitches. Applicable to each row of defective stitching, the first stitch shall be a maximum of 1/4 inch from the junction of the outersole.

NOTE: In lieu of repairing each row of stitching individually, the four rows of stitching in the vamp or counterpocket/backstay may be repaired in one operation by stitching across the rows of stitching. Location of stitching shall be as specified above and shall start and end within the rows of stitching. Each group of vamping and counterpocket/backstay stitching on a quarter shall be repaired separately.

3.9 Leakage. The finished boots shall be tested for leakage as specified in 4.4.4.

3.10 Workmanship. The end item shall conform to the quality of product established by this Specification and the occurrence of defects shall not exceed the applicable acceptable quality levels.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this Specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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**4.1.1 Responsibility for compliance.** All items shall meet all requirements of Section 3 and 5. The inspection set forth in this Specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the Specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

**4.1.2 Responsibility for dimensional requirements.** Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point, or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

**4.1.3 Certificate of compliance.** Where certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certificate.

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

**4.3 First article inspection.** When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.3 and shall be tested for the characteristics specified in 4.4.4.

**4.4 Quality conformance inspection.** Unless otherwise specified, sampling for inspection shall be in accordance with MIL-STD-105.

**4.4.1 Component and material inspection.** In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents; unless, otherwise excluded, amended, modified, or qualified in this Specification or applicable purchase document. In addition, testing shall be performed on components and materials listed in Table VI. When the data in the "Number of determinations per sample unit" and "Results reported as"



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columns are not specified in Table VI, they shall be as required by the referenced test methods. A rubber compound lot shall consist of the amount of outersole and heel rubber compound that is produced or compounded in one day. A representative composite test sample of the lot of rubber shall be vulcanized by using a 10 minute cure at 310°F and the composite sample shall be as follows:

- a. Two pieces, 6 by 6 by 0.070  $\pm$  0.010 inches
- b. Two pieces, 6 by 6 by 0.250  $\pm$  0.010 inches

All test reports shall contain the individual values utilized in expressing the final result. The lot shall be unacceptable if one or more sample units or the composite sample fails to meet any requirement specified except for abrasive index. For abrasive index, all composite samples from the rubber compound lots making-up the boot lot shall be tested. If the average of all composite samples fails the abrasive index, the boot lot shall be rejected. The sample size shall be as follows:

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

TABLE VIII. Component Tests

Component and lot size(s) expressed in terms of:	Characteristic	Requirement paragraph	Test method	Requirement Applicable to:		Number of determinations per: Sample Unit *	Results: Pass or Fail (# numerically nearest)
				Sample Unit	Composite		
Collar leather	fungicide	3.3.1.3	<u>1/</u>		X	-	-
Box toes (1 box toe)	Material identification	3.3.4	<u>2/</u>			-	-
	Thickness	3.3.4	<u>2/</u>			-	-
	Skiving	3.3.4	<u>2/</u>			-	-



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TABLE VIII. Component Tests (continued)

Component and lot size(s) expressed in terms of:	Characteristic	Requirement paragraph	Test method	Requirement Applicable to:		Number of determinations per: Sample Unit *	Results: Pass or Fail (# numerically nearest)
				Sample Unit	Composite		
Foam Rubber	Material identification	3.3.5	<u>2/</u>			-	-
	Thickness	3.3.5	<u>2/</u>				
	Compressibility	3.3.5	D-1056 <u>2/ 3/</u>			-	-
Tacks and Staple Wire	Material identification	3.3.6.2	<u>2/</u>				
Speed lace loops & rivets	Material identification	3.3.6.3	<u>2/</u>				
Steel Shank (1 pair)	Material identification	3.3.6.1	<u>2/</u>			-	-
	Thickness	3.3.6.1	<u>2/</u>			-	-
	Hardness (Rockwell C Scale)	3.3.6.1	E-18 <u>3/</u>	X		1	Hardness number
	Height, steel rib	3.3.6.1	Visual micro-meter-	X		* Sample Unit is: 2 shanks	
	Length and Width	3.3.6.1	<u>2/</u>	X		1	X
	Coating identification	3.3.6.1	<u>2/</u>				
	Finish	3.3.6.1	<u>2/</u>				

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TABLE VIII. Component Tests (continued)

Component and lot size(s) expressed in terms of:	Characteristic	Requirement paragraph	Test method	Requirement Applicable to:		Number of determinations per: Sample Unit *	Results: Pass or Fail (# numerically nearest)
				Sample Unit	Composite		
Outersole rubber compound (lot)	Abrasive index (before & after aging)	3.3.7.1 (b.)	D-1630		X	3	Whole number
	Hardness (before & after aging)	3.3.7.1 (c.)	D-2240 <u>3/ 4/</u>		X	5	Whole number
	Hardness & hardness change at -18°C	3.3.7.1 (d.)	4.5.2		X	1	Whole number
	Cut growth (after aging)	3.3.7.1 (e.)	D-1052 <u>3/ 4/</u>		X	2	One Percent
	Ozone resistance	3.3.7.1 (f.)	4.5.3 <u>2/</u>	-	-	-	-
	Volume swell	3.3.7.1 (g.)	6001 & 6211 <u>5/</u>	-	X	3	One Percent
	Polyvinyl chloride exclusion	3.3.7.1 (i.)	<u>6/</u>				
Adhesive	Material identification	3.3.9	<u>2/</u>				
Seam sealant	Material identification	3.3.10	<u>2/</u>				

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TABLE VIII. Component Tests (continued)

Component and lot size(s) expressed in terms of:	Characteristic	Requirement paragraph	Test method	Requirement Applicable to:		Number of determinations per: Sample Unit *	Results: Pass or Fail (# numerically nearest)
				Sample Unit	Composite		
Finishing materials	Compatibility	3.3.11	<u>2/</u>				
Removable cushion insert (one pair)	Material identification Thickness Density  Tensile strength  Compression set  Compression set after hydrolysis	3.3.12.1 3.3.12.1 3.3.12.1  3.3.12.1  3.3.12.1  3.3.12.1	<u>2/</u> <u>2/</u> D-3574 Test A <u>2/ 3/</u>  D-3574 Test E <u>2/ 3/</u>  D-3574 Test D <u>2/ 3/</u>  D-3574 Test D <u>2/ 3/</u>				
Heel filler	Radius Width Length	3.3.7.2 3.3.7.2 3.3.7.2	Gage Gage Gage	X X X	- - -	2 2 2	Two (2) fillers of each size in the lot.
Heel filler	Thickness Heel curve	3.3.7.2	Gage	X	-	2	

1/ Refers to FED-STD-311.

