

MIL-B-44152A  
11 December 1986  
 SUPERSEDING  
 MIL-B-44152  
 30 October 1984

MILITARY SPECIFICATION

BOOTS, COMBAT, MILDEW AND WATER RESISTANT, DIRECT MOLDED SOLE

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

1. SCOPE

1.1 Scope. This document covers a speed laced mildew and water resistant black leather combat boot with a direct molded sole (DMS).

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

\*TABLE I. Schedule of sizes

Width	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14
XN					X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X
N	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
NR	X X	X X	X X	X X	X X	X X	X X	X X	X X	X													
R	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
RW	X X	X X	X X	X X	X X	X X	X X	X X	X X	X													
W	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
XW	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8430

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## 2. APPLICABLE DOCUMENTS

2.1 Government documents:

- \* 2.1.1 Documents. The following documents 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.

## SPECIFICATIONS

## FEDERAL

- A-A-203 - Paper, Kraft, Untreated
- V-L-61 - Laces, Nylon
- V-T-295 - Thread, Nylon
- KK-I-570 - Insole, Footwear, Leather, Cattlehide
- TT-C-490 - Cleaning Methods and Pretreatment of Ferrous Surfaces 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

## MILITARY

- MIL-I-1821 - Insoles, Footwear (Ventilating Type)
- 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-S-22777 - Soles and Heels, Rubber, Traction Tread, Shoe
- 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

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- 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

## 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
- 2-1-1634 - Heel, Trac-Shun Design for Boots, Combat, Mildew and Water Resistant, DMS
- 2-1-1635 - Speed Lace Assembly

(Copies of documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

- \* 2.2 Other 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 shall be those listed in the issues of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

## 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 3951 - Standard Practice for Commercial Packaging
- 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, PA 19103.)

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(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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 shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Guide sample. Samples, when furnished, are solely for guidance and information to the contractor (see 6.3). Variation from this document may appear in the sample, in which case this document shall govern.

3.2 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2, and 6.5).

3.3 Material.

3.3.1 Leather. All leather components shall contain not less than 0.18 percent nor more than 0.70 percent paranitrophenol fungicide.

- \* 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. 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 manufacturer 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 6.3).
- \* 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 paranitrophenol shall be as specified in 4.4.1.

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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.

\* 3.3.1.5 Heel pads. The heel pads shall be cut from either chrome tanned or a combination of chrome and vegetable tanned, full grain or partially corrected lining leather, sheepskin, kip, calf, cattlehide, or cattlehide splits. The heel pads shall have a minimum thickness of 2-1/2 ounces and a maximum thickness of 3-1/2 ounces when tested as specified in 4.4.1. The color of the heel pads shall be either light russet or the color imparted by tanning process. Heel pads cut from upper leather or gusset leather specified in 3.3.1.1 and 3.3.1.2 may be used provided the thickness is a minimum of 2-1/2 ounces and a maximum of 3-1/2 ounces when tested as specified in 4.4.1. As an alternate to the above, the heel pads shall be chrome tanned or chrome vegetable retanned split pigskin. The pigskin shall be the first split from the grain side after the grain has been removed. The thickness shall be 2-1/2 to 3-1/2 ounces. The pigskin shall be drum dyed and the color shall be light russet. The surface of the split that was nearest the grain surface shall be sealed with a clear lacquer, sufficient to coat the surface fibers but not decrease porosity and then smooth plated. The sealed plated surface shall be worn next to the foot. Testing for paranitrophenol shall be as specified in 4.4.1.

\* 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 marked on patterns..

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 patterns provided and shall be skived 9/16  $\pm$  1/8 inch wide at the breast. Testing shall be as specified in 4.4.1.

\* 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.

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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. 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 innersole. The steel shank shall have a zinc electroplated 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 (+ 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.

3.3.6.3 Nails, heel attaching. The nails for heel attaching shall be brass or steel cut or wire type and shall be of sufficient length when driven to the top surface of the heel core to provide a clinch on the insole.

- \* 3.3.6.4 Speed lace assembly. The speed lace assembly shall be of three piece construction consisting of nylon coated brass speedlacer, brass eyelet, and brass capped eyelet in accordance with Drawing 2-1-1635. A full tubular rivet as shown on Drawing 2-1-1635 may be used in lieu of the capped eyelet.

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3.3.7 Rubber compounds.

\* 3.3.7.1 Rubber compound for outersole. The rubber compound for the outersole 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 nonmarking producing only a slight erasable mark on white paper.

b. Abrasive index. The abrasive index shall not be less than 300 before and after aging for 70 hours at 100°C.

c. Hardness. The Shore A durometer hardness shall be  $65 \pm 5$ . After accelerated aging for 70 hours at  $100 \pm 1^\circ\text{C}$ , the durometer hardness shall change no more than 10 points from the original.

d. Hardness and hardness change at  $-18^\circ\text{C}$ . The hardness after 1 hour exposure in a cold chamber at  $-18^\circ\text{C}$  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  $100 \pm 1^\circ\text{C}$ , 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 40 percent in medium #6 fuel.

h. Bond strength. The bond strength 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 outersole 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.

