MIL-B-27486C
4 OCT 85
SUPERSEDING
MIL-B-27486B(USAF)
14 February 1973

MILITARY SPECIFICATION

BOOTS, FLYER'S FWU-3/P

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

1. SCOPE

1.1 Scope. This specification covers the requirements for material and for manufacture of a quick-donning, lined, and fully insulated flight boot, which is designated FWU-3/P.

1.2 Classification. The boot shall be of one type and in the follcwing sizes and widths as specified (see 6.2).

SCHEDULE OF BOOT SIZES

Size	Width							
	A	AA	B	C	D	E	EE	EEE
5	X	X	X	X	X	X	X	X
5 1/2	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X
6 1/2	X	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X	X
7 1/2	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X
8 1/2	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X
9 1/2	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X
10 1/2	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X
11 1/2	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X
12 1/2	X	X	X	X	X	X	X	X
13	X	X	X	X	X	X	X	X
13 1/2	X	X	X	X	X	X	X	X

2. APPLICABLE DOCUMENTS

* 2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: the Engineering Division, San Antonio ALC/MMEDO, Kelly AFB, TX 78241 by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 8430

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

V-F-106	Fasteners, Slide, Interlocking.
V-L-61	Laces, Nylon.
V-T-276	Thread, Cotton.
V-T-285	Thread, Polyester.
V-T-295	Thread, Nylon.
KK-I-570	Insole, Footwear, Leather, Cattlehide.
KK-L-165	Leather, Cattlehide, Vegetable-Tanned and Chrome Retanned, Impregrated, and Soles.
KK-W-231	Welting, Leather, Shoe.
UU-P-268	Paper, Kraft, Wrapping.
CCC-C-443	Cloth, Duck, Cotton (Single and Plied Filling Yarns, Flat).
DDD-T-86	Tape, Textile: Cotton, General Purpose (Unbleached, Bleached, or Dyed).
PPP-B-636	Boxes, Shipping, Fiberboard.
PPP-T-45	Taped, Gummed, Paper Reinforced and Plain, for Sealing and Securing.

MILITARY

MIL-C-3133	Cellular Elastomeric Materials, Molded or Fabricated Parts.
MIL-L-10867	Leather, Cattlehide, Gusset, Chrome Tanned, Fatliquored.
MIL-C-13924	Coating, Oxide, Black, for Ferrous Metals.
MIL-B-17757	Boxes, Shipping Fiberboard (Modular Sizes).
MIL-S-22777	Soles and Heels, Rubber, Traction Tread, Shoe.
MIL-L-40051	Leather, Cattlehide, for Glove Leather.
MIL-C-41814	Counter, Footwear.

STANDARDS

FEDERAL

FED-STD-151	Metals, Test Methods.
FED-STD-311	Leather, Methods of Sampling and Testing.
FED-STD-595	Color.

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-670	Classification System and Tests for Cellular Elastomeric Materials.
MIL-STD-794	Parts and Equipment, Procedures for Packaging of.

(Copies of specifications and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

B36	Brass Plate, Sheet, Strip, and Rolled Bar.
B134	Wire, Brass
D5	Bituminous Materials Penetration of.
D412	Rubber Properties in Tension, Test Methods for.
D570	Plastic, Water Absorption of
D746	Plastics and Elastomers, Brittleness Temperature of, By Impact
D792	Plastics, Specific Gravity and Density of, by Displacement
D1043	Stiffness Properties as a Function of Temperature by Means of a Torsion Test, Test Methods for.
D1203	Plastics Loss of Plasticizer from (Activated Carbon Methods).
D1238	Flow Rates of Thermoplastics by Extrusion Plastometer, Test Methods of.
D2941	Measuring of Break Pattern of Leather (Breakscale).
D3951-82	Packaging, Commercial
E28	Apparatus, Ring and Ball, Softening Point by

(Application for copies of ASTM publications should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphis, PA 19103.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Guide sample. Samples, when furnished, are solely for guidance and information to the contractor (see 6.4). Variations from this specification may appear in the sample, in which this specification shall govern.

"Type II - Molded Cushion Insole" and

3.2 First article. When specified (see 6.2), the contractor shall furnish a sample for first article inspection and approval (see 4.2 and 6.5).

3.3 Material.

3.3.1 Upper leather. Vamps, quarters and backstays shall be cut from the best quality, green-salted, chrome-tanned sides. The tannery lot shall not exceed 23,000 square feet. The sides shall be full grained, 3 1/4 to 4 1/2 ounces in thickness and the area of a side shall not exceed 22 square feet. The leather shall be similar in softness to elk-type sides and the break shall not be more than a break scale of 5 when tested as specified in 4.4.1. Any upper leather defect such as fat wrinkles, pit and insect damage plainly visible shall be considered as affecting appearance and shall not appear in the vamps or quarters in front of the breast of the heel. Cut parts with scratches, slaughter cuts on the grain surface of the leather, brands ot light flesh cuts that show through on the grain surface shall not be used. Flanky, pipey, loose, cracked or any rough or coarse grain leather shall not appear in the counter area back of the breast of the heel or in the tongue or backstay. Clusters of veins, split veins or pronounced veins shall not appear in the vamps or quarters.

3.3.1.1 Color and finish. The leather shall be black and shall be drum dyed. The leather shall be full grain and shall be finished grain side out with no buffing to remove surface blemishes. A light application of black finish containing only a sufficient amount of pigment to assist in obtaining a uniform color shall be applied and the surface brought to a smooth finish. The flesh side shall be cleaned of coarse fibers. Fungicide paranitrophenol treatment is not required.

* 3.3.2 Slide fastener unit. The slide fastener unit shall be from leather conforming to type II, class A of MIL-L-40051, except that the requirements for crocking, stiffness, shrinkage, temperature, elongation, stitch tear strength and chemical requirements shall not apply. Thickness of the leather shall be 2 1/2 to 3 1/2 ounces and color shall be black.

* 3.3.2.1 Top band. The top band shall be cut from leather conforming to type II, class A of MIL-L-40051, except that the requirements for crocking, stiffness, shrinkage temperature, elongation, stitch tear strength and chemical requirements shall not apply. Top band stripping of one inch width shall be used and thickness shall be 2 to 2 1/2 ounces. The color of the leather shall be black. As an alternate, leather specified in 3.3.1 may be used for the top band and the thickness shall be 2 to 2 1/2 ounces.

3.3.3 Gusset. The gusset shall be cut from leather conforming to treatment C of MIL-L-10867. The color shall be black.

3.3.4 Lining leather. The quarter, vamp and tongue (gusset) linings shall be cut from soft chrome tanned, full grain or corrected grain, cattlehide glove leather, 2 1/2 to 3 1/2 ounces in thickness. The color shall be gray,

approximately matching color number 36492 of FED-STD-595. No loose, flanky or otherwise inferior cut parts shall be used. Fungicide paranitrophenol treatment is not required. As an alternate to the above, the linings may be cut from 2 1/4 to 3 1/4 ounces thick, full grain chrome tanned or chrome vegetable retanned pigskin. The pigskin shall be drum dyed gray approximately matching color number 36492 of FED-STD-595. The pigskin shall be finished on the grain-side with a light application of aniline finish or on the flesh side shall be smooth plated. The finished surface shall be worn next to the foot. Slaughter cuts, off stretch, or otherwise inferior cut parts shall not be used.

3.3.5 Insoles. The insoles shall conform to type I or III tannage a or b of KK-I-570, and the thickness shall be 5 1/2 to 6 1/2 irons. The insoles shall have either a channeled or stuck on rib (see 3.3.11). As an alternate the insoles may be cut from Texorist material. The Texorist material shall contain 0.25 to 1.00 percent Copper 8 Quinolinolate uniformly throughout the insole. The insole shall be 0.116 (± .010) inches thick. The insole shall be cut with the heel-to-toe direction across the machine direction of the Texorist material. The Texorist insole shall have a stuck on rib applied to the printed side of the material.

3.3.6 Midsoles. The midsoles shall conform ot type I, class 3, style 1, subclass (b) of KK-L-165 and shall be 5 to 6 irons in thickness.

* 3.3.7 Heel pads. Heel pads shall be of russet sheepskin leather, natural kip, or calf, with a minimum thickness of 2 ounces and a maximum thickness of 3 1/2 ounces. In addition heel pads cut from gray lining leather or gray side leather, as required by 3.3.4 may be used. As an alternate to the above, the heel pads may be cut from the pigskin lining leather specified in 3.3.4.

3.3.8 Welting. The leather shall conform to the requirements of KK-W-231. Paranitrophenol treatment is not required.

3.3.9 Rubber.

3.3.9.1 Outsoles. The rubber outsoles shall conform to type I, class 1, style 2 of MIL-S-22777.

3.3.9.2 Heels. The rubber heels shall conform to type II, class 1, style 2 of MIL-S-22777.

3.3.10 Counters. The counters shall be of the materials specified in 3.3.10.1 and 3.3.10.2.

3.3.10.1 Leather, leatherboard, or shoeboard. The leather, leatherboard or shoeboard counters shall conform to the requirements of MIL-C-41814 except that the leather or leatherboard counters thickness shall be 5 to 5 1/2 irons.