2/ Unless otherwise specified, a certificate of compliance shall be submitted and will be acceptable for the stated requirements.

3/ Refers to ASTM Standard.

4/ Aging shall be at a temperature of  $100 \pm 1^{\circ}\text{C}$  for 70 hours in accordance with the ASTM D-573 procedure for accelerated aging. The abrasive paper to be obtained from the Carborundum Company shall be G40E155F or equal.

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5/ Refers to FED-STD-601.

6/ The contractor shall submit a certificate of compliance indicating that the outersole and heel do not contain polyvinyl chloride (PVC).

7/ Test in accordance with MIL-L-3122.

4.4.2 In-process inspection. Inspection shall be made at any point or during any phase of manufacturing to determine whether operations 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 nonconformance. In addition, the contractor shall furnish a certificate of compliance for the application of adhesive in 3.8.9.1 and the rubber interface in 3.8.9.2 (when used), and for the outersole molding as specified in 3.8.12 for pressure, heat, and dwell time.

4.4.2.1 Mold approval. During the molding operation and prior to the formation of the initial inspection lot, one boot, shall be randomly selected from the production of each new mold and determination shall be made whether the outersole conforms to the measurements specified in Drawing 2-1-1633. If the soles and heels are found to be in conformance, the molds from which they were made shall be approved. If the measurements are found to be nonconforming, an additional five outsoles and heels produced from those molds shall be measured for conformance to the above drawings and if all outer-soles and heels conform to the measurements. The molds shall be approved. If all molds used in the processing of the initial inspection lot have been approved, testing of the finished boots for conformance to outersole and heel measurements shall not be required, except for the sole and heel thickness which shall be in accordance with the drawings. When new molds are added, or when molds are repaired, mold approval must be obtained as described previously.

4.4.2.1.1 Identification marking of approved molds. Each mold shall have an inscribed identifying number. The location of the number shall be as shown on Drawing 2-1-1633. The mold identification numbering shall be consecutive, beginning with number "1". The height of the numbers shall be not more than 1/8 inch.

4.4.2.2 In-process examination of uppers after all fitting. The upper assemblies shall be examined for the defects listed below. The lot size shall be expressed in units of upper assemblies prepared for lasting. The sample unit shall be one completely fabricated upper assembly prepared for lasting. The inspection level shall be II, and the Acceptable Quality Level (AQL), expressed in terms of defects per hundred units, shall be 1.0 for major defects and 4.0 for total (combined major and minor) defects.

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Examine	Defect	Classification	
		Major	Minor
Construction and workmanship (general)	Any component missing or not specified type	101	
	Any component misplaced or not affixed as specified <u>1/</u>	102	201
	Vamp stitched more than 5/32 inch from edge at throat	103	
	Vamp stitched more than 3/32 inch from edge at throat, but not more than 5/32 inch.		202
	Vamp throat or wings not skived	104	
	Counterpocket/backstay or quarter not skived as specified		203
	Backseam not rubber down		204
Quality of leather	Thickness more than 1/2 ounce less than minimum specified	105	
	Thickness less than specified minimum, but not exceeding 1/2 ounce less		205
	Thickness more than maximum specified		206
	Rough fiber on flesh side <u>1/</u>	106	207
	Off-stretch cut	107	
	Slaughter cut <u>1/</u>	108	208

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

4.4.2.3 In-process examination of vamps. Prior to fitting, every cut vamp shall be examined for the defects listed below. Any vamp containing one or more defects shall be rejected.

- Scratch or scar
- Slaughter cut
- Flesh cut penetrating through the grain surface
- Damaged grain surface
- Brand
- Belly cuts
- Flanky, pipey, loose, cracked, or any rough or coarse grain
- Cluster of veins, split veins, or pronounced veins

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**4.4.2.4 In-process examination of boot before last pulling.**

The partially facricated boots shall be examined for the defects listed below. The lot size shall be expressed in units of partially fabricated boots. The sample unit shall be one partially constructed boot assembled to the point just prior to pulling off the MIL-5 last. The inspection level shall be II, and the AQL, expressed in terms of defects per hundred units, shall be 1.0 for major defects and 4.0 for total (combined major and minor) defects.

Examine	Defect	Classification	
		Major	Minor
Bottom of boot	Any component missing or not specified type	101	
	Upper damaged <u>1/</u>	102	201
	Insole not scoured on the flesh side as required	103	
	Poor heel seat, side, or toe lasting <u>1/</u>	104	202
	Insole tack not removed	105	
Upper part of boot	Uppers not firmly pulled down to last <u>1/</u>	106	203
	Lace openings less than 1-1/4 inches or more than 1-1/2 inches	107	
	Quarter not laced as specified		204
	Less than 1/2 inch of upper lasted over insole, except heel seat upper less than 7/16 inch or more than 3/4 inch	108	
	Upper in lasted area not sufficiently roughed or cleaned after roughing	109	
	Excessive roughing or scouring <u>1/</u>	110	205