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

\* 3.3.7.2 Rubber compound for heel. The rubber compound for the heel shall conform to the following requirements when tested as specified in 4.4.1.

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 not be less than 450 before and after aging for 70 hours at  $100 \pm 1^\circ\text{C}$ .

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

d. Hardness and hardness change at  $-18^\circ\text{C}$ . The durometer hardness after 1 hour exposure in a cold chamber at  $-18^\circ\text{C}$  shall be 90 maximum, and shall not exceed the hardness at room temperature by more than 20 points.

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

f. Volume swell. The volume swell shall not be greater than 30 percent in medium #6 fuel.

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

3.3.8 Heel core. The heel core shall be of plastic or composition material conforming to the heel core material requirements for class 1 of MIL-S-22777.

\* 3.3.9 Thread, nylon, nonwicking. The thread shall be nylon nonwicking 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.

3.3.10 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

\* 3.3.11 Seam sealant. Seam sealant shall be Dow Corning 477 silicone solution diluted to a 20 to 25 percent solution using a suitable compatible solvent. No detergents shall be present in the diluting solvent.

\* 3.3.12 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.

3.3.12.1 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.



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3.3.12.2 Fillers. 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.

3.3.12.3 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.

\* 3.3.13 Insoles, ventilating. The ventilating insoles shall conform to type II of MIL-I-1821. The ventilating insole size relation to applicable size boot shall be as indicated in MIL-I-1821. The following is an example of an insole size relationship to the applicable size boot as indicated in MIL-I-1821.

## Size (insoles)

Sizes (boots)	Boot widths XN, N, NR	Boot widths R, RW	Boot widths W, XW
8, 8-1/2	8 N	8 R	8 W

\* 3.3.14 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 full 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 construction with separately molded, nailed on trac-shun heel (see figure 1).

3.4.1 Outersole design. The outersole 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.

\* 3.4.2 Heel design. The heel design shall conform to Drawing 2-1-1634. Heels are to be used with boot sizes and widths as follows:

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Boot width	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	
XN				22	22	24	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58
N	22	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44
NR	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44
R	2	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44
RW	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	44
W	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	44
XW	24	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	46

\* 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  $10-7/8 \pm 1/4$  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.

\*TABLE III. Contractor's dies and patterns

<u>Parts</u>	
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

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\*TABLE III. Contractor's dies and patterns (cont'd)

<u>Parts</u>	
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
Heel pad	Whole 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 conforming to Drawing 2-1-1633 and TRAC-SHUN heel conforming to Drawing 2-1-1634.

### 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.

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\*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 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 $\pm 0.3$ mm
Quarter	Flesh	Lasting edge <u>1/</u>	$5/8 \pm 1/8$	1.5
Quarter	Flesh	Vamp margin <u>1/</u>	$3/16 \pm 1/32$	1.5
Vamp	Flesh	Throat and wings	$3/16 \pm 1/32$	1.2
Vamp	Flesh	Toe <u>1/</u>	$3/4 \pm 1/8$	1.5
Counter-pocket/ backstay	Flesh	Lasting edge <u>1/ 2/</u>	$5/8 \pm 1/8$	1.5
Counter-pocket/ backstay	Flesh	Stitch edge	$3/16 \pm 1/32$	1.3

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\*TABLE V. Skiving requirements (cont'd)

Part	Side	Location	Scarf width, inches	Scarf edge thickness, millimeters $\pm 0.3$ mm
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.

\* 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 on 5-1/4 by 6-1/2 inch tag stock folded in the middle to form four 5-1/4 by 3-1/4 printed pages in book form. The back page shall contain 4-step lacing instructions for the speed laces in accordance with figure 3. A punch hole shall be made in the top near the folded edge for insertion of the lace.

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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, ventilating.
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 ventilating 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 ventilating 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.

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). 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

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quarters shall then be rubbed open so that the quarters butt rather than lap and the seam 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  $1/16 + 1/32$  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. The speed lace loops shall be equally spaced on each quarter, eight on sizes 3 through 6-1/2, nine on sizes 7 through 9-1/2, and ten on sizes 10 through 14. The speed lace loops shall be placed perpendicular to the edge of the quarters and parallel to each other, and shall be securely riveted  $1/4 + 1/32$  inch from the center of the rivet to the edge of the quarter.
- \* 3.8.4.3.1 Lacing for lasting. The quarters shall be laced by hand in the lower two pairs of speed lace loops. As an alternative, the quarters may be laced in the first or first and third lower pairs of speed lace loops. The hand lacing or metal clip shall hold the quarters securely and provide for an opening after lasting of  $1-3/8 + 1/8$  inch.
- \* 3.8.4.4 Foam padding and collar fitting. The collar cover shall be stitched flesh 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 1/8 inch from the edge and this stitching shall be extended to secure the end of the collar 1/16 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.