3.3.10.2 Polyethylene. The polyethylene counters shall be molded from an unfilled polyethylene resin of natural color to fit the last. The molded pieces shall be uniform in texture and finish and shall be free from porosity, cracks, blisters, and any other defects affecting serviceability. The polyethylene resin shall conform to the requirements of Table I when tested as specified in 4.4.1.

TABLE I. Requirements of polyethylene resin.

Characteristic	Requirements
Specific gravity	0.91 to 0.93
Melt index	1.5 to 4.0
Tensile strength	1400 to 2500 psi
Elongation	100 to 800 percent
Stiffness modulus (torsion) at 23°C	20,000 to 40,000 psi
Brittle Temperature (80 percent nonfailure)	-76°F minimum
Water absorption, gain in weight in 24 hours	0.14 percent maximum
Volatility loss, 72 hours at 82°C	0.05 percent maximum

3.3.11 Stuck on rib. The finished rib shall be 15/64 ±1/64 inches high, a minimum of 5/8 inch in width measured from the inside vertical portion of the rib, and shall extend from heel breast line to heel breast line on the insole. The rib shall be made from coated fabric or a combination of coated fabric and fiberboard. The fabric shall conform to requirements specified in 3.3.11.1. The upstanding portion of the rib shall be one of the following: not less than 3 ply of coated fabric folded over on itself; two layers of coated fabric with a fiberboard filler not less than .050 inch thick; or fiberboard and coated fabric.

3.3.11.1 Rib construction. The ribbing fabric used in the construction of the rib shall be unbleached cotton or cotton/synthetic fabric conforming to the requirements listed below. The fabric shall be coated on one side with a rubber-based adhesive specified in 3.3.14 and bonded to the flesh side of the insole. The fabric or fiberboard shall cover 5/32 (-2/32 +1/32) inch of the peripheral edge and extend over the top of the vertical rib and cover the area between the ribs for a distance not less than 5/8 inch from the inside rib edge. The preformed rib shall be firmly and smoothly fitted and bonded to the flesh side of the insole as specified above to provide the required extension on the finished shoe.

Type I thread upper ... 3.3.5

Weight (ounces) per square yard (min)	- 8
Yarns per inch (min) - Warp	- 50
- Filling	- 30
Breaking strength pounds (min) warp and filling	- 105

3.3.11.2 Rib strength. The physical requirements for the rib strength shall conform to the following when tested as specified in 4.4.3.2.1.

Characteristic	Minimum	Average
Shear strength	70 pounds	75 pounds
Stitch strength	20 pounds	30 pounds

1/ No single determination shall fall below the value specified and the average of all specimens shall not be less than the average specified.

* 3.3.12 Slide fastener. The slide fastener shall conform to type I, style 3, size MS of V-F-106. The slide fastener shall have a brass chain and components with a black chemical finish. As an alternate, class 301, 302 and 430 corrosion resisting steel may be used for catch lever only. The fastener shall have a short pull tab with the slot opening 5/16 (±1/16) inch wide by 7/32 (±1/32) inch high. The individual scoop pull off shall be a minimum of 12 pounds, and the scoop slippage shall be a minimum of 13 pounds.

3.3.12.1 Slide fastener tape. The fastener tape shall be nylon and shall be dyed black to match the upper leather. As an alternate, 100% polyester fastener tape may be used provided it meets or exceeds all other slide fastener and slide fastener tape requirements specified in MIL-B-27486 and amendment 1 and V-F-106E. The tape shall show a minimum of "good" fastness to weathering only.

3.3.13 Insulation.

3.3.13.1 Uppers and tongues. The material for insulating the uppers and the tongues shall be nontoxic unicellular plastic foam composed of a multitude of individual cells, each sealed off, one from the other. The cells shall be uniform size, homogenous throughout, and free from large voids, foreign matter, contaminations, or seams, and shall be free from any other matter that accelerates aging or deterioration. The material shall conform to the requirements specified in Table II.

3.3.13.2 Insoles. The material for insulating the insole shall be sponge rubber conforming to Grade RO3 of MIL-STD-670, natural color and fabricated according to MIL-C-3133, 1/8 (±1/64) inch thick.

3.3.14 Soles, heels, and midsoles. Cements that are compatible with carboxylated acrilonitrile rubber compounds and are resistant to jet fuels shall be used for bonding the soles, the heels, and the midsoles; it may be used for bonding any of the parts of the boots for which a type of adhesive is not specified herein. In all instances, the cement utilized shall be one of the three following types: synthetic rubber solvent cement, synthetic resin and rubber solvent cement, or synthetic resin solvent cement. The adhesive for bonding the soles and the midsoles shall form a continuous film that will provide a suitable bond between the components of the boots.

TABLE II. Insulation for Uppers and Tongues

Characteristics	Requirement
Compression deflection at 25 percent (70 ±5°F)	1.5 - 3.5 psi
Density (70 ±5°F)	3.5 to 6.5 pounds per cubic foot
Water absorption (48 hours under 10-foot head of water)	0.1 pound per square foot, maximum
Compression set (24 hour recovery)	30 percent, maximum
Dimensional change, linear, 24 hours at 150 ±5°F	average of length and width, 2.5 percent, maximum
Flammability (1/4-inch by 1/2-inch strip, self-extinguishing)	5 seconds
Low temperature resistance (bent 180 degrees over a 1/2-inch mandrel)	no cracking at -65°F
Thermal conductivity	27 BTU-in/hr/ft ^{2}/°F
Thickness	.125 (±0.020)
Tensile strength (70 ±5°F)	30 psi, minimum
Oil resistance (24 hours of immersion, using commercial grade motor oil)	no softening or swelling
Elongation	150 percent, minimum
Odor	not objectionable

3.3.15 Insole reinforcement. The insole reinforcement shall be a cotton duck conforming to Type I of CCC-C-443. As an alternate, material conforming to the requirements of 3.3.11.1 may be used.

3.3.16 Backseam tape. The backseam tape shall be 1/2 inch wide conforming to type I, class 1 of DDD-T-86.

3.3.17 Insole cover. The cover for the sponge insole shall be cut from a 2-iron-thick, flexible, split cattlehide leather. The leather shall be treated or finished to provide a sweat-proof cover. The treatment for the insole cover shall be a nontoxic compound.

3.3.18 Box toes. The box toes shall be cut from a material consisting of a woven base cotton flannel impregnated with a pyroxylin or polystyrene compound. The box toes may be either an activated or a prepared type. The thickness of material shall be 0.0875 (plus or minus 0.0075) inch. The box toes shall be of a suitable shape and size and shall engage and shall be caught in the stitching of the insole rib around its toe radius after lasting. The box toes shall be skived 9/16 (plus or minus 1/16) inch at the breast.

3.3.19 Laces. The laces shall be black, 50 inches in length conforming to type II, class 1 of V-L-61.

3.3.20 Shank combination. The shank combination shall consist of a single rib steel shank attached by four prongs or two rivets to a shank board cover.

3.3.20.1 Shank board. The shank board shall be a water-resisting type, shall have a finished thickness from 6 1/2/64 to 9 1/2/64 inch. The shank board covers shall be cut right and left; shall be in seven sizes for the run of the boots from 5 to 13 1/2 in all widths; and shall be of proper widths to fill the entire width of the bottom cavity from the ball line to and including the heel seat, except for such clearance as may be incurred in the shank casing schedule specified herein. The shank board covers shall have a graduated scarf of 1 1/2 (plus or minus 1/16) inches on both ends and shall be marked consecutively with a steel stamp starting with the schedule 1 on the smallest size to and including the schedule 7 on the largest size.

SCHEDULE OF SHANK CASING SIZES

Boot sizes (widths AA thru EE)	5 5 1/2	6 6 1/2	7 7 1/2	8 8 1/2 9 9 1/2	10 10 1/2 11	11 1/2 12 12 1/2	13 13 1/2 14
Schedule	1	2	3	4	5	6	7

3.3.20.2 Steel shank. The steel shank shall be made from 19-guage, 0.0418 inch (plus or minus 0.003 inch), cold-rolled, carbon steel with a hardness ranging from 47 to 54 Rockwell C scale, The width of the shank shall be 0.625 (plus 0.003 or minus 0.007) inch. The shank shall be made with a single rib, the over-all thickness of the rib, including the steel, shall be 0.080 to 0.125 inch. The steel shank shall have a zinc electro plated coating with a dull or bright finish, or a zinc compound coating completely and uniformly applied to the base metal. Steel shanks with a black oxide coating conforming to class 1 of MIL-C-13924 may be used in lieu of zinc coating. The rib shall taper to within 1/2 (plus or minus 1/8) inch from end of toe and to within 1 (plus or minus 1/8) inch from the end of the heel. The length of the shank shall conform to the following schedule:

SCHEDULE OF SHANK LENGTHS

Shank casing sizes	Lengths in inches ($\pm$1/16 inch)
1	3-3/4
2	4
3	4-1/4
4	4-1/2
5	4-3/4
6	5
7	5-1/4
8	5-1/2
9	5-3/4

* 3.3.21 Heel-attaching nails. The nails for attaching the heels shall be of brass or steel, cut or wire type, and of sufficient length to produce a 1/16 clinch on the insole cover. The cut type of brass nails shall be cut from material conforming to alloy No. 6 or No. 8 of ASTM Designation B 36 and shall be commercial No. 450 or 1336 with a 20-gauge point. Gauging of points shall be done with an English standard wire gauge, in which 20 gauge is 0.035 (plus or minus 0.005) inch. The points of the nails shall enter the gauge at least 1/32 inch. The wire nails shall be commercial type 13-1/2 gauge, with a flat clinching point and shall be cut from alloy No. 7 conforming to ASTM Designation B 134.