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

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4.4.3 End item visual examination. The end items shall be examined for the defects listed below. The lot size shall be expressed in units of boots. The sample unit shall be one completely fabricated boot and the selection shall be by pairs. The inspection level shall be II, and the AQL, expressed in terms of defects per hundred units, shall be 1.0 for major defects. The inspector shall check to see that insoles are inserted in the boots. For the pairing examination, and when determining possible differences in outersole thickness, the pair shall be examined together. During the inspection for the defects listed within the "End item visual examination." Defect Table, the minor defects or departures from specification requirements listed in the table shall be observed and recorded. Presents of these departures shall not result in the rejection of the lot, but the plant quality assurance and the government personnel reserves the right to establish and impose lot rejection criteria when either the frequency or severity of the presences of these departures warrant. This additional rejection criteria may be invoked at any time during the life of the contract when the government judges this action to be in their best interest. Defects of pairing shall be classified as a single defect. The vamp and inside and outside quarters of each boot shall be examined for break of leather in accordance with the procedures outlined below:

a. To examine the vamp, the boot shall be held in an upright position with both hands. The toe of the boot shall face away from the examiner. Position thumbs on top of vamp approximately halfway between box toe line and blucher noses and 1 inch to 1-1/2 inches apart. Press downward with thumbs in order to form grain surface into a concave surface and observe the break pattern. Any vamp exhibiting a break pattern at any location comparable to a break pattern represented by numbers 5 through 8 on the Satra scale (see 6.5) shall be scored as a defect. The defect shall be scored regardless of the direction in which the break pattern appears.

b. To examine the quarters, the index finger and the second finger held in a "V" position shall be placed against the inside of the quarter, between the fourth and sixth opened laced loops from top of quarter. The thumb shall be placed on the outside of the quarter over the fifth loop. Pressure shall be applied to the quarter with the thumb and fingers so as to impact a break pattern to the leather. The break pattern of the quarter shall be observed and compared with the break patterns of the Satra scale. Any quarter exhibiting a break pattern comparable to a break pattern represented by numbers 6 through 8 on the Satra scale shall be scored as a defect. The following note regarding defects visible at a distance of 3 feet is not applicable to examination of the break pattern.

NOTE: Appearance defects shall be scored only when the condition is plainly visible at a distance of 3 feet or more.

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4.4.3 End item visual examination.

Examine	Defect	Classification	
		Major	Departure
Pairing	Not properly mated (i.e., not right and left of same size)	101	
	Variation in color, luster, or appearance <u>1/</u>	102	201
	Variation of more than 1/4 inch in height of pair	103	
	Box toe crooked, long, or short <u>1/</u>	104	202
	Difference in outersole thickness between left and right boots:		
	- more than 3/32 inch	105	
	- more than 1/16 inch, but not more than 3/32 inch		203
Cleanness	Any non-removable spot, stain, or foreign matter affecting appearance		204
Color and finish	Color not within the specified range of color (*).	106	
	Finish streaky, chipped, or flaky on upper		205
	Any raw edges not stained to match upper leather		206
Design, type, and style Upper leather	Not as specified	107	
	Not full grain	108	
	Leather snuffed (i.e., fiber structure damaged)	109	
	Any grub or tick damage, scratches, brands, or boney leather <u>1/</u>	110	207
	Fat wrinkles or veins <u>1/</u>	111	208
	Stretchy vamp	112	
Gusset-tongue leather	Flanky	113	
	Loose flesh, boney, or boardy <u>1/</u>	114	209
Collar leather	Scratch, vein, or other imperfections <u>1/</u>	115	210



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4.4.3 End item visual examination. (continued)

Examine	Defect	Classification	
		Major	Departure
Break pattern of vamps and quarters	Break pattern comparable to break pattern represented by numbers 5 through 8 for the vamps and 6 through 8 for the quarters; on Satra break scale	116	

NOTE: Leather exhibiting a break pattern comparable to the numbers indicated above is considered to be loose, pipey, or flanky. The break pattern shall be determined in accordance with 4.4.3.

## Construction and workmanship (general)

Any cut, tear, hole, repair, or factory damage <u>1/</u>	117	211
Wrinkled or bunched area at the back seam <u>1/</u>	118	212
Any component or assembly omitted or misplaced, operation omitted or not properly performed (unless otherwise classified herein) <u>1/</u>	119	213
Loose leather fibers along cut edge of quarter vamp line or counterpocket/backstay		214

## Seams and stitching (upper)

Open seam not repaired	120	
Repair of open seam not as specified		215

NOTE: A seam shall be classified as open when one or more stitched joining a seam are broken or when two or more consecutive skipped or run-off stitches occur. On multiple stitched seams, a seam is considered open when either one or both sides of the seam are open. When the above conditions occur on the inside of the boot, it shall be scored as a footnote (1/ or 2/) defect. One or more run-off stitches shall be classified as a major defect.

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4.4.3 End item visual examination. (continued)

Examine	Defect	Classification	
		Major	Departure
Seams and stitching (upper) (continued)	Loose tension resulting in a loosely secured seam <u>1</u> /	121	216
	Tight tension resulting in puckering or cutting of leather <u>1</u> /	122	217
	Wrong stitch type	123	
	Any row of stitching with less than 8 stitches per inch, but not less than 6 stitches per inch		218
	Any row of stitching with less than 6 stitches per inch	124	
	More than the specified maximum number of stitches <u>1</u> /	125	219
	NOTE: A plus tolerance of 3 stitches per inch will be allowed when stitching over heavy places or turning sharp corners		
	Gage of stitching not as specified or irregular <u>1</u> /	126	220
	Stitching omitted where required <u>1</u> /	127	221
	Thread ends not trimmed throughout boot		222
Vamp or counter-pocket stitching at outersole junction	Needle holes or needle chew <u>1</u> /	128	223
	Sand hole (i.e., tongue not properly caught in at throat		224
	NOTE: Last stitch at top edge of backstay not caught under collar is not considered a defect.		
	One or more rows of defective stitching not repaired	129	
	Repaired, but first stitch more than 1/4 inch from outersole junction	130	
	Repaired with one stitch in lieu of two or more stitches		225

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4.4.3 End item visual examination. (continued)