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3.8.4.5 Seam daubing. All upper stitching lying below the third 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,  $1/16 + 1/32$  inch from the vamp-wing edge, plus two rows of stitching  $1/16 + 1/32$  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  $5/8 + 1/16$  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.

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 well cemented on both sides within  $1/2$  inch from counter flange. The counter shall be turned over the last at the bottom  $1/2 + 1/16$  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 3.3.10 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 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



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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:

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

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 + 0.25 inches in diameter and 1 or 2 inches in width, revolving at a speed of 2500 + 400 revolutions per minute. The bristles shall have a diameter of 0.015 + 0.003 inch. 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 outsole 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.

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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 outsole 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 3.3.10 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.

\* 3.8.9.2 Rubber interface. An optional 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 sole machine. The 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 a mold release compound shall be permitted as required.

\* 3.8.12 Outersole molding. The outersole rubber piece cut to extend from toe to rear of heel in one unbroken piece shall be directly molded to the upper of the boot with the use of molding equipment which is approved for this purpose by the contracting officer. The equipment shall be operated so as to exert a minimum pressure of 250 pounds per square inch on the compound. The sole mold shall be heated to a temperature not to exceed 375°F and the side mold shall be heated to a temperature not to exceed 300°F. The dwell time at these temperatures during vulcanization shall be a minimum of 15 minutes. The boots shall be molded with the use of metal lasts which shall conform to the measurements contained in MIL-L-41815.

\* 3.8.13 Relasting for heel attaching. After vulcanization of outersole, boots shall be relasted with production lasts of sufficient size and width (not to exceed one size smaller) for heeling to insure proper clinching of nails against heel plate on last. As an alternate, a heel plate may be used in lieu of relasting.

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3.8.14 Sole and heel finishing.

- \* 3.8.14.1 Heel base preparation. After removal of the boot from the direct molded sole machine, any spew around the heel base section of the outersole shall be removed with scissors or spew trimmer. The heel base area shall be marked for roughing and spotting the correct size heel. The rubber skin shall then be removed from the heel base area by roughening with a wire brush or sand paper. Special care shall be taken in both these operations to assure that only the spew and rubber skin are removed and that the actual substances of heel base are maintained conforming to Drawing 2-1-1633. In lieu of roughing, the heel base area may be chemically primed using a 2 to 4 percent solution of chlorinated bleaching powder in ethyl acetate. The heel base shall then be coated with a polyurethane rubber solvent cement and allowed to dry.
- \* 3.8.14.2 Heel preparation. The heel shall conform to Drawing 2-1-1634. The rubber skin on the inner surface of the heel shall be carefully removed with a wire brush. Special care must be taken to insure that only the rubber skin is removed and that the heel substance is maintained conforming to the drawing. In lieu of roughing, the heel may be chemically primed using a 2 to 4 percent solution of chlorinated bleaching powder in ethyl acetate. The heel shall then be coated with polyurethane rubber solvent cement and allowed to dry.
- \* 3.8.14.3 Heel spotting and nailing. The adhesive on both the heel and the heel base shall be activated. The heel shall be secured with 9 to 12 nails for heel sizes 22 through 26, and 11 to 14 nails for heel sizes 28 and up. The nails shall be of sufficient length to assure a smooth, secure clinch on the insole. The heeling machine shall be equipped with proper drivers to assure that all nail heads are driven evenly against the plastic or composition core in the heel and clinch the nail ends on the insole.
- \* 3.8.14.4 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 2-1-1634. The use of a knife for trimming spew is prohibited at the upper leather edge.

3.8.15 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.

3.8.16 Upper finishing.

3.8.16.1 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.

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

3.8.16.3 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 3.3.12, 3.3.12.1 and 3.3.12.3.

3.8.17 Attaching heel pads. The heel pads specified in 3.3.1.5 shall be inserted grain side or buffed side up. The entire surface of the flesh side of the heel pads shall be coated with a suitable adhesive and firmly pressed into the heel seat area. The heel pads shall match the contour of the insole heel seat area and the width shall be sufficient to cover the entire heel seat area. The heel pads shall be graded properly for all sizes.

3.8.18 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.

3.8.19 Inserting ventilating insole. A ventilating insole as specified in 3.3.13 shall be inserted in each boot.

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

3.8.21 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.

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

3.10 Workmanship. The finished boots shall conform to the quality of product established by this document. 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 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 the document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

- \* 4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicted or actual, nor does it commit the Government to acceptance of defective material.

- \* 4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for assuring 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 assure compliance with all dimensional requirements.

4.1.3 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

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

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

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4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for the defects specified in 4.4.3 and tested for the characteristics specified in table VII. The presence of any defect or failure of any test shall be cause for rejection of the first article.