3.3.22 Tacks and nails. All permanent tacks and nails shall be of brass or steel and shall be of sufficient length to attach thoroughly the parts through which they are driven and to keep the insoles smooth on the inside. All brass tacks shall be cut from material conforming to alloy No. 6 or No. 8 of ASTM Designation B 36.

3.3.23 Heel-seat-fastening pegs and nails. The heel-seat-fastening pegs shall be glue-sized paper-base fiber with a diameter of 0.081 to 0.086 inch, commercial type B, or equal. The pegs shall be of sufficient length to secure firmly the parts through which they are driven and to keep the insole smooth on the inside. As an alternate, No. 39 head brass nails of sufficient length to clinch properly may be used.

3.3.24 Eyelets for the quarter and the slide-fastener unit. The eyelets shall be made of aluminum, 0.012 (plus or minus 0.0015) inch thick with roll setting barrel and shall conform to the finished requirements of Table III. After fabrication, the eyelets shall be top roller coated with two coats of black enamel. At the option of the contractor, the eyelets may be tumble coated.

3.3.25 Bottom filler. The bottom filler shall be either a thermoplastic or cold process type.

TABLE III. Dimensions of Finished Eyelets

Dimension	Minimum (Inch)	Maximum (Inch)
Outside diameter of flange	0.343	0.355
Outside diameter of barrel	0.203	0.215
Diameter of hole before setting	0.156	0.166
Over-all length before setting	0.218	0.234

3.3.25.1 Thermoplastic bottom filler. The thermoplastic type shall consist of a mixture of ground cork and a suitable thermoplastic binder in proportion of a minimum of 2-3/4 parts by volume of cork to each one part of binder. The cork granules shall be free from bark. The ground cork and the binder shall be thoroughly and evenly mixed. The binder shall be water insoluable. The binder shall have a softening point of at least 125° Fahrenheit (F) and a maximum penetration of 85 millimeters with a 200 gram load for 60 seconds at 77°F, when tested as specified in 4.4.1.

3.3.25.2 Cold process bottom filler. The cold process type shall be spreadable without the use of heat. It shall consist of a mixture of ground cork and a suitable binder in proportion of two parts cork to one part binder by volume. The cork granules shall be free from bark. When spread filler is dry and set, it shall consist of four parts cork to one part binder. The binder shall be water insoluable and shall have a softening point of at least 150°F when tested as specified in 4.4.1. The binder shall be tested after evaporation to a constant weight level.

3.3.26 Thread.

* 3.3.26.1 Thread, upper fitting. The thread for all upper fitting shall be nylon, conforming to Type I or II, class 1, or type III of V-T-295. The color of the running thread shall be black and the color of the shuttle thread shall be natural. Color fastness requirements shall not apply. The thread size shall be E for the needle and bobbin with stitch type 301, E for needle, and B or E for the bobbin or looper with stitch type 401. As an alternate for stitching of the upper backstay, cotton thread may be used. The needle thread shall be dyed to match the color of the upper and shall conform to type IB3, 4 ply, ticket No. 16 of V-T-276. The bobbin thread shall conform to type IA1 or IA3, 4 ply, ticket No. 16 of V-T-276, except that the type IA3 thread shall be black. Colorfastness requirements shall not apply.

3.3.26.2 Thread, Goodyear stitching. The thread used for the Goodyear sole stitching shall be either a polyester or a cotton thread, as specified in 3.3.26.2.1 or 3.3.26.2.2.

3.3.26.2.1 Cotton thread. The cotton thread shall conform to V-T-276. The running thread shall be Type IVA or IVB, ticket No. 8/11 "Z", twist dyed to match the color of the upper leather. The shuttle thread shall be Type IVA or Type IVB, Ticket No. 8/10, unbleached (natural). Colorfastness requirements shall not apply.

3.3.26.2.2 Polyester thread. The polyester thread shall conform to Type I, class 1, subclass C of V-T-285. The color of the running thread shall be black and shall be size 10, 3 ply. The color of the shuttle thread shall be natural and shall be size 10 (3 or 6 ply). Requirements for colorfastness shall not apply.

3.3.27 Wax for thread used for inseam sewing and Goodyear stitching. The wax shall be white or golden and shall be permanently plasticized resin that in a temperature range of normal machine use will thoroughly wax the thread that is intended to be used for inseam sewing and Goodyear stitching. The thread shall be well penetrated with wax.

3.3.28. Ink, edge setting. The ink for edge setting shall produce a bright, hard finish that is uniform in appearance after setting with a hot iron. The color of the ink shall match the upper leather.

3.3.29 Cleaning solution. The cleaning solution shall be a composition which, when applied with a cloth or sponge, shall remove grease and soil marks of manufacturing operations from the boot uppers, without adversely affecting the components cleaned.

3.3.30 Repairers. The repairers may be a crayon or a paste type applied by hand or a liquid repairer applied by the spray method. They shall match the color of the upper leather and shall have sufficient coverage to correct minor surface imperfections, or discolorations of the leather.

3.3.31 Fillers. When fillers are used, they shall provide a suitable foundation for the application of the top finish and may be applied by the sponge or the spray method.

3.3.32 Top finish. The top finish may be applied by either the sponge or the spray method, shall be a material compatible with, and capable of wetting into and binding, the previously applied coats; and shall provide a flexible finish with a medium bright luster.

3.4 Design. The design shall be an approximately 7-1/2-inch-high, quick-donning type of flight boot and plain toe blucher pattern with backstay. The quick-donning (slide-fastener) opening shall be fully laced on each side. The boot shall have a full length leather midsole, a full length rubber outsole, and a whole rubber heel. The boots shall be fully insulated at the insole and the upper and the tongue areas. The insulation shall be installed between the inner leather lining and the outer shell on the uppers and the tongues. The quick-closing feature of the boot shall conform to Figure 1 and the slide-fastener unit shall conform to Figure 2. The two-side slide fastener unit shall be constructed of two sections of upper leather with the slide fastener sandwiched between them. The two sections of leather shall be stitched together and stitched through the slide fastener tape as shown in Figure 2.

3.5 Patterns and dies. A standard set of patterns and their markers will be furnished, by the Government, as a basis from which the contractor's dies and patterns shall be made. The patterns, the markers, and the contractor's cutting dies and patterns shall consist of the components parts specified in Table IV. Except for the lasting allowance, the Government patterns shall be followed exactly. Lasting allowance, if required, may be added by the contractor, but lasting allowance shall never be removed from the Government patterns.

TABLE IV. Contractor's Dies and Patterns.

Component Parts	Contractor's Dies and Patterns
Patterns	
Quarter	whole and half sizes
Quarter and vamp insulation	whole sizes
Vamp (upper)	whole and half sizes
Vamp and quarter lining	whole and half sizes
Insulation (insole)	whole and half sizes
Insole	whole and half sizes
Top band	
Backstay	three sizes
Gusset	sizes and widths
Gusset insulation	three sizes
Gusset lining	three sizes
Slide-fastener insert (top and bottom)	two sizes
Insole rounding	each size
Markers	
Slide fastener	two sizes
Quarter (eyelet row and backstay)	each width and size
Vamp	each width and size

3.6 Lasts. The boots shall be made on standard FWU-5/P U. S. Government lasts and wood insole rounding patterns. Lasts in all necessary sizes will be loaned by the Government.

3.7 Construction.

3.7.1 Cutting uppers. The uppers shall be cut from grain-out leather. Except for the top bands, none of the upper parts shall be split or shaved after the tanning operation. No parts cut off stretch shall be acceptable. Vamps shall be cut from the bend area of the side leather.

3.7.2 Skiving of leather parts. The upper leather components of the boot shall be skived on the flesh side at the points indicated in Table V. The width of the scarf shall be sufficient to permit the correct lasting of the boot and the required stitching without hardness or bulkiness at the seams. The feather edge of the scarf shall be approximately 1/3 the thickness of the leather.