Examine	Defect	Classification	
		Major	Departure
Outersole including heel	Thickness not as specified	131	
	Flash edges not removed by scouring affecting appearance		226
	Edge scouring irregular affecting appearance		227
	Blister:		
	- 1/2 inch or more in longest dimension	132	
	- penetrating 1/3 or more the thickness of the rubber	133	
	- more than three blisters, more than 1/8 inch, but less than 1/2 inch in longest dimension	134	
	- one, two, or three blisters, more than 1/8 inch, but less than 1/2 inch in longest dimension		228
	Any other defect in tread or edge area <u>1</u> /	135	229
	Incomplete or incorrect vulcanization of outersole to uppers (i.e., rubber not securely attached <u>1</u> /	136	230
Counters	Rolled or curled counter <u>1</u> /	137	231
	Soft counter		232
Speed laces	Number of speed lace loops not as specified, but each row has the same number		233
	Not the same number of loops in each row	138	
	Loops not properly spaced within the row or misaligned between the rows to an extent interfering with proper lacing <u>1</u> /	139	234
	Loops not perpendicular to edge of quarters or parallel to each other		235
	Any loop not securely riveted	140	

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4.4.3 End item visual examination. (continued)

Examine	Defect	Classification	
		Major	Departure
Speed laces (continued)	Distance from center of rivet to edge of quarter less than 7/32 or more than 9/32 inch <u>1</u> /	141	236
	Four splits in rivet clinch roll		237
	Five or more splits in rivet clinch roll	142	
	Vamp lining having excessive fullness, torn, loose, or wrinkled <u>1</u> /	143	238
Lining			
Insole	Short or long <u>1</u> /	144	239
	Any protruding lasting staple or prong	145	
	Any protruding shank prong on insole	146	
	Any protruding point of lasting staple or point of tack forward of heel breast line <u>2</u> /		
Removable cushion inserts	Missing, wrong size, or wrong side up	147	
Marking and instruction tag	Missing, incomplete, incorrect, not applied in the specified manner, misplaced, illegible, or not specified size		240
Heel finishing	Heel not finished square and smooth, affecting appearance		241
Eyelets, quarter	Number of eyelets, not as specified; but each row has the same number		242
	Not the same number of eyelets in each row	148	
	Eyelets not properly spaced within the row of misalignment between the rows to an extent interfering with proper lacing *		
	Edge of any eyelet more than 5/16 inch from the edge of the quarter		243
	Any eyelet not securely clinched		244

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

2/ Any protruding point of lasting staple or point of tack forward of the heel breast line, found in the sample, shall cause rejection of the lot represented.

4.4.4 End item testing. The finished boot shall be tested for the characteristics listed in Table VII. The sample unit for all tests shall be one boot. (See Figure 1.) All test results shall contain the individual values utilized in expressing the final result. For all tests except leakage, the sample size shall be five boots regardless of lot size and the lot shall be unacceptable if one or more sample units fail to meet any requirement specified. For the leakage test, the sample size shall be eight boots regardless of lot size and the lot shall be unacceptable if two or more sample units fail the leakage test.

TABLE IX. End item tests

Character- istics(s)	Require- ment paragraph	Test Method	Number of determina- tions per sample unit	<u>Results reported as:</u>	
				Pass or Fail	Numeri- cally to nearest #
Non-marking (outersole and heel)	3.3.7.1 and 3.3.7.2	4.5.1	1	X	-
Bond strength (outersole)	3.3.7.1	4.5.4	1	-	1 pound
Measurement 1/ (s)	Drawings 2-1-1633	Gage	1	X	-
Leakage	3.9	4.4.4.1	1	X	-
Toe Adhesion	3.3.7.1	4.5.5	1	X	-

1/ Mold approval (see 4.4.2.1).

4.4.4.1 Leakage test. Remove the molded insole cushion inserts. Place the boot on a horizontal plane. Fill inside of boot with water up to the base of the blucher point (see 6.8). Any boot displaying leakage at any seam, sole edge or leather after a minimum of 15 minutes shall be a test failure. The boots tested for leakage shall be thoroughly dried prior to performing the bond strength test.

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**4.4.5 Packaging examination.** The fully packaged end items shall be examined for the defects below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2, and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

<u>Examine</u>	<u>Defect</u>
Marking exterior and interior	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as: incomplete sealing or closure of flap, improper taping, loose strapping or inadequate stapling Arrangement within container, not as specified Bulged or distorted container Unit pack not as specified
Content	Number per customer is more or less than required

**4.4.6 Palletization examination.** The fully packaged and palletized end items shall be examined for the defects listed below. The lot size shall be expressed in units of palletized unit loads. The inspection level shall be S-1, and the AQL, expressed in terms of defects per hundred unit, shall be 6.5.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirement
Palletization	Pallet pattern not as specified Interlocking of loads, not as specified Load not bonded, as specified
Weight	Exceeds maximum load limits
Marking	Omitted; incorrect; illegible; of improper size, location sequence, or method of application

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**4.5 Methods of inspection.**

**4.5.1 Non-marking test for outsoles and heels.** The edge of the outsole and heel shall be drawn across a sheet of white bond paper using moderate pressure. Any resulting marking which cannot be easily removed by rubbing with the fingers shall be considered a test failure.

**4.5.2 Hardness and hardness change at -18°C test.** A specimen 0.250  $\pm$  0.010 inch thick and at least 1 inch wide by 2 inches long shall be tested for hardness as specified in ASTM-D 2240, except the scale shall be read 5 seconds after the presser foot is in firm contact with the specimen. The same specimen shall then be conditioned for 1 hour at -18°C, and the difference between the two determinations shall be recorded as the hardness change.

**4.5.3 Ozone resistance test.** There shall be no sign of cracking of the compound when tested as follows. Test specimens 1 inch wide 3-3/4 inches long and 0.070  $\pm$  0.010 inch thick shall be mounted in accordance with the requirements of ASTM-D 518, procedure B, except that the length of the clamping strips shall be such as to facilitate placement within the test chamber of the ozone cabinet. Test specimens may be taken directly from the outsole. Test specimens for the heel should be molded from the same compound used in fabrication of the heel and cured at the same time and temperature used in manufacture. Samples shall be exposed for 7 days to an ozone concentration of 50 ( $\pm$  10) parts per hundred million parts of air at a temperature of 40  $\pm$  1°C as described in ASTM-D 1149. At the end of the exposure time, the specimens shall be examined under a seven-power magnifier.