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 document 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" 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 + 0.010 inches
- b. Two pieces, 6 by 6 by 0.250 + 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</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

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\*TABLE VI. Component tests

Component and lot size expressed in terms of	Characteristic	Requirement paragraph	Test method	Requirement Applicable to Sample unit	Com-	Number of determinations per sample unit	Results reported as	
							posit-	Pass or fail
Collar leather	Paranitrophenol	3.3.1.3	6711 1/	-	X	-	-	-
Heel pads (1 pad)	Material identification	3.3.1.5	2/	-	-	-	-	-
	Thickness	3.3.1.5	1011 1/	X	-	-	-	5 heel pads
	Tannage	3.3.1.5	2/	-	-	-	-	-
	Paranitrophenol	3.3.1.5	6711 1/	-	X	-	-	-
Box toes (1 box toe)	Material identification	3.3.4	2/	-	-	-	-	-
	Thickness	3.3.4	2/	-	-	-	-	-
	Skiving	3.3.4	2/	-	-	-	-	-
Foam rubber	Material identification	3.3.5	2/	-	-	-	-	-
	Thickness	3.3.5	2/	-	-	-	-	-
	Compressibility	3.3.5	D 1056 2/ 3/	-	-	-	-	-
Steel shank (1 pair)	Material identification	3.3.6.1	2/	-	-	-	-	-
	Thickness	3.3.6.1	2/	-	-	-	-	-
	Hardness (Rockwell C Scale)	3.3.6.1	E 18 3/	X	-	1	-	Hardness number
	Height, steel rib	3.3.6.1	Visual micro-meter	X	-	1	X	2 shanks
Length and width	Coating identification	3.3.6.1	2/	-	-	-	-	-
	Finish	3.3.6.1	2/	-	-	-	-	-

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\*TABLE VI. Component tests. (cont'd)

Component and lot size expressed in terms of	Characteristic	Requirement paragraph	Test method	Requirement applicable to Sample unit	Con- unit	Number of determinations per sample unit	Results reported as Pass or fail	Numerically to nearest	Sample unit
Tacks and staples	Material identification	3.3.6.2	2/	-	-	-	-	-	-
Nails	Material identification	3.3.6.3	2/	-	-	-	-	-	-
Speed lace loops	Material identification	3.3.6.4	2/	-	-	-	-	-	-
Outsole compound (lot)	Abrasive index (before and after aging)	3.3.7.1	D 1630 3/ 4/	-	X	3	-	Whole number	-
	Hardness (before and after aging)	3.3.7.1	D 2240 3/ 4/	-	X	5	-	Whole number	-
	Hardness and hardness change at -180C	3.3.7.1	4.5.2	-	X	1	-	Whole number	-
	Cut growth (after aging)	3.3.7.1	D 1052 3/ 4/	-	X	2	-	One percent	-
	Ozone resistance	3.3.7.1	4.5.3 2/	-	-	-	-	-	-
	Volume swell	3.3.7.1	6001 and 6211 5/ 6/	-	X	3	-	One percent	-
	Polyvinyl chloride exclusion	3.3.7.1	6/	-	-	-	-	-	-
Heel compound (lot)	Abrasive index (before and after aging)	3.3.7.2	D 1630 3/ 4/	-	X	3	-	Whole number	-
	Hardness (before and after aging)	3.3.7.2	D 2240 3/ 4/	-	X	5	-	Whole number	-
	Hardness and hardness change at -180C	3.3.7.2	4.5.2	-	X	1	-	Whole number	-



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\*TABLE VI. Component tests (cont'd)

Component and lot size expressed in terms of	Characteristic	Requirement paragraph	Test method	Requirement applicable to Sample unit	Number of determinations per sample unit	Results reported as Pass or fail	Number of Pass or fail	Results reported as Numerically to nearest unit
Heel compound (lot) (cont'd)	Ozone resistance	3.3.7.2	4.5.3 2/	-	-	-	-	-
	Volume swell	3.3.7.2	6001 and 6211 5/	-	3	-	One	percent
	Polyvinyl chloride exclusion	3.3.7.2	6/	-	-	-	-	-
Adhesive	Material identification	3.3.10	2/	-	-	-	-	-
Seam sealant	Material identification	3.3.11	2/	-	-	-	-	-
Finishing materials	Compatibility	3.3.12	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 + 10C for 70 hours in accordance with the ASTM D 573 procedure for accelerated aging. The abrasive paper to be obtained from the Carborundum Co. shall be G40E15SF.
- 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/ Tests required only if heel pads are separately purchased items.

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\* 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 without heel, 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. One heel shall also be selected from each heel mold to determine conformance to the measurements specified in Drawing 2-1-1634. 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 outsoles 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 for the outersole mold and Drawing 2-1-1634 for the heel mold. 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 assembly shall be examined for the defects listed below. The lot size shall be expressed in units of one upper assembly 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 2.5 for major defects and 6.5 for total (major and minor combined) defects.

NOTE: Defects designated by an asterisk shall be scored as major when seriously affecting serviceability and minor when affecting serviceability but not seriously.