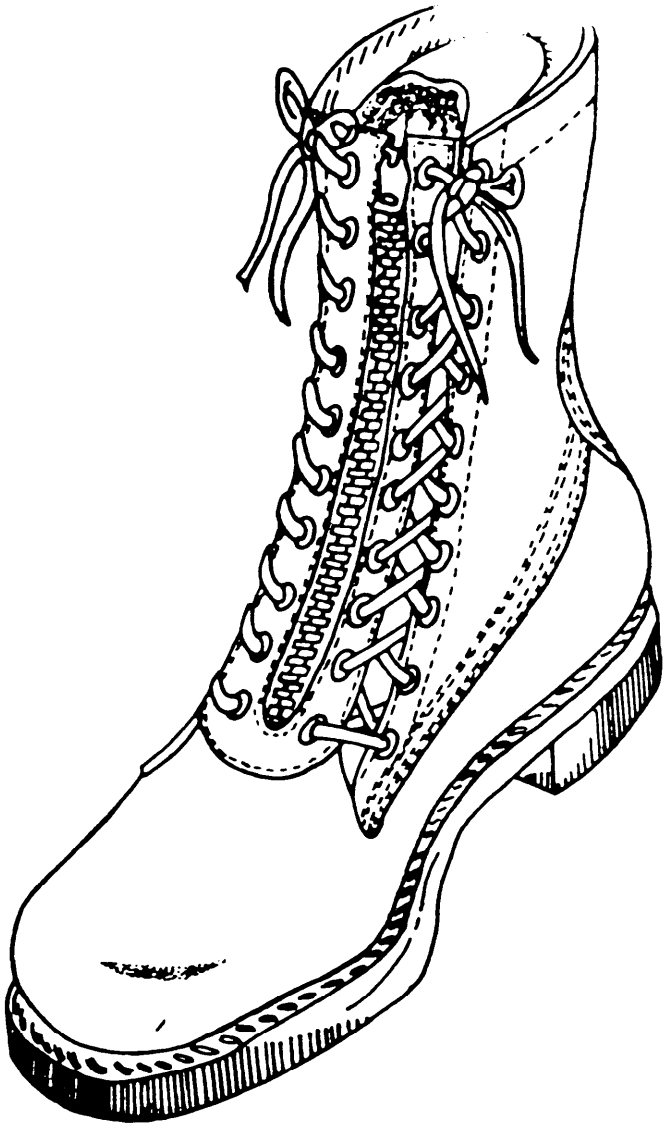

FIGURE 1. BOOT

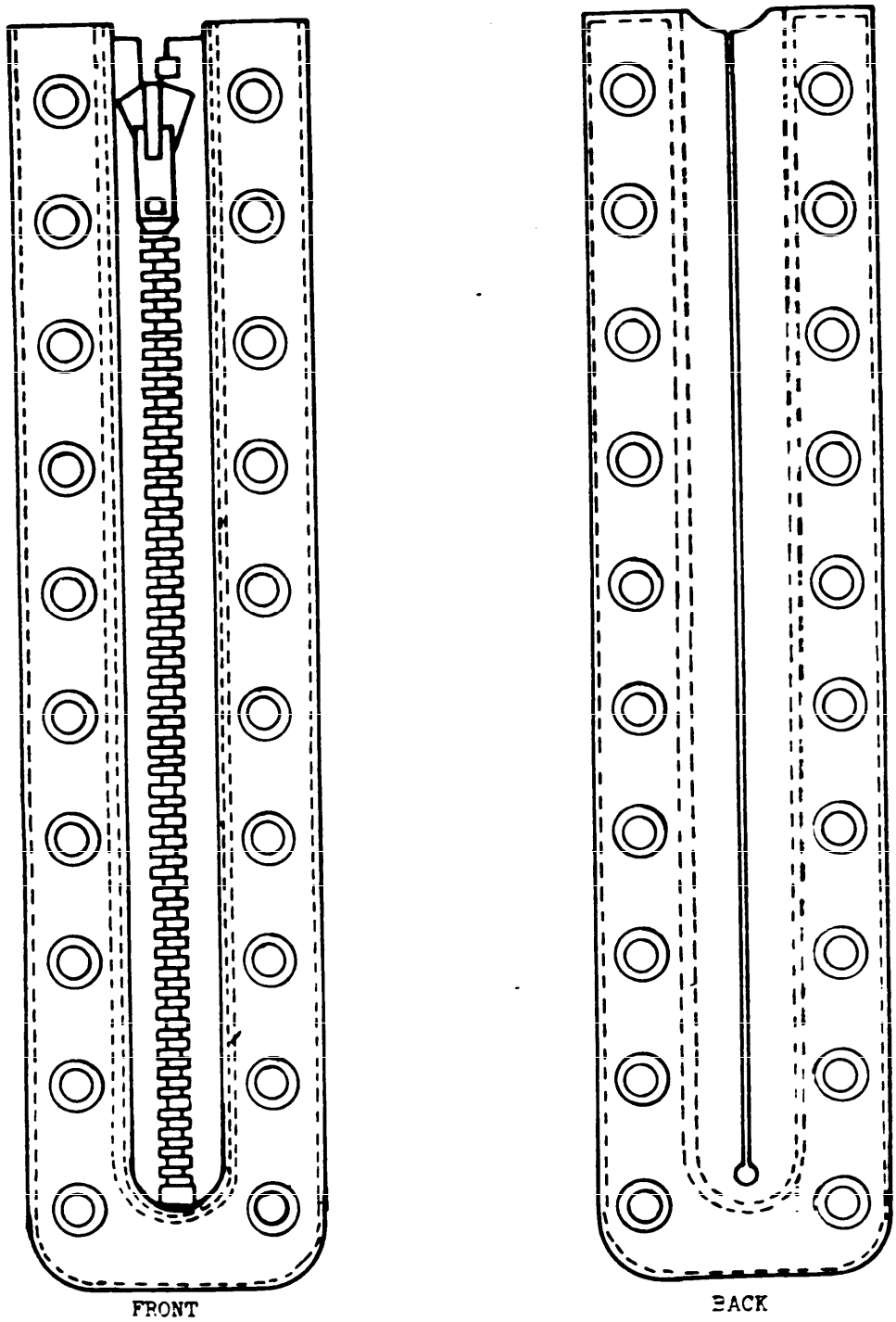

FIGURE 2. SLIDE-FASTENER UNIT

TABLE V. Skiving of Leather Parts

Part	Location
(Quarter)	(not necessary)
Vamp	throat, top edge
Backstay	bottom

3.7.2.1 Skiving of insulation. The insulation of the boot may be skived at the lasting edge if required.

3.7.3 Crimping. The tongues shall be crimped by actual placement on a crimping blade that is shaped with the curve of the boot front and the cone of the standard Government lasts. The plates shall be properly heated and shall be definitely impressed. The tongue parts shall be crimped singly. The vamps shall be crimped not more than one pair at a time. They shall be placed accurately on the crimping blade, and the machine plates shall be properly heated and shall be under carefully adjusted pressure.

3.7.4 Marking quarter lining, permanent identification. The inside quarter lining of each boot shall be marked with the correct size and width, the contractor's identification symbol, contract number, and the month and year (expressed in numerals) of the date of the contract. This marking shall be impressed into the grain side of the leather so that it is visible permanently without cutting through at any point and shall be placed approximately in the center of the inside quarter, 1/2 inch below the bottom edge of the top band. Figure shall be Arabic, and letters shall be Gothic. All figures and letters, except the size and width marking, shall be a minimum of 3/16 inch and a maximum of 3/8 inch in height. The size and width markings shall be in the first line of the nomenclature. The contractor's symbol shall be in a block as shown by the following example: AB

3.7.5 Upper fitting.

3.7.5.1 Closing quarters, vamps, vamp lining and quarter lining. Quarters and vamps shall be butted and closed at the backs using stitch type 304, 8 to 10 stitches per inch. The quarter lining shall be closed at the back using stitch type 301 or 401, 8 to 10 stitches per inch. The stitching shall be approximately 1/16 inch from the edge, shall be rubbed down and reinforced with the backseam tape on the flesh side with one row of stitching along each edge of the tape with 8 to 10 stitches per inch using stitch type 301. The quarter lining seam in the vamp area shall be closed using stitch type 304 with 8 to 10 stitches per inch and reinforced with backseam tape with one row of stitching along each edge using stitch type 301 with 8 to 10 stitches per inch.

3.7.5.2 Vamping and backstay fitting. Stitch quarters to vamps with two double rows of stitching, single or double needle, with the first row of stitching approximately 1/16 inch from the edge and the distance between the double rows of stitching shall be 1/8 to 3/16 inch. The backstay shall be

stitched to the quarters and vamp with two rows of stitching, single or double needle, approximately 1/16 inch apart with the first row approximately 1/16 inch from the edge.

3.7.5.3 Assemble lining to uppers. Stitch top band to upper edge of quarters, grain side to grain side with one row of stitching using stitch type 301, 8 to 10 stitches per inch, approximately 1/16 inch from the edge. Insert lining in uppers. Turn over top band and stitch quarters, quarter lining and top band together with one row of stitching approximately 1/16 inch from the first row of top band stitching using stitch type 301 with 10 to 12 stitches per inch. The vamp lining and vamp shall be cemented together in the throat area.

3.7.5.4 Gusset assembly. The insulated gusset lining shall be centered on the gusset in the tongue area and stitched all around with one row of stitching approximately 1/16 inch from the edge using stitch type 301.

3.7.5.5 Gusset fitting. The assembled gusset shall be stitched to the vamp and quarters. The gusset shall be stitched to the vamp throat, according to markers with two rows of stitching approximately 1/4 inch apart, with the first row approximately 1/16 inch from the edge of the gusset using stitch type 301. The stitching shall be through the gusset, vamp, and vamp lining. The gusset shall also be stitched to the forward edge of the quarters with two rows of stitching from the top edge of quarters to blucher ear. The first row of stitching shall be approximately 1/16 inch from the front edge of the quarter and the second row shall be approximately 1/2 inch from the first row. Stitch type shall be 301. Stitching at the top edge of quarter shall be through gusset, top band, lining, and quarter.