**4.5.4 Bond strength test of outsole and leather.****4.5.4.a Adhesion at toe.**

**4.5.4.b Specimen.** The test specimen shall be a single finished boot of any size.

**4.5.4.c Procedure.** The apparatus shall be the SATRA Sole Adhesion tester STD 185/S equipped with toe piece 185/5 having an arc length of 22 mm, a radius of 1-1/4 inch and a toe piece length of 12.7 mm. A description of such apparatus may be found in SATRA Test Method AM4. Adjust the height of the anvil to suit the sole thickness, using the packing pieces provided. (See 6.12.) The forepart of the sole should be approximately horizontal or sloping slightly downwards towards the toe. Check the zero of the load gauge and correct if necessary. Place the test boot without a last on the anvil of the

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adhesion tester so that the toe piece of the instrument is inserted in the featherline groove between the sole and upper. Grasp the boot firmly and press down on the back so that the load increases steadily. If possible, apply the load at such a rate that the test is completed in about 3 seconds. Push the boot against the pressure block when applying the load, to prevent the toe of the boot from slipping out of engagement with the toe piece of the instrument. However, avoid digging the toe piece into the upper material excessively as this may affect the result obtained. Slipping is less likely to occur if boots are tested before edge trimming. When the sole begins to separate from the upper (for a distance of approximately 1/8 inch [3 mm] in from the feather edge) read the load on the instrument. This is usually a maximum value, the load dropping as further separation takes place.

#### 4.5.4.d Adhesion at ball.

4.5.4.1 Specimen. The same boot, used for the Adhesion at Toe Test, may be used for this test prepared as follows: The boot shall be legibly marked on each side at two points (i.e., at 2 inches and 4 inches from the tip of the toe). The molded outersole shall then be separated from the upper to the 2 inch mark. The separation may be aided by any suitable device or machine capable of withstanding the amount of force necessary to accomplish separation. The use of pincers conforming to Type II, Class 1 of GGG-N-350, or equivalent, with the sharp cutting edge ground down to a 1/8 inch face, and a last, one to two sizes smaller than the boot inserted into the boot and mounted on a last stand, have been found to facilitate the preparation of specimens for the bond strength test. After separation to the 2 inch mark is obtained, the boot last, when used, shall be removed and the toe cap of the boot shall be crushed to facilitate mounting of the specimen in the tester. In the event that separation at the 2 inch mark is not between the upper and rubber outersole, that portion of the rubber outersole remaining adhered to the upper shall be separated manually with the aid of a knife or other instrument, so as to show separation between leather and rubber outersole. Care should be exercised in order to be sure that the leather is not cut.

4.5.4.2 Procedure. The apparatus for measuring outersole-upper separation shall be as described in Method 2031 of FED-STD-311. The separated and crushed toe portion of the boot shall be gripped by one clamp in a manner such that the minimum effective jaw surface area applied shall be 1 by 1 inch. (NOTE: With some testing machines modification of the clamps may be required to provide sufficient opening for insertion of the specimen.) The jaw surface shall be centered approximately 1/2 to 1 inch from the tip of the toe. The other jaw surface shall hold the overlay portion of the separated



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upper and shall be not less than 1 by 2 inches with the long dimensions perpendicular to the pull of the machine. The separated rubber outersole portion of the boot shall be gripped by the other clamp of the testing machine. Each jaw of the clamp shall be not less than 1 by 2 inches with the long dimensions perpendicular to the pull of the machine. The machine shall be set in operation and the separation continued at a speed of  $10 \pm 2$  inches per minute until the outersole is separated from the upper to a point past the mark 4 inches from the tip. The maximum value attained during separation shall be taken as the bond strength.

## 5. PACKAGING

5.1 Preservation. Preservation shall be Level A.

### 5.1.1 Level A.

5.1.1.1 Unit pack. Each pair of boots shall be unit packed in a one-piece dye-cut fiberboard set-up box. The boots shall be separated from each other by tissue paper conforming to Type I of A-A-1249. The box shall be constructed from domestic corrugated single-wall minimum grade 200 fiberboard in accordance with PPP-F-320. Approximate inside dimensions shall be as specified in Table VIII.

5.1.1.2 Alternate unit pack. When specified, (see 6.2), each pair of properly mated boots shall be tied together by the ends of laces which have been inserted through the top speed lace of the outside quarter of each boot.

5.2 Packing. Packing shall be Level A or B, as specified (see 6.2).

### 5.2.1 Level A packing.

5.2.1.1 Unit packed boots. Six pairs of boots of one size and width only, unit packed as specified in 5.1.1.1, shall be packed in a snug-fitting shipping container conforming to style RSC, Grade V2s of PPP-B-636. Unit packs shall be arranged one across the length, two across the width, and three in depth. The approximate inside dimensions of the shipping container shall be as specified in Table VIII. Each container shall be closed in accordance with Method III, waterproofed in accordance with Method V, and reinforced as specified in the Appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.5. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). Strapping shall be limited to nonmetallic strapping except for Type II, Class F loads.

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TABLE VIII. Unit pack and shipping container dimensions.

- (A) Approximate inside dimensions of unit pack & shipping container,
- (B) Dimensions given are in inches, and
- (C) Dimensions are stated in the sequence of length, width, & depth.
- (D) The unit packs shall be arranged on end: 2 across the length, 3 along the width, and 1 in depth.