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Examine	Defect	Classification	
		Major	Minor
Construction and workmanship (general)	Any component missing or not specified type.	X	
	Any component misplaced or not affixed as specified.		*
	Vamp stitched more than 5/32 inch from edge at throat.	X	
	Vamp stitched more than 3/32 inch from edge at throat but not more than 5/32 inch.		X
	Vamp throat or wings not skived.	X	
	Counterpocket/backstay or quarter not skived as specified.		X
	Backseam not rubbed down.		X
Quality of leather	Thickness more than 1/2 ounce less than minimum specified.	X	
	Thickness less than specified minimum but not exceeding 1/2 ounce less.		X
	Thickness more than maximum specified.		X
	Rough fiber on flesh side.		*
	Off-stretch cut.	X	
	Slaughter cut.		*

\* 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

4.4.2.4 In-process examination of boot before last pulling. The partially fabricated boot shall be examined for the defects listed below. The lot size shall be expressed in units of one partially fabricated boot. 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 2.5 for major defects and 6.5 for total (major and minor combined) defects.

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NOTE: Defects designated by an asterisk shall be scored as major when seriously affecting serviceability and minor when affecting serviceability but not seriously.

Examine	Defect	Classification	
		Major	Minor
Bottom of boot	Any component missing or not specified type.	X	
	Upper damaged.		*
	Insole not scoured on the flesh side as required.	X	
	Poor heel seat, side, or toe lasting.		*
	Insole tack not removed.	X	
Upper part of boot	Uppers not firmly pulled down to last.		*
	Lace openings less than 1-1/4 inches or more than 1-1/2 inches.	X	
	Quarter not laced as specified.		X
	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.	X	
	Upper in lasted area not sufficiently roughed or cleaned after roughing.	X	
	Excessive roughing or scouring.		*

\* 4.4.3 End item visual examination. The boot shall be examined for the defects listed below. The lot size shall be expressed in units of one boot. 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 2.5 for major defects and 6.5 for total (major and minor combined) defects. The inspector shall check to see that ventilating insoles are inserted in the boots. For the pairing examination, and when determining possible differences in outsole thickness, the pair shall be examined together. 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 so as 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 6.4) shall be scored as a defect. The defect shall be scored regardless of the direction in which the break pattern appears.

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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 impart 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 5 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. Defects designated by an asterisk shall be scored as major when seriously affecting serviceability or appearance, and minor when affecting serviceability or appearance but not seriously.

Examine	Defect	Classification	
		Major	Minor
Pairing	Not properly mated, i.e., not right and left of same size.	X	
	Variation in color, luster, or appearance.		*
	Variation of more than 1/4 inch in height of pair.	X	
	Box toe crooked, long, or short.		*
	Difference in outsole thickness between left and right boots: - more than 3/32 inch. - more than 1/16 inch but not more than 3/32 inch.	X	X
Cleanness	Any non-removable spot, stain, or foreign matter affecting appearance.		X
Color and finish	Not specified color.	X	
	Finish streaky, chipped, or flaky on upper.		X
	Any raw edges not stained to match upper leather.		X
Design, type, and style	Not as specified.	X	
Upper leather	Not full grain	X	
	Leather snuffed, i.e., fiber structure damaged.	X	

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Examine	Defect	Classification	
		Major	Minor
Upper leather (cont'd)	Any grub or tick damage, scratches, brands, or boney leather.		*
	Fat wrinkles or veins.		*
	Stretchy vamp.	X	
	Leather embossed or printed.	X	
Gusset-tongue leather	Flanky.	X	
	Loose flesh, boney, or boardy.		*
Collar leather	Scratch, vein, or other imperfections.		*
Break pattern of vamps and quarters	Break pattern comparable to break pattern represented by numbers 5 through 8 on Satra break scale.	X	
	NOTE: Leather exhibiting a break pattern com- parable to the numbers indicated above is considered to be loose, pipey, or flanky. The break pattern shall be deter- mined in accordance with 4.4.3.		
Construction and workmanship (general)	Any cut, tear, hole, repair, or factory damage.		*
	Wrinkled or bunched area at the back seam.		*
	Any component or assembly omitted or misplaced, operation omitted or not properly performed (unless otherwise classified herein.)		*
	Loose leather fibers along cut edge of quarter vamp line or counterpocket/ backstay.		X
Seams and stitching (upper)	Open seam not repaired.	X	
	Repair of open seam not as specified.		X

NOTE: A seam shall be classified as open when one or more stitches joining a seam are broken or when two or more consecutive skipped 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

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Examine	Defect	Classification	
		Major	Minor
Seams and stitching (upper) (cont'd)	NOTE: boot it shall be scored as an asterisk (*) defect. One or more run-off stitches shall be classified as a major defect.		
	Loose tension resulting in a loosely secured seam.		*
	Tight tension resulting in puckering or cutting of leather.		*
	Wrong stitch type.	X	
	Any row of stitching with less than 8 stitches per inch but not less than 6 stitches per inch.		X
	Any row of stitching with less than 6 stitches per inch.	X	
	More than the specified maximum number of stitches.		*
	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.		*
	Stitching omitted where required.		*
	Thread ends not trimmed throughout boot.		X
	Needle holes or needle chew.		*
	Sand hole, i.e., tongue not properly caught in at throat.		X
NOTE: Last stitch at top edge of backstay not caught under collar is not considered a defect.			
Vamp or counterpocket stitching at outer-sole junction	One or more rows of defective stitching not repaired.	X	
	Repaired but first stitch more than 1/4 inch from outersole junction.	X	
	Repaired with one stitch in lieu of two or more stitches.		X