3.7.5.6 Barring. The vamp shall be barred with two rows of stitching uniformly spaced approximately 1/8 inch above and parallel to the top row of vamp stitching. The barring shall be 5/8 (plus or minus 1/16) inch in length on each blucher ear and shall be accomplished using a single needle or a double needle, 1/16-inch gage. Barring shall start at the top row of the eyelet stiching. The edge of the vamp lining shall be securely cemented, with a permanent type of cement, to the tongue where it contacts the vamp.

3.7.6 Eyelet quarters. Each quarter of boots in sizes 5 to 9-1/2 inclusive shall have nine eyelets, and each quarter of boots in sizes 10 to 13-1/2 inclusive shall have ten eyelets. The eyelets shall be inserted in accordance with the marker patterns, and the nearest edge of the eyelets shall not be closer than 1/8 (plus or minus 1/32) inch to the edge of the quarter. The eyelets shall be securely and smoothly clinched.

3.7.7 Lacing for lasting. The lacing for lasting shall be accomplished by lacing not less than three pairs of the bottom eyelets. The spacing of the lacing shall be 2-3/8 (plus or minus 1/16) inch.

* 3.7.8 Slide fastener unit. Insert slide fastener between two leather pieces and stitch together on the inside with two rows of stitching, single or double needle, as shown in Figure 2, using stitch type 301. Stitch all around the outer edge and top with one row of stitching approximately 1/16 inch from the edge using stitch type 301. The correct number of eyelets shall be attached on each side according to markers. A 3/32 inch, black, round braided nylon cord 5-1/2 inches ($\pm$1/2 inch long) shall be attached to pull tab.

3.7.9 Sole leather stock fitting. The grain side of the leather midsoles and the reverse side of the rubber outsoles shall be roughed their full length with coarse abrasive paper. Two coats of chloroprene adhesive shall be applied to the midsole. The first coat shall serve as a primer and shall be allowed to dry before the application of the second coat. A single coat of the same adhesive shall be applied to the buffed mating surface of the outsole. The combined leather midsole and rubber outsole shall then be molded to conform to the correct contour of the bottom of the boot and shall have a minimum bond strength of 8 pounds per inch of width when tested, as specified in 4.4.3.2.2. A boot which has been properly inseamed, inseam trimmed, and bottom filled and made over the pertinent size of width of last shall be used to check the contour of the molded sole combination. This contour shall be checked at the sole-laying operation not less than 8 hours after molding the sole.

3.7.9.1 Insole construction. The insoles shall be sorted for varying fibers to obtain uniform channeling and shall be cased for even weight. The insoles shall be fleshed and shall be rounded to the insole patterns. Diecut insoles will be acceptable provided they conform to last bottom paper patterns loaned by the Government. A plus or minus 1/64 inch tolerance from Government loaned insole patterns will be allowed.

3.7.9.2 Insole scoring. The lip scoring shall be located 2-9/16 inches from the heel end of a size 8 insole and shall grade from that size at the rate of grade obtained from a lip-cutting and scoring machine.

3.7.9.3 Insole channeling. The insoles shall be channeled on the flesh side. The channel leaf and outside lip shall be not less than one-third the thickness of the insole; the channel leaf shall be slightly thicker than the lip. The substance between the channel leaf and the lip shall be 1/64 inch greater than the combined thickness of the leaf and the lips. The channel leaf shall provide a height of rib to meet the requirements of the finished rib specified in 3.3.11. The channel margins shall be as follows:

a. The inside shank margin shall be 4-1/2/16 inch from the score line to a point 1 inch rearward of the inside ball.

b. The inside ball margin shall be 2-1/2/16 inch from a point 1/2 inch rearward of the ball line to a point 1/2 inch rearward of the box toe line.

c. The toe margin shall be 3/16 inch starting and ending 1/4 inch rearward of the box toe line.

d. The outside ball margin shall be 2-1/2/16 inch from a point 1/2 inch rearward of the box toe line to a point 3/4 inch rearward of the ball line.

e. The outside shank margin shall be 4-1/2/16 inch from a point 3/4 inch rearward of the ball line to the insole score line.

3.7.9.3.1 Assembly of stuck-on rib. When assembled, the stuck-on rib insole shall meet the requirements of 3.3.11 and 3.3.11.1.

3.7.9.4 Insole reinforcing. All insoles, except stuck-on rib insoles, shall be reinforced by the application of cotton duck specified in 3.3.15. The duck shall be coated on one side with an adhesive specified in 3.3.14 and shall be bonded to the flesh side of the insole. The duck shall cover

the entire area between the ribs from the score line forward, shall extend to the top of the upstanding rib, shall be firmly and smoothly fitted and bonded to the base and lip, and shall be trimmed to the required rib height. The insoles shall be coated with a chloroprene adhesive on the flesh side prior to attaching the coated duck. As an alternate, a 3/4 inch strip of the same duck material may be used and firmly bonded at the base and lip of the rib.

3.7.9.5 Joining insulating insole and insole. The sponge insulating insole shall be cemented to the insole, sponge side to grain side of insole.

3.7.10 Lasting. Uppers may be conditioned by any suitable means except that they shall not be dipped in water. The correct size and width of uppers, lasts and insole assembly shall be assembled. The insole assembly shall be tacked to the last with not less than 5 tacks; one in the center of the heel seat, one at the shank, one at each side of the ball, and one at the toe. Tacks shall not be larger than 2-1/2 ounces. Edges of the insole shall be flush with the last at all points. The heel seat of the insole shall be smooth and even with the heel seat of the last. The counters shall be well cemented before insertion. The correct size box toe, as specified in 3.3.18, shall be properly conditioned and inserted between the insulation and the vamp lining. The uppers shall be assembled to the lasts to provide a wiped-in heel seat of 1/2 to 9/16 inch. The uppers shall be drawn over the lasts with sufficient 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. Caution shall be exercised in the over-all lasting to insure that the insulation is not compressed or damaged. The sides of the boots shall be spindled, drawing the uppers snugly to the last, and then side-lasted so that when stapled the uppers will be held firmly and securely to the last. Care shall be taken to pull the vamp lining smoothly and tightly without any tears. The heel seat shall be wiped-in flat and shall be free from wrinkles. The toe shall be firmly and smoothly wiped-in and securely attached around the base of the insole rib.

3.7.10.1 Time allowance on lasts. The boots shall remain on the last until thoroughly dry.

3.7.11 Inseaming. Inseaming shall be done by machine with the thread thoroughly hot waxed, with proper tension on the thread, using a needle not larger than No. 41, and with not less than 3-1/4 stitches per inch. The welting shall be in proper temper to provide a tight seam without cracking the welt. The inseam shall be stitched from welt butt to welt butt to a point that will catch in the counter with one or two stitches.

3.7.12 Tack pulling and inseam trimming. Care shall be taken to remove all tacks, and no broken tack points shall remain. The inseam shall be carefully and closely trimmed from butt of welt to butt of welt without cutting or damaging the stitches. The ends of the welt shall be skived with a 5/8 (plus or minus 1/8) inch bevel, and the butts shall be tacked. The welt shall be beaten out smoothly while in temper and slashed or stretched around the toes.

3.7.13 Shank fitting, bottom filling. The shank shall be carefully selected for correct size in accordance with the shank casing schedule specified in 3.3.20.1. The shanks shall be positioned with the fiberboard cover filling the heel seat cavity. The forward end of the shank shall be flush with the insole, shall fit the contour of the bottom of the boot rearward of the ball line, and shall be anchored at both ends to the boot with a chloroprene adhesive. The bottom filler shall be applied and pressed firmly into the insole channel around the toe, extending to the forward end of the shank, with a uniform and even surface. The bottom shall present a firm, flat, smooth surface for sole laying. Any cavities between the shank cover and the insole rib at the heel portion shall be filled with bottom filler.

3.7.14 Sole laying. The bottom of the boots shall be cemented all over with a synthetic adhesive. After the combined leather midsole and rubber outsole have been properly cemented and molded, as specified in 3.7.9, they shall be placed on the sole-laying machine under pressure to hold the sole to the welt at all points. The soles shall be laid evenly and shall be of an adequate size to obtain the specified edge extension, as specified in 3.7.9.3.

3.7.15 Rough rounding. The soles shall be smoothly rounded on a rough rounding machine to provide for the edge extension of sole and welt specified in 3.7.9.3.

3.7.16 Goodyear stitching soles and welts together. Soles and welts shall be stitched together on a lock stitch machine, using the thread specified in 3.3.26.2. The thread shall be thoroughly waxed. A needle and an awl not larger than No. 45 shall be used. The stitching shall be 5 to 7 stitches per inch and shall be laid on the surface of the welt and close to the feather edge of the welt on the finished boots. The lock shall be placed just under the surface of the outsole.

3.7.17 Heel seat fastening. The heel seat fastening shall be done by a fiber fastening machine using pegs specified in 3.3.23. When fastening is accomplished using automatic (gang fastener) equipment, the pattern provided by the equipment will be acceptable. When pegs are driven one at a time, there shall not be less than four to the inch. Pegs shall be properly positioned at the edge of the insole from welt butt to welt butt. When brass nails are used, they shall be driven three to the inch.

3.7.18 Heel seat rounding. The leather midsole and rubber outsole shall be smoothly rounded in the heel seat area from butt of welt to butt of welt.

3.7.19 Leveling. Bottoms shall be progressively leveled while in temper on a leveling machine by means of metal rolls. The machine shall be adjusted to level the bottoms of the sole from the toe back to the heel breast line. As an alternate, any suitable equipment may be used, that will adequately level the sole bottom while in temper.