Range of boot sizes	Unit pack dimensions	Shipping container dimensions
3 through 8	11-1/2 x 10 x 5	20-1/2 x 15-1/2 x 12
8-1/2 through 14	14 x 11-1/2 x 5-1/2	23-1/2 x 17 x 14-1/2

5.2.1.2 Alternate six pack. When specified (see 6.2), six pairs of boots of one size and width only, preserved as specified in 5.1.1.2, shall be arranged as shown in Table IX and packed in a fiberboard shipping container conforming to Style RSC-L, Grade V2s of PPP-B-636. The inside of each container shall be fitted with a box liner conforming to Type CF, Class weather-resistant, variety DW, Grade V15c of PPP-B-636; except that the liner joint may be secured in accordance with commercial practice. The approximate inside dimensions of the shipping container shall be as specified in Table IX. A sheet of 30 pounds minimum basis weight kraft paper conforming to A-A-203 shall be placed between each layer of boots in order to protect the leather from damage by the speed lace loops during shipment. A sheet of this paper shall also completely cover the top and bottom of the contents of each container. Each container shall be closed in accordance with Method III, waterproofed in accordance with Method V, and reinforced as specified in the Appendix of PPP-B-636; except that the inspection shall be in accordance with 4.4.5. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). Strapping shall be limited to nonmetallic strapping, except for Type II, Class F loads.

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TABLE IX. Alternate six (6) pack dimensions and packing arrangements.(A) Approximate inside dimensions of shipping containers: 1/

Range of boot sizes	Length, inches	Width, inches	Depth, inches	Pallet number
3 thru 5	23-1/2	12	11	91
5-1/2 thru 8	24-1/2	13	12	91
8-1/2 thru 11	25-1/2	13-3/4	13	91
11-1/2 thru 14	27	14-1/2	14	6

1/ Approximate dimensions are furnished as a guide only, For boot sizes below 5XN and above 12XW, the contractor shall determine the size container to use. The dimensions of the container shall be such that it will result in a snug fit of the contents to be packed therein. The use of blocking materials to accommodate small size boots in an oversize container will not be permitted.

(B) Packing arrangements. Arrangement of boots within the shipping container shall be in three layers with two pairs per layer. Each pair shall be in a flat position, laces to laces, with soles in opposing directions. The first two pairs of boots shall be placed end-to-end. The third pair shall be placed on top of the second pair also end-to-end. The fourth pair shall be placed on top of the first pair in the same manner as the third pair was positioned to the second pair. Each layer of boots shall be alternated in opposite directions as the previous layer.

5.2.1.3 Alternate twelve pack. When specified (see 6.2), twelve pairs of boots of one size and width only, preserved as specified in 5.1, shall be arranged as shown in Table X (B) and packed in a fiberboard shipping container conforming to Style FOL-L, Grade V2s of PPP-B-636. The inside of each container shall be fitted with a box liner conforming to Type CF, Class weather-resistant, variety DW, Grade V15c of PPP-B-636, except that the liner joint may be secured in accordance with commercial practice. The approximate inside dimensions of the shipping container shall be as specified in Table X (A). A sheet of 30 pound minimum basis weight kraft paper conforming to A-A-203 shall be placed between each layer of boots in order to

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protect the leather from damage by the speed lace loops during shipment. A sheet of this paper shall also completely cover the top and bottom of the contents of each container. Each container shall be closed in accordance with Method III, waterproofed in accordance with Method V, and reinforced as specified in the Appendix of PPP-B-636; except that the inspection shall be in accordance with 4.4.5. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). Strapping shall be limited to nonmetallic strapping, except for Type II, Class F loads.

TABLE IX. Shipping container dimensions and packing arrangements.  
(A) Approximate inside dimensions of shipping containers: 1/

Range of boot sizes	Length, inches	Width, inches	Depth, inches	Pallet number
3 thru 7-1/2	30	14-1/2	11-1/2	94
8 thru 11-1/2	31	15-1/2	13-1/2	94
12 thru 14	34	17	15	1

1/ Approximate dimensions are furnished as a guide only, For boot sizes below 5XN and above 12XW, the contractor shall determine the size container to use. The dimensions of the container shall be such that it will result in a snug fit of the contents to be packed therein. The use of blocking materials to accommodate small size boots in an oversize container will not be permitted.

(B) Packing arrangements. Arrangement of boots within the shipping container shall be in three layers with four pairs per layer. Each pair shall be in a flat position, laces to laces, with soles in opposing directions. The first two pairs of boots shall be placed end-to-end in the length of the container. The third pair shall be placed on top of the second pair with the heels next to the toe of the second pair. The fourth pair shall be placed on top of the first pair in the same manner as the third pair was positioned to the second pair. The first four pairs of boots constitute one layer. Each layer of boots shall be alternated in opposite direction as the previous layer (see figure 2).

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5.2.2 Level B packing.

5.2.2.1 Unit packed boots. Six pairs of boots of one size and width only, preserved as specified in 5.1.1.1, shall be packed in a fiberboard shipping container conforming to Style RSC, Type CF (Variety SW) or SF, Class Domestic, Grade 275 of PPP-B-636. Unit packs shall be arranged one along the length, two across the width, and three in depth. The approximate inside dimensions of the shipping container shall be as specified in table VIII. Each container shall be closed in accordance with Method II as specified in the appendix of PPP-B-636; except that the inspection shall be in accordance with 4.4.5.

5.2.2.2 Alternate six pack. When specified (see 6.2), six pairs of boots of one size and width only, preserved as specified in 5.1.1.2, shall be arranged as shown in Table IX (B) and packed in a fiberboard shipping container conforming to Style RSC-L, Type CF (Variety SW) or SF, Class Domestic, Grade 275 of PPP-B-636. The manufacturer's joint shall be metal stitched. The inside of each container shall be fitted with a box liner conforming to Type CF, Class Domestic, Variety DW, Grade 275 of PPP-B-636; except the liner joint may be secured in accordance with commercial practice. The approximate inside dimensions of the shipping container shall be as specified in Table IX (A). A sheet of 30 pound minimum basis weight paper conforming to A-A-203 shall be placed between each layer of boots in order to protect the leather from damage by the speed lace loops during shipment. A sheet of this paper shall also completely cover the top and bottom of the contents of each container. Each container shall be closed in accordance with Method II as specified in the Appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.5.