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Examine	Defect	Classification	
		Major	Minor
Outersole including heel	Thickness not as specified.	X	
	Flash edges not removed by scouring affecting appearance.		X
	Edge scouring irregular affecting appearance.		X
	Blister:		
	- 1/2 inch or more in longest dimension.	X	
	- penetrating 1/3 or more the thickness of the rubber.	X	
	- more than three blisters, more than 1/8 inch but less than 1/2 inch in longest dimension.	X	
	- one, two, or three blisters, more than 1/8 inch but less than 1/2 inch in longest dimension.		X
	Any other defect in tread or edge area.	*	
	Incomplete or incorrect vulcanization of outersole to uppers, i.e., rubber not securely attached.	*	
Counters	Rolled or curled counter.	*	
	Soft counter.		X
Heel finishing and attaching	Heel not finished square and smooth, affecting appearance.		X
	Open heel seat.	*	
	Checked heel, i.e., separation at heel and outersole.		X
	Crooked or wrong size heel.		X
	Any crack or chip in heel.		X
	Breast of heel not beveled.		X
	Any heel nail missing.		X
	Either corner breast nail or center back nail not properly clinched on insole.	X	
	Two or three nails other than center back or corner breast nail, not properly clinched on insole.		X
	More than three nails other than center back or corner breast nails, not properly clinched on insole.	X	



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Examine	Defect	Classification	
		Major	Minor
Heel finishing and attaching (cont'd)			
	NOTE: Evidence of nails on insole shall not be interpreted as proper or sufficient clinching.		
Speed laces	Number of speed lace loops not as specified but each row has the same number.		X
	Not the same number of loops in each row.	X	
	Loops not properly spaced within the row or misaligned between the rows to an extent interfering with proper lacing.		*
	Loops not perpendicular to edge of quarters or parallel to each other.		X
	Any loop not securely riveted.	X	
	Distance from center of rivet to edge of quarter less than 7/32 or more than 9/32 inch.		*
	Four splits in rivet clinch roll.		X
	Five or more splits in rivet clinch roll.	X	
Lining	Vamp lining having excessive fullness, torn, loose, or wrinkled.		*
Insole	Short or long.		*
	Any protruding lasting staple or prong.	X	
	Any protruding shank prong on insole.	X	
	Any protruding point of lasting staple or point of tack forward of heel breast line.	<u>1/</u>	
Heel pads	Missing.	X	
	Wrinkled.	X	
	Crooked.		X
	Wrong size.		X

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Examine	Defect	Classification	
		Major	Minor
Ventilating insole	Missing, wrong size, or wrong side up.	X	
Marking and instruction tag	Missing, incomplete, incorrect, not applied in the specified manner, misplaced, illegible, or not specified size.		X

1/ 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. 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 VII. End item tests

Characteristic	Requirement paragraph	Test method	Number of determinations per sample unit	Results reported as	
				Pass or fail	Numerically 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
Measurements <u>1/</u>	Drawings 2-1-1633 and 2-1-1634	Gage	1	X	-
Leakage	3.9	4.4.4.1	1	X	-

1/ Mold approval (see 4.4.2.1).

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- \* 4.4.4.1 Leakage test. Remove the ventilating insole. 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.
- \* 4.4.5 Packaging examination. The fully packaged end items shall be examined for the defects listed 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 closure of container flap, loose strapping, inadequate stapling, or improper taping. Arrangement within container not as specified. Bulged or distorted container.
Content	Number per container 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 sample unit shall be one palletized unit load, fully packaged. The inspection level shall be S-1 and the AQL, expressed in terms of defects per hundred units, shall be 6.5.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirements.
Palletization	Pallet pattern not as specified. Interlocking of loads not as specified. Load not bonded with required straps 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 and the durometer shall then be conditioned for 1 hour at  $-18^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and the hardness then determined at that temperature. The scale shall be read 5 seconds after the presser foot is in firm contact with the specimen. The reading shall be taken as the hardness at  $-18^{\circ}\text{C}$ , 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  $40 \pm 1^{\circ}\text{C}$  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 upper.

4.5.4.1 Specimen. The test specimen shall be a single finished boot of any size 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 outsole 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 or 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

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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 so 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 upper and shall be not less than 1 by 2 inches with the long dimension 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 dimension 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 or Commercial as specified (see 6.2).

5.1.1 Level A. Each pair of properly mated boots shall be tied together by the ends of laces which have been inserted through the top speed lace loop of the outside quarter of each boot.