3.7.20 Heeling. The heels shall be attached with 13 nails of material specified in 3.3.21. The nails shall be of a length to insure a secure, smooth clinch on the insole assembly. Care shall be taken that the heeling machine is equipped with proper length drivers to drive the nails firmly and evenly against the heel core and the nail heads below the surface of the heel so they are not visible. Nails shall not be driven in the heel tread pattern.

3.7.21 Heel trimming and finishing. The heels shall be trimmed and scoured smoothly. The heel breastline shall not be scoured. The leather midsole in the heel seat area shall be stained to match the sole edge.

3.7.21.1 Edge trimming. The edges shall be trimmed square with the required finished extension of the outside ball 4/16 (plus or minus 1/32) inch, toe and inside ball 3/16 (plus or minus 1/32) inch, measured at right angles. The edges of the outsole, the midsole, and the welt shall be smoothly joined.

3.7.21.2 Edge setting. The leather portion of the edge (welt and midsole) shall be stained to match the color of the upper leather and set on the edge setting machine and made smooth and bright. The top surface of the welts shall be black. No iron stain shall be permitted.

3.7.22 Finishing.

3.7.22.1 Preparation. The boots shall be properly cleaned, removing the accumulated dirt, wax, cement, and any other foreign matter. All threads ends shall be trimmed.

3.7.22.2 Treeing. The boots shall be treed, while on the lasts or on a treeing machine, using right and left tree feet conforming to the last. All wrinkles shall be removed from the interior and the exterior of the boots. No material shall be used that might injure the leather or the thread.

3.7.22.3 Final finish. The boots shall be repaired, properly filled, and given a top finish by the sponge or the spray method with materials and methods, as specified in 3.3.29 to 3.3.32 inclusive. All raw edges (including backstay, quarter, slide-fastener unit, and slide-fastener pocket) shall be stained to match the upper leather.

3.7.22.4 Edge pad and brush. The edges of the sole and the heel shall be padded and brushed to a bright finish.

3.7.23 Cementing heel pads. Heel pads shall be coated with cement over the entire surface on the flesh side and shall be pressed firmly into the heel portion of the insole cover at all points.

3.7.24 Lacing. The boots shall be properly mated. The pair of laces for each boot shall be inserted through either of the top eyelets on the boot and through the matching top eyelet on the slide-fastener insert and tied in place. The slide-fastener insert and balance of the laces shall then be inserted into the boot.

3.8 Workmanship. The finished boots shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptance quality level.

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 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 specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certification of compliance. Where certificates of compliance are submitted, the Government reserves the right to check 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).

4.3 First article inspection. When required, (see 6.2), the first article sample submitted in accordance with 3.2 shall be examined in accordance with 4.3.4, for compliance with design, construction, workmanship and dimensional requirements.

4.4 Quality conformance inspection. Inspection shall be in accordance with the provisions set forth in MIL-STD-105, except where otherwise indicated herein.

* 4.4.1 Component and material inspection. In accordance with 4.1 above, components and materials shall be tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents. In addition, testing shall be performed on components and materials listed in Table VI. When data in the "Number of Determinations Per Sample Unit" and "Results Reported As" columns are not specified in Table VII, they shall be reported as required by the referenced test methods. 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 fail to meet any requirements specified. The sample size shall be as follows:

Lot size	Sample size
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

4.4.1.1 Examination of insoles. The leather insoles shall be examined for visual and dimensional requirements conforming to the provisions of the end item examination of KK-I-570. The texorist insoles shall be examined for defects listed below:

The inspection level shall be level II and AQL shall be 4.0 defects per 100 units. Any hole, cut, tear or gorge. Any brittle area or evidence of delamination. Thickness not as specified. Sole outline not conforming to required pattern.

4.4.1.2 Examination of midsoles. The midsoles shall be examined for visual and dimensional requirements conforming to the provisions of the end item examination of KK-L-165.

4.4.1.3 Examination of counters. The counters shall be examined for visual and dimensional requirements conforming to the provisions of the end item examination of MIL-C-41814.

TABLE VI. Testing of Components

Component and Unit of Product	Characteristic	Specification Reference		Requirement Applicable to		No. of Determinations per Sample Unit	Results Reported As	Sample Unit
		Requirement Paragraph	Test Method	Sample Unit	Lot Average			
Upper Leather (one side or skin)	Material Ident.	3.3.1	1/					One piece 3/ 8" X 8"
	Break	3.3.1	D-2941	X		1	Nearest scale No.	
	Chrome Tannage	3.3.1	1/					
	Thickness	3.3.1	1011 3/	X		1	Nearest 1/2 ounce	
Lining Leather (one side or skin)	Material Ident.	3.3.4	1/					One piece 8" X 8"
	Chrome Tanning	3.3.4	1/					
	Thickness	3.3.4	1011 3/	X		1	Nearest 1/2 ounce	
	Grain							
	Finish	3.3.4	1/					
	Color	3.3.4	1/					
Heel Pads	Material Ident.	3.3.7	1/					
	Thickness	3.3.7	1011 3/	X		1	Nearest 1/2 ounce	
Counter (Polyethylene)	Material Ident.	3.3.10.2	1/					1 blank 4-1/2 X 1-1/2 X 1/8
	Specific Gravity	3.3.10.2	D-792 2/					
	Melt Index	3.3.10.2	D-1238 2/					
	Elongation	3.3.10.2	D-412 2/					
	Stiffness	3.3.10.2	D-1043 2/					
	Brittle Temperature	3.3.10.2	D-746 2/					
	Water Absorption	3.3.10.2	D-570 2/					
	Volatility loss	3.3.10.2	D-1203 2/					
	Strength	3.3.10.2	Table I					

TABLE VI. Testing of Components (Cont'd)

Component and Unit of Product	Characteristic	Specification Reference		Requirement Applicable to		No. of Determinations per Sample Unit	Results Reported As	Sample Unit
		Requirement Paragraph	Test Method	Sample Unit	Lot Average			
Stuck-on Rib Fabric	Material Ident.	3.3.11.1	1/					
	Weight	3.3.11.1	1/					
	Thread Count	3.3.11.1	1/					
	Breaking Strength	3.3.11.1	1/					
Upper Leather Insulation	Material Ident.	3.3.13.1, Table II	1/					
	Compression Deflection	"	1/					
	Density	"	1/					
	Water Absorption	"	1/					
	Compression Set	"	1/					
	Dimensional Change	"	1/					
	Flammability	"	1/					
	Low Temp. Resistance	"	1/					
	Thermal Conductivity	"	1/					
	Thickness	"	1/					
	Tensile Strength	"	1/					
	Oil Resistance	"	1/					
	Elongation	"	1/					
	Odor	"	1/					
Insole Insulation	Thickness	3.3.13.2	Gage		X	3	Nearest 1/64 inch	One piece 8" X 8" inch
Texorist	Copper 8 Quinolinolate	3.3.5	1/					

TABLE VI. Testing of Components (Cont'd)

Component and Unit of Product	Characteristic	Specification Reference		Requirement Applicable to		No. of Determinations per Sample Unit	Results Reported As	Sample Unit
		Requirement Paragraph	Test Method	Sample Unit	Lot Average			
Insulating Insole Leather	Material Ident.	3.3.17	1/					
	Thickness	3.3.17	1011 3/					
	Finish	3.3.17	1/					
Box Toes (napped cloth 1 yard)	Material Ident.	3.3.18	1/					
	Thickness	3.3.18	1/					
Shank Board	Material Ident.	3.3.20.1	1/					
	Thickness	3.3.20.1	Gauge		X	3	Nearest 1/128 inch	1 pair
Steel Shank	Material Ident.	3.3.20.2	1/					
	Hardness	3.3.20.2	243 4/			3	Nearest Number	2 shanks
	Coating Ident.	3.3.20.2	1/					
	Overall Thickness	3.3.20.2	Gauge		X	1	Nearest .001 inch	
Nails (Heel Attaching) 1 Pound	Material Ident.	3.3.21	B-36 and B-134 2/	X		1	Pass or fail	1/4 pound
	Gage	3.3.21	3.3.21	X		1	Pass or fail	
Tacks and Nails (1 Pound)	Material Ident.	3.3.22	B-36 2/	X		1	Pass or fail	1/4 pound

TABLE VI. Testing of Components (Cont'd)

Component and Unit of Product	Characteristic	Specification Reference		Requirement Applicable to		No. of Determinations per Sample Unit	Results Reported As	Sample Unit
		Requirement Paragraph	Test Method	Sample Unit	Lot Average			
Pegs and Nails (Heel Seat)	Material Ident.	3.3.23	1/					
	Gage	3.3.23	1/					
Eyelets	Material Ident.	3.3.24	1/					
	Thickness	3.3.24	1/					
	Outside dia. flange	3.3.24	1/					
	Outside dia. of barrel	3.3.24	1/					
	Dia. of hole before setting	3.3.24	1/					
	Overall length	3.3.24	1/					
Bottom Filler (1 Pound)	Material Ident.	3.3.25	3/					1 Pound
	Solubility of binder in water	3.3.25.1 & 3.3.25.2	3/					
	Softening point of binder	3.3.25.1 & 3.3.25.2	E-28 2/		X	2	Nearest Degree	
	Penetration of binder	3.3.25.1	D-5 2/		X	2	Number	
Wax	Material Ident.	3.3.27	1/					

1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.
2/ Refers to ASTM methods.
3/ Refers to FED-STD-311.
4/ Refers to FED-STD-151.