5.2.2.3 Alternate twelve pack. When specified (see 6.2), twelve pairs of boots of one size and width only, preserved as specified in 5.1.1.2, shall be arranged as shown in Table X (B) and packed in a fiberboard shipping container conforming to Style FOL-L, Type CF (Variety SW) or SF, Class Domestic, Grade 275 conforming to PPP-B-636.

5.2.2.3.1 The manufacturer's joint shall be metal stitched. The inside of each container shall be fitted with a box liner conforming to Type CF, Class Domestic, Variety DW, Grade 275 of PPP-B-636; except that the liner joint may be secured in accordance with commercial practice. The approximate inside dimensions of the shipping container shall be as specified in Table X (A). A sheet of 30 pound minimum basis weight kraft paper conforming to A-A-203 shall be placed between each layer of boots in order to protect the leather from damage by the speed lace loops during shipment. A sheet of this paper shall also completely cover the top and bottom of the contents of each container. Each container shall be closed in accordance with Method II as specified in the Appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.5.

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5.3 Palletization. When specified (see 6.2), boots packed as specified in 5.2.2 shall be palletized on a 4-way entry pallet in accordance with load Type Ia of MIL-STD-147; except that the use of a sheet of paper or fiberboard between every other layer is not required. Pallet type shall be Type I (4-way entry) Type IV, or Type V in accordance with MIL-STD-147. Pallets shall be fabricated from wood Groups I, II, III, IV of MIL-STD-731. Each prepared load shall be bonded with primary or secondary straps in accordance with bonding means C and D or film bonding means F or G. Pallet pattern number shall be as specified in Table VIII, IX, or X, as applicable.

5.4 Marking. In addition to any special marking required by the contract or purchase order, unit packs, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129, as applicable.

## 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 boots are intended for use by military personnel of the Department of Defense.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this Specification.
- b. Size and width required (see 1.2).
- c. Issue of DODISS to be cited in the Solicitation, and if requested, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When a first article is required (see 3.1, 4.3, and 6.3).
- e. When alternate unit pack and packing is required (see 5.1.1.2, 5.2.1.2, 5.2.1.3, 5.2.2.2, and 5.2.2.3).
- f. Type and class of unit load required (see 5.2.1.1, 5.2.1.2 and 5.2.1.3).
- g. Level of packing required (see 5.2).
- h. When palletization is required (see 5.3).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. 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 also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

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

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6.5 Satra scale. The Satra scale may be obtained from the British Shoe and Allied Trade Research Association, Satra House, Kettering, Northants, England; or may be obtained from Satra house's North American Agent: Bata Engineering Batawa, Ontario, Canada.

6.6 Needle size. It has been found that a higher degree of water resistance in the seams can be obtained by using a size 16 needle.

6.7 Type II, Class B thread approval. Request for approval of Type II, Class B thread should be submitted to the U.S. Army Natick Research, Development, and Engineering Center, ATTN: STRNC-ITFT. It should be accompanied by one spool of approximately 8 ounces of the thread being submitted for approval. The submitted sample shall conform to all requirements of V-T-295. Applicable test data and a list of the materials constituting the treatment and finish stipulating their grades and standards under solvents and manufacturers name shall be furnished. The sample shall be marked with letters and/or numbers to identify the thread submitted for approval.

6.8 Volume of water for leakage test. Suggested volumes of water required in performance of the leakage test are as follows:

Proposed leakage test volumes in milliliters

Boot sizes	XN	N	NR	R	RW	W	XW
3, 3-1/2	-	245	255	270	285	300	330
4, 4-1/2	-	270	280	295	310	325	360
5, 5-1/2	265	295	310	325	340	360	395
6, 6-1/2	290	320	335	355	375	395	435
7, 7-1/2	315	350	370	390	410	430	475
8, 8-1/2	345	385	405	425	445	470	520
9, 9-1/2	380	420	-	465	-	515	570
10, 10-1/2	415	460	-	510	-	565	625
11, 11-1/2	450	500	-	555	-	615	680
12, 12-1/2	495	550	-	610	-	675	745
13, 13-1/2	540	600	-	665	-	735	815
14	595	660	-	730	-	810	895



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6.9 Suggested source(s) for removable inserts. Suggested sources for removable cushion inserts meeting the requirements of 3.3.13 are:

Gemini Laminating Corporation  
(Product Number 139300)  
35 Balch Street  
P.O. Box 398  
Beverly, MA 01915

Rogers Foam  
145 Central Street  
Somerville, MA 02145

Frelonic  
(Product Number PI-9503)  
63 Grove Street  
P.O. Box 169  
Salem, MA 01970

6.9.1 Suggested source for the microcellular foam. A suggested source for the microcellular foam meeting the requirements of 3.3.12 is Rogers Foam, Poron Division, East Woodstock, CT 06244.