5.1.2 Commercial. The boots shall be preserved in accordance with ASTM D 3951.

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

\* 5.2.1 Level A packing. Twelve pairs of boots of one size and width only, preserved as specified in 5.1, shall be arranged as shown in table VIII (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

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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 VIII (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 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. Toward the end of the contract or when there are less than the required amount per container of the same size and width, mixed sizes and widths may be packed within the same container. 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 VIII. Shipping container dimensions and packing arrangement

(A) Approximate inside dimensions of shipping containers <sup>1/</sup>

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

<sup>1/</sup> 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. Twelve pairs of boots of one size and width only, preserved as specified in 5.1, shall be arranged as shown in table VIII (B) and packed in a fiberboard shipping container conforming to style FOL-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 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 VIII (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. Toward the end of the contract or when there are less than the required amount per container of the same size and width, mixed sizes and widths may be packed within the same container.

5.2.2.1 Weather-resistant fiberboard containers. When specified (see 6.2), the shipping container shall be a grade V3c, V3s or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with method III as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.5.

5.2.3 Commercial packing. Boots, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951.

\* 5.3 Palletization. When specified (see 6.2), boots, packed as specified in 5.2.2 and 5.2.3 shall be palletized on a 4-way entry pallet in accordance with load type Ia of MIL-STD-147. 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, or IV of MIL-STD-731. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means K and L or film bonding means O or P, except that for bonding means P, a fiberboard sheet of top of the load is not required. Pallet pattern 94 shall be used for boot sizes 3 through 11-1/2 and pallet pattern 1 shall be used for boot sizes 12 through 14. Pallet patterns shall be in accordance with the appendix of MIL-STD-147. Interlocking of loads shall be effected by reversing the pattern of each course.

5.4 Marking. In addition to any special marking required by the contract or purchase order, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

5.4.1 Labels, mixed sizes. Each shipping container packed with mixed sizes and widths shall have securely attached to the end and side, directly under the printing or stenciling, a white paper label 5 by 4 inches with the words "MIXED NSN's" plainly stamped or printed thereon and under these words shall be legibly stamped or printed the correct quantity and NSN's contained therein.

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## 6. NOTES

6.1 Intended use. The boots are intended for use by military personnel of the Department of Defense.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Sizes and widths required (see 1.2).
- c. When a first article is required (see 3.2, 4.3, and 6.5).
- d. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).
- e. Type and class of unit load required (see 5.2.1)
- f. When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.1).
- g. When palletization is required (see 5.3).

6.3 Samples. For access to samples, address the contracting activity issuing the invitation for bids.

6.4 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.

6.5 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 include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

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.



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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 volume in milliliters						
	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

6.9 Subject (key word) listing.

Boots, leather, black  
Footwear  
Mildew and water resistant

6.10 Changes from previous issue. The margins of this document are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Custodians:

Army - GL  
Navy - NU  
Air Force - 99

Preparing activity:

Army - GL  
Project No. 8430-0352

Review activities:

Army - MD  
Navy - MC  
Air Force - 82  
DLA - CT

User activity:

Air Force - 45

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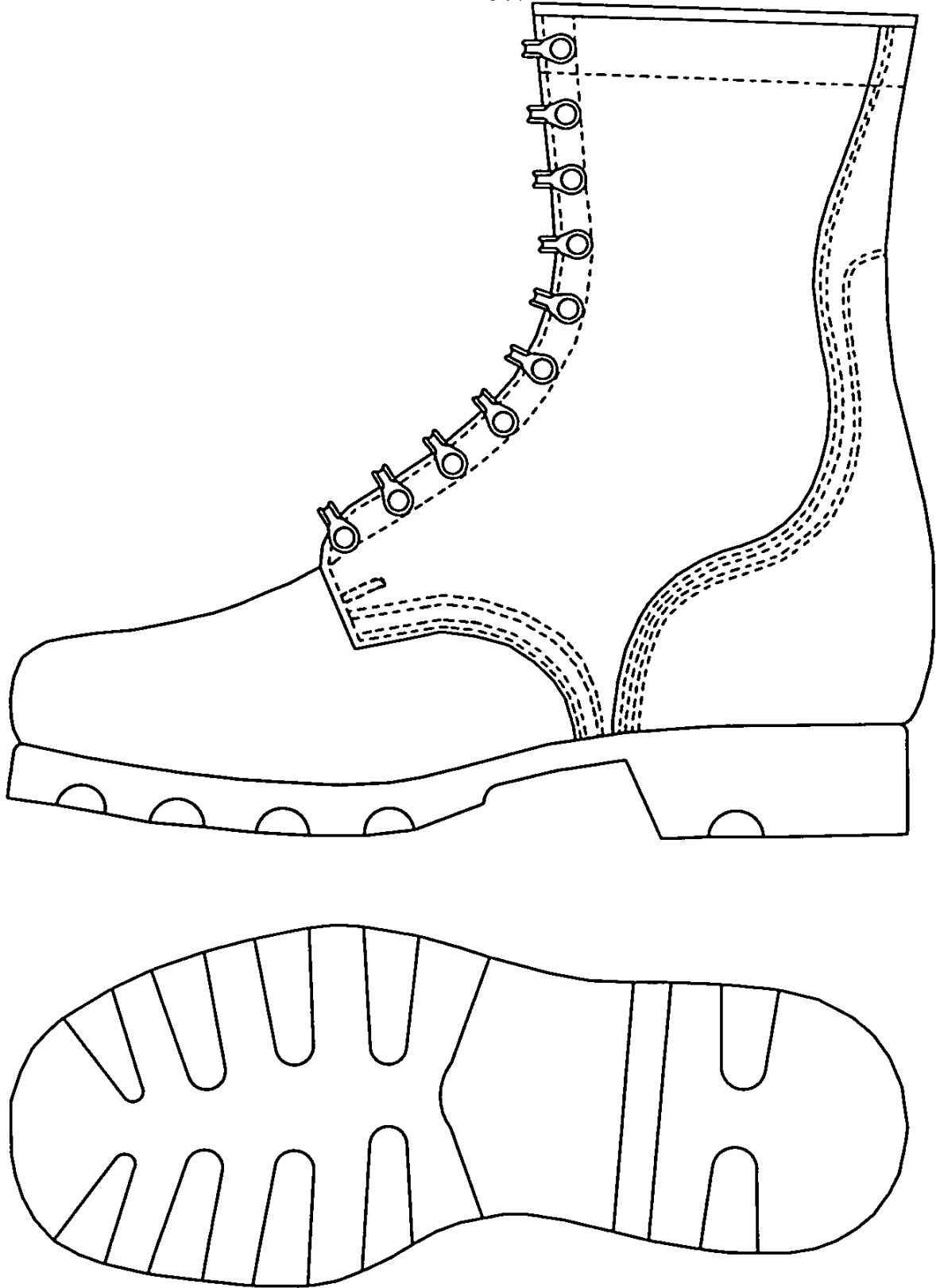