4.4.2 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing processes to determine whether operations or assemblies are accomplished as specified. The Government reserves the right to exclude from consideration for acceptance any material or services for which in-process inspection has indicated nonconformance.

4.4.3 Intermediate inspection.

4.4.3.1 Visual examination. The defects found during intermediate examination shall be classified in accordance with 4.4.3.1.1 and 4.4.3.1.2. The applicable inspection levels and acceptable quality levels (AQL's) shall be as indicated in 4.4.3.1.3.

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

4.4.3.1.1 Examination of uppers after all fitting. The upper assembly shall be examined for defects in cutting, fitting and other construction characteristics which cannot be seen in the end item. The sample unit shall be one completely fabricated upper assembly prepared for lasting. The lot size shall be expressed in units of one upper.

TABLE VII. Upperassembly intermediate visual examination.

Examine	Defect	Classification	
		Major	Minor
Construction and Workmanship (General)	Construction not as specified	X	
	Any component missing or not specified type	X	
	Any component misplaced or not affixed as specified	*	
	Any component damaged	*	
	Any component not skived as specified	X	
	Lining back and toe seam not rubbed down and reinforced	X	
	Reinforcing tape not caught in both rows of stitching		X
Quality of leather	Thickness more than 1/2 ounce less than the minimum specified	X	
	Thickness less than the specified minium, but not exceeding 1/2 ounce less		X
	Thickness more than the maximum specified		X
	Slaughter cut or otherwise damaged	X	
	Course or rough fiber on flesh side	*	
	Off-stretch cut	X	

4.4.3.1.2 Examination of boot before bottom filling. The partially fabricated boot shall be examined for defects in construction and workmanship which cannot be seen in the end item. The sample unit shall be one partially constructed boot at a point after lasting and attachment of shank but before the application of bottom filler. The lot size shall be expressed in units of one boot.

TABLE VIII. Partially fabricated boot intermediate visual examination.

Examine	Defect	Classification	
		Major	Minor
Bottom of boot	Any component missing or not specified type	X	
	Shank not properly positioned and not fitting contour of boot bottom	X	
	Shank wrong size, malformed or not securely attached		X
	Any tear in cotton duck or stitched area:		
	- more than 1/2 inch	X	
	- less than 1/2 inch		X
	Any insole tack not removed	X	
	Excess leather in heel seat interferring with fit of shank		X
	Poor heel seat, side or toe lasting	*	
	Upper damaged	*	
	Inseam not properly trimmed	*	
	Less than 3 stitches per inch on inseam	X	
	Less than 3 1/4 but not less than 3 stitches per inch on inseam		X
Shoe bottom	Inseam stitches broken, cut, skipped or damaged	X	
	Inseam stitches not at bottom of rib or in welt groove	X	
	Broken insole rib	X	
	Ends of counter not caught in inseam stitching		X
	Welt not laid out		X
	Welt butt not skived		X
	Welt butt not tacked in butt area		X
	Any operation omitted or improperly performed		

TABLE VIII. Partially fabricated boot intermediate visual examination. - Continued.

Examine	Defect	Classification	
		Major	Minor
Upper part of boot	Uppers not tightly pulled down to last		X
	Lace opening more or less than specified		X
	Quarters not laced as specified		X

4.4.3.1.3 Inspection level and AQL's for intermediate examination.

		AQL	
	Inspection level	Major	Total
For defects applicable to 4.4.3.1.1 and 4.4.3.1.2	II	2.5	6.5

4.4.3.2 Intermediate testing.

4.4.3.2.1 Testing of intermediate product (combined rib and insole). When used, the stuck on rib shall be tested for compliance with the requirements of 3.3.11.2 according to 4.5.2.1 and 4.5.2.2. The sample unit shall be one assembled insole and the sample size shall be ten insoles (five for each test) regardless of lot size. Requirements are applicable to the sample unit. The lot shall be unacceptable if one or more sample units fail to meet the specified requirement. All test reports shall contain the individual values utilized in expressing the final results.

4.4.3.2.2 Outsole-midsole assembly. The outsole-midsole assembly shall be tested for compliance with the requirements of 3.7.9 when tested as specified in 4.5.1. All test reports shall contain the individual values utilized in expressing the final result. The sample unit shall be one cemented outsole-midsole unit. The lot size shall be expressed in terms of one cemented midsole-outsole unit. Requirements are applicable to the sample unit. The lot shall be unacceptable if one or more sample units fail to meet the requirement specified. The sample size shall be as follows:

Lot size	Sample size
800 or less	2
801 thru 22,000	3
22,001 and greater	5

4.4.4 Inspection of the end item.

4.4.4.1 Examination of the end item. The defects found during examination shall be classified in accordance with 4.4.4.1.1 and 4.4.4.1.2. The inspection levels and AQLs shall be as indicated in 4.4.4.1.3.

4.4.4.1.1 Visual examination of the end item. The boots shall be examined for defects in pairing, design, material, construction, workmanship, finishing and marking. The sample unit shall be one completely fabricated boot and the selection shall be by pairs. The lot size shall be expressed in units of the

boot. Defects of pairings shall be classified as a single defect. Heel pads removed by the Government during verification examination shall be replaced by the supplier.

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

TABLE IX. End item visual examination.

Defect	Major	Minor
PAIRING		
Not properly mated, that is, right and left not same size or wide variation in color, appearance, or grain texture of leather	X	
Box toe crooked, long or short	*	
CLEANNESS		
One or more spots or stains not removed		X
One or more spots or stains of a permanent nature	*	
COLOR AND FINISH		
Any exposed cut edge of leather not stained to match upper		X
Uppers not finished as specified or finish is streaky, chipping, or flaky	*	
Pattern marker line not removed		X
Not specified color	X	
MATERIAL		
GENERAL		
Any component not as specified	X	
UPPER LEATHER (INCLUDING SLIDE-FASTENER INSERT AND GUSSET)		
Not full grain	X	
Open grub or tick damage, brands, honey, loose, pipey flanky, heavy fat wrinkles, veins, and any otherwise inferior leather	*	
Healed grub or tick damage	*	
Stretchy vamp	X	

TABLE IX. End item visual examination. - Continued.

Defect	Major	Minor
CONSTRUCTION AND WORKMANSHIP		
Boot twisted or otherwise misshapen, for example, back-stay not centered	X	
Any component missing	X	
Any defective component or defect of assembly not herein classified		*
Any cut, tear, hole, rip, repair, abrasion, or any other damage		*
Any part misplaced, required operation omitted or required operation not properly performed not herein classified		*
Blucher points out of alignment		*
Lining and insulation not a good compatible fit to upper, for example, too full or too tight		*
Wrinkled or bunched area at the back seam or any other location		*
Any other lasting defect not classified herein		*
Assembly not properly fitted and seriously affecting serviceability	X	
SEAMS AND STITCHING		
GENERAL		
Loose tension resulting in a loosely secured seam		*
Tight tension resulting in puckering or cutting of leather or stress on assembly		*
Not specified stitch or seam type	X	
Lining closing containing less than 8 stitches per inch but not less than 6 stitches per inch		X
Lining closing has less than 6 stitches per inch	X	
Any row of stitching, except lining closing, with less than 10 stitches per inch but not less than 8 stitches per inch.		X
Any row of stitching, except lining closing, with less than 8 stitches per inch	X	

TABLE IX. End item visual examination. - Continued.

Defect	Major	Minor
More than the specified maximum number of stitches 1/	*	
Gage of stitching not as specified or irregular	*	
Required stitching omitted	*	
Thread ends not trimmed		X
Needle holes or needle chews	*	
Wrinkle or fold	*	
Open seam	*	
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 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.		
GOODYEAR STITCHING		
Less than 5 or more than 9 stitches per inch	X	
More than 7.5 but not more than 9 stitches per inch		X
One skipped or broken stitch	*	
More than one skipped or broken stitch	X	
Welt damaged by stitching	*	
Stitch locks laying on the surface for a distance of 1 inch or less		X
Stitch locks laying on the surface for a distance more than 1 inch	X	
COUNTERS		
Rolled, curled, or soft counter	*	
EYELETS		
One or more eyelets missing	X	
Eyelet out of alignment to the extent of interfering with proper lacing	X	
More eyelets on one side than on the other	X	
Edge of eyelet less than 3/32 or more than 5/32 inch from the edge of the quarter		X

TABLE IX. End item visual examination. - Continued.

Defect	Major	Minor
Eyelet not black in color		X
Eyelet not properly centered		X
Eyelet not coated with enamel		X
One or more insecurely clinched eyelets, that is, eyelet moving when held between fingers or pulling away from leather	X	
Improper clinching of eyelets, resulting in cutting of leather	X	
Any sharp burrs or metal slivers	X	
SLIDE FASTENER		
Inoperative	X	
Binds or otherwise difficult to operate	X	
Not properly positioned or otherwise defective, seriously affecting serviceability	X	
Not properly positioned or otherwise defective, affecting serviceability, but not seriously		X
Pull-tab cord missing or not properly affixed or not type specified		X
Slide fastener reversed on assembly	X	
Slide fastener not specified type	X	
Slide fastener not specified finish		X
EDGE MAKING		
Edge trimmed into the Goodyear stitching	*	
Trimming irregular or edges not trimmed square		X
Sole extension less than minimum specified	*	
Sole extension greater than maximum specified		X
Edges not set as specified	*	
Checked sole, i.e., separation between midsole and outsole	*	

TABLE IX. End item visual examination. - Continued.