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

6.11 Subject (key word) listing.

Footwear  
Fungicide  
High top  
Leather, black  
War  
Wet weather

6.12 Sole Adhesion Tester. The Sole Adhesion Tester specified in 4.5.4 may be obtained from:

SATRA  
Rockingham Road  
Kettering, Northamptonshire  
NN169JH, England



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**Custodians:**

Army - GL  
Navy - NU  
Air Force - 99

**Preparing Activity:**

DLA -CT

**Project No.**

8430 - 0414

**Review Activities:**

Army - MD  
Navy - MC  
Air Force - 45, 82

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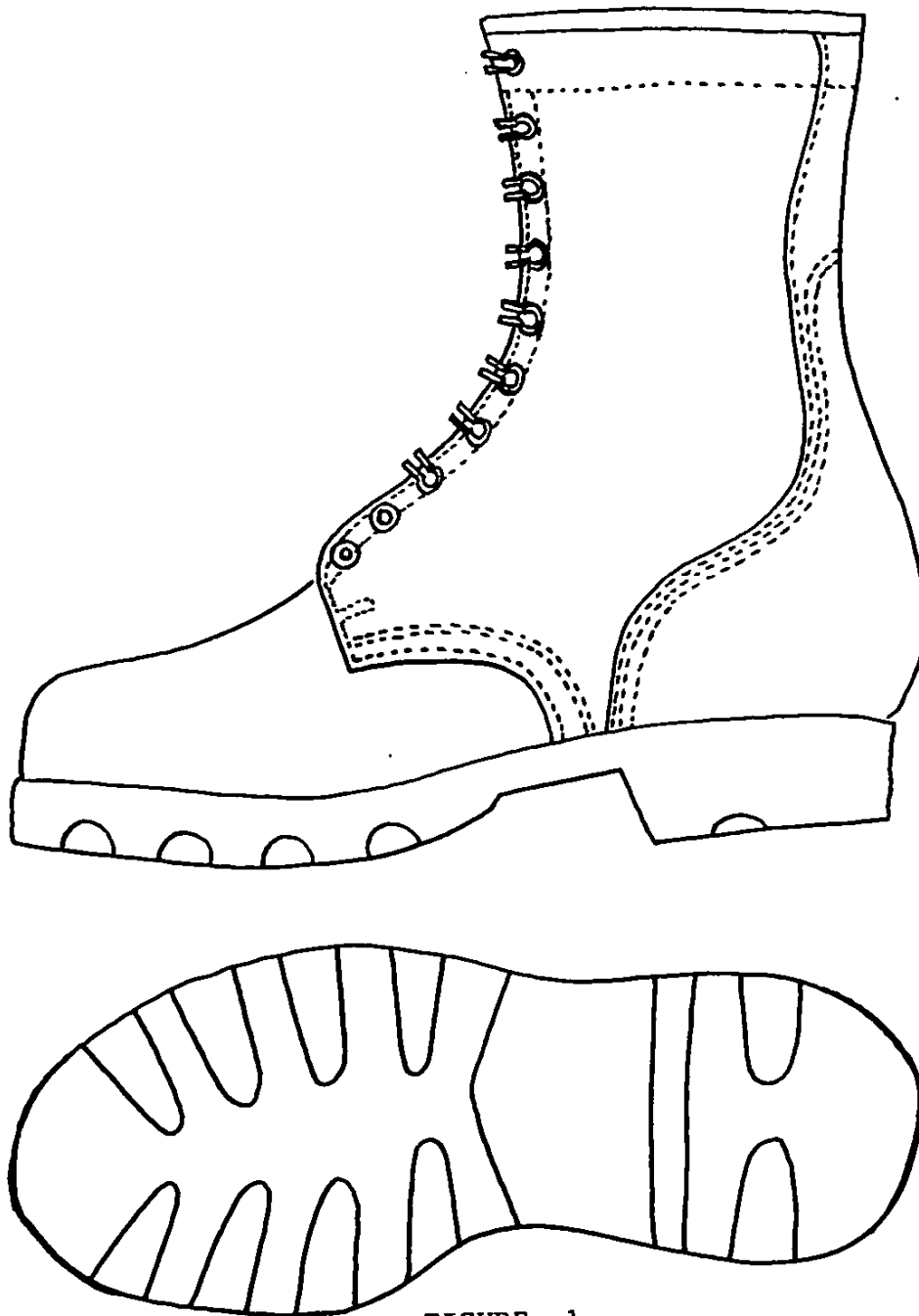


FIGURE 1.

BOOTS, COMBAT, MILDEW AND WATER RESISTANT,  
DIRECT MOLDED SOLE (DMS)

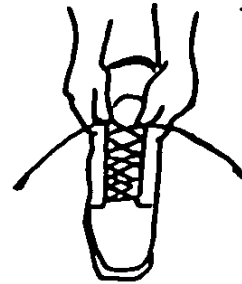
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THE FOLLOWING ARE LACING  
INSTRUCTIONS FOR SPEED LACES



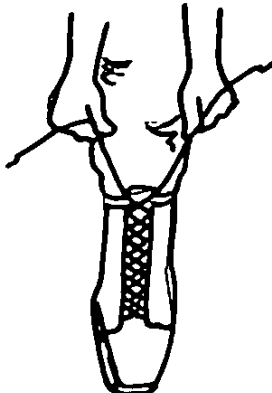
STEP 1

After first lacing through all loops and tying each end of the lace with a hard knot, loosen up lace for easy step-in of foot.



STEP 2

With thumbs on either edge, remove all pleats and wrinkles by pushing together securely around leg.



STEP 3

Hold lace ends at pre-tied knots. Pull up lace to desired tightness.



STEP 4

Wrap extra lace length around collar and secure.

FIGURE 2. Speed lace instructions

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization waive any portion of the referenced document(s) or to amend contractual requirements.

<b>I. RECOMMEND A CHANGE</b>		<b>1. DOCUMENT NUMBER</b> MIL-B-44152C	<b>2. DOCUMENT DATE (YYMMDD)</b> 93/05/28
<b>3. DOCUMENT TITLE</b> BOOTS, COMBAT, MILDEW & WATER RESISTANT, DIRECT MOLDED SOLE (DMS)			
<b>4. NATURE OF CHANGE</b> (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
<b>5. REASON FOR RECOMMENDATION</b>			
<b>6. SUBMITTER</b>			
<b>a. NAME (Last, First, Middle Initial)</b>		<b>b. ORGANIZATION</b>	
<b>c. ADDRESS (Include Zip Code)</b>		<b>d. TELEPHONE (Include Area Code)</b> (1) Commercial (2) AUTOVON (If applicable)	<b>7. DATE SUBMITTED (YYMMDD)</b>
<b>8. PREPARING ACTIVITY</b>			
<b>a. NAME</b> DLA - CT		<b>b. TELEPHONE (Include Area Code)</b> (1) Commercial (2) AUTOVON (215) 737-8081 444-8081	
<b>c. ADDRESS (Include Zip Code)</b> DEFENSE PERSONNEL SUPPORT CENTER DPSC-PSSD (BLDG. 12-3-D) 2800 S. 20th ST. Philadelphia, PA 19101		<b>IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:</b> Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	