FIG.1 BOOTS, COMBAT, MILDEW AND WATER RESISTANT, DMS

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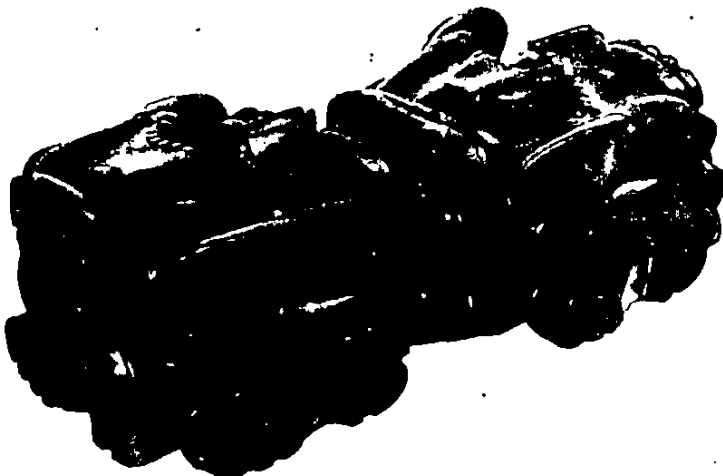


**FIGURE 2  
PACKING ARRANGEMENT**

**STEP 1  
FIRST TWO PAIRS**



**STEP 2  
FIRST COMPLETE TIER**



**STEP 3  
THREE TIERS ALTERNATED  
TO FORM THE COMPLETED  
SHIPPING CONTAINER  
ARRANGEMENT**

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**THE FOLLOWING ARE LACING  
INSTRUCTIONS FOR SPEED LACES**



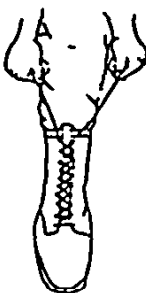
**STEP 1**

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.



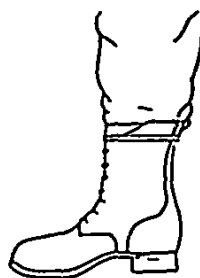
**STEP 2**

With thumbs on either edge remove all pleats and wrinkles by pushing lace up 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 3**

<b>STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL</b> <i>(See Instructions - Reverse Side)</i>	
<b>1. DOCUMENT NUMBER</b> MIL-B-44152A	<b>2. DOCUMENT TITLE</b> Boots, Combat, Mildew and Water Resistant, Direct Molded Sole
<b>3a. NAME OF SUBMITTING ORGANIZATION</b>	<b>4. TYPE OF ORGANIZATION (Mark one)</b> <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____
<b>3b. ADDRESS (Street, City, State, ZIP Code)</b>	
<b>5. PROBLEM AREAS</b>	
a. Paragraph Number and Wording:	
b. Recommended Wording:	
c. Reason/Rationale for Recommendation:	
<b>6. REMARKS</b>	
<b>7a. NAME OF SUBMITTER (Last, First, MI) - Optional</b>	<b>8. WORK TELEPHONE NUMBER (Include Area Code) - Optional</b>
<b>9. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional</b>	<b>8. DATE OF SUBMISSION (YYMMDD)</b>