Defect	Major	Minor
INSEAMING		
Grinning seam, that is, thread exposure	X	
Strained seams, that is needle holes visible but thread not exposed		X
HEEL FINISHING AND ATTACHING		
Heel not finished square, that is, pronounced flare or taper		X
Heel not finished uniformly to required smoothness		X
Open heel seat	*	
Checked heel, i.e., separation of heel and outsole	*	
Crooked or not correct size heel		X
INSOLE, INSULATION AND COVER		
Insole cover not smooth, contains ridges, not lying flat, or not completely cemented to insulation or insole	X	
Short by 3/16 inch or more	X	
Short by 3/32 inch but less than 3/16		X
Any protruding point of tack, nail, or fiber peg in heel area	X	
Any protruding point or nail or tack forward of heel breast	2/	
Heel pad - not firmly and completely adhered to heel seat		X
MARKINGS		
Size or width marking missing or illegible	X	
Any marking (except size or width marking) missing, incorrect, incomplete, illegible, not applied in specified manner, misplaced, or not of specified size		X

1/ A plus tolerance of three stitches will be allowed for stitching over heavy places or turning sharp corners.

2/ This defect shall be cause for rejection of the entire lot.

4.4.4.1.2 Examination of heel nailing. The boots shall be visually examined for defects in heel nailing. The sample unit shall be one boot, and the lot size shall be expressed in terms of the boot. The following conditions shall be classified as defects in heel nailing:

a. More than three nails, other than center back or corner breast nails, unclinched or run-off insole.

b. Any corner breast nail or center back nail unclinched or run-off insole.

c. More than two back nails (not including dead-center back) unclinched or run-off insole.

d. Any heel nail missing.

NOTE: Evidence of brass on the insole shall indicate clinching.

4.4.4.1.3 Inspection level and AQL for end item examination. The inspection levels and AQL's expressed in defects per 100 units shall be as follows:

	Inspection level	AQL
For defects applicable to 4.4.4.1.1	II	2.5 Major 6.5 Total
For defects applicable to 4.4.4.1.2	I	6.5 (one class)

4.4.5 Inspection of packaging. An examination shall be made to determine that the packaging, packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully prepared for delivery except that it need not be sealed. Defects of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per hundred units.

Examine	Defect
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified. Any component damaged, affecting serviceability.
Workmanship	Inadequate application of components, such as; incomplete closure of container flaps, loose strapping, improper taping, or inadequate stapling. Bulged or distorted container.
Contents	Number of intermediate packages is more or less than required.

4.5 Test.

4.5.1 Bond strength of outsole to midsole.

4.5.1.1 Specimen. The specimen shall be a combined midsole-outsole unit which has aged at least 2 days. The outsole shall be separated from the midsole for a distance of approximately 2 1/2 inches from the toe end of the specimen.

4.5.1.2 Apparatus. A power-driven portable gage tong adhesion machine or an approved portable testing device of equal performance shall be used. The rate of travel of the power actuated grip shall be 2 inches per minute. The machine shall be operated without any device for maintaining maximum load indication.

4.5.1.3 Procedure. The separate toe ends of the specimen shall be clamped in the jaws of the machine, with the jaws 2 inches apart. The specimen shall extend outward at right angles to the direction of the application load. The machine shall be started and the outsole shall be pulled apart for a distance of 1 inch. At that instant, the load indicated on the machine shall be read and recorded. The load shall be divided by the width of the specimen at the corresponding line of separation and reported as pounds per linear inch of width.

4.5.2 Shear strength and stitch strength of combined rib and insole.

4.5.2.1 Shear strength. A 1 inch by 2 1/2 inch specimen shall be cut from the insole. The long edge of the specimen shall be perpendicular to the rib and shall include an inch width of the upstanding rib and the edge of the insole. The upstanding rib shall be clamped in one jaw of a Scott or similar tester, and the unattached leather shall be clamped in the other jaw. The rate of separation of the jaws shall be 12 $\pm$2 inches per minute under no load. The bond separating or breaking force shall be recorded to the nearest 1 pound. Specimen failures caused by rupture of the leather shall not be recorded.

4.5.2.2 Stitch strength. A specimen as described in 4.5.2.1 shall be cut and two holes shall be drilled in the middle of the height of the upstanding rib, using a 5/64 inch diameter drill. The holes shall be 1/4 $\pm$1/64 inch apart, equidistant from the center line that bisects the 1 inch dimension of the specimen. A steel wire 0.041 $\pm$0.002 inch in diameter in a "U" shape or the largest "U" shape of a paper clip, shall be passed through the two holes so that clip pulls against the fabric side of the rib. The free leather end shall be clamped in the lower jaw of a Scott or similar tester, while the wire ends are clamped in a wrapped top jaw; and the specimen tested as specified in 4.5.2.1. The moment of initial tear shall be noted as the stitch strength of the specimen.

5. PACKAGING

5.1 Preservation. Preservation shall be level A, C or Commercial as specified (see 6.2).

* 5.1.1 Level A. Each boot shall be separated one from the other by a sheet of paper not less than 30 pounds basic weight (24 by 36), grade B of UU-P-268. Each mated pair of boots shall then be packaged in a box conforming to type CF, domestic class, style RSC of PPP-B-636. The box shall be fabricated from corrugated medium fiberboard with a bursting strength of 125 pounds per square inch. The outside dimensions of the box shall be 14 7/8 inches in length,

11-5/8 inches in width, and 5 inches in depth. The box shall be completely sealed around the center length of the box with a 3-inch width of gummed paper tape. The tape shall conform to type III of PPP-T-45.

* 5.1.2 Level C. Each boot shall be separated one from the other by a sheet of paper not less than 30 pounds basis weight (24 by 36), Grade B of UU-P-268 and each mated pair of boots shall be packaged to conform to the MIL-STD-794 requirements for this level.

5.1.3 Commercial. The commercial/industrial preservation of the boots shall conform to the requirements of ASTM D 3951-82.

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

5.2.1 Level A. Six pairs of boots of the same size and width, packaged as specified in a fiberboard container, shall be placed on end (upright position), two along the length and three across the width of the container. The fiberboard container shall conform to class weather resistant, size No. 3 of MIL-B-17757. Closure requirements for the container shall be as specified in the container specification. Toward the end of the contract or when there are less than the required amount per container of the same size, mixed sizes may be packed within the same container. The unit packing marking shall be located on the upper left hand section of the side panel of the container.

5.2.2 Level B. Boots shall be packed as specified in 5.2.1, except that the fiberboard container shall conform to class domestic, grade 275, size No. 3 of MIL-B-17757.

5.2.3 Level C. Boots packaged as specified in 5.1 shall be packed in containers conforming to the MIL-STD-794 requirements for this level.

5.2.4 Commercial. The boots packaged as specified shall be packed in accordance with the requirements of ASTM D 3951-82.

5.3 Marking. In addition to any special markings required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129 or ASTM D 3951-82, as applicable.

5.3.1 Mixed sizes. Each shipping container packed with mixed sizes (see 5.2.1) shall have securely attached to the end and side white paper labels 5 by 4 inches. The words "MIXED NSN's" shall be plainly printed thereon and under these words shall be legibly printed or stencilled the quantity and the NSN's of boots container therein.

* 5.4 Palletization. Unitized loads, commensurate with the level of packing specified in the contract or order shall be palletized in accordance with MIL-STD-147. Palletized loads shall be uniform in size and quantities to the greatest extent possible. If the container is of a size which does not conform to any of the pallet patterns specified in MIL-STD-147, the pallet pattern used shall first be approved by the contracting officer.

6. NOTES

6.1 Intended use. The boots covered by this specification are intended for use by flight personnel.

6.2 Ordering data.

* 6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Sizes and widths required (see 1.2).

c. When a first article is required (see 3.2, 4.2 and 6.3).

d. Selection of applicable level of packaging and packing (see 5.1 and 5.2).

e. When pulletization is required (see 5.4).

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 first article should consist of one finished pair of boots. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for inspection and approval of the first article.

6.4 Samples. For access to samples, address the procuring officer issuing the invitation for bids.

6.5 The margins of this specification 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.

Custodian:
Air Force - 99
Army - 6L

Review activity:
DLA - CT

User activity:
11
45

Preparing activity:
Air Force - 82

(Project 8430-0356)

U.S. GOVERNMENT PRINTING OFFICE: 1985 - 605-036/24336

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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

☆ U.S. Government Printing Office: 1987—360-979/5804

(Fold along this line)

(Fold along this line)

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 73236 WASH DC

POSTAGE WILL BE PAID BY HQ U.S. AIR FORCE

SAN ANTONIO AIR LOGISTICS CENTER/MMEDO
KELLY AFB, TEX 78241

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-B-27486C	Boots, FLYER'S, FWU-3P

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

force: 21724415 delete "men's" from title. ... under DRAWING: All