

MILITARY SPECIFICATION

SHOE, MOLDERS

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 materials and manufacture of a Molders style work shoe with safety-toe and oil resistant soles and heels.

1.2 Classification. The shoes shall be of one type in the following whole and half sizes and width as specified (see 6.2).

<u>Sizes</u>	<u>Widths</u>
4 - 14 1/2	XN - Extra narrow
4 - 14 1/2	N - Narrow
4 - 14 1/2	R - Regular
4 - 14 1/2	W - Wide
4 - 14 1/2	XW - Extra wide

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards and handbooks 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.

SPECIFICATIONS

FEDERAL

C-F-206 - Felt, Sheet: Cloth, Felt, Wool, Pressed
V-T-285 - Thread, Polyester

Beneficial comments (recommendations, additions, and deletions) and any pertinent data which may be of use in improving this document should be addressed to: Officer in Charge, Navy Clothing and Textile Research Facility, 21 Strathmore Road, Natick, MA 01760 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 8430

- V-T-295 - Thread, Nylon
- KK-I-570 - Insole, Footwear, Leather, Cattlehide
- TT-C-490 - Cleaning Methods and Pre-treatment of Ferrous Surfaces for Organic Coatings
- TT-C-735 - Standard Test Fluids Hydrocarbon
- 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

MILITARY

- MIL-C-13924 - Coating, Oxide, Black, For Ferrous Metals
- MIL-B-17757 - Boxes, Fiberboard, Corrugated (Modular Sizes)
- MIL-S-22777 - Soles and Heels, Rubber, Traction Tread, Shoe
- MIL-C-41814 - Counters, Footwear
- MIL-L-43585 - Lasts, Footwear, Shoe, Safety-toe, Men's, US MIL-7

STANDARDS

FEDERAL

- FED-STD-151 - Metals; Test Methods
- FED-STD-191 - Textile Test Methods
- FED-STD-311 - Leather, Methods of Sampling and Testing
- FED-STD-601 - Rubber; Sampling and Testing
- FED-STD-751 - Stitches, Seams, and Stitchings

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage

(Copies of specifications, standards, drawings, and publications required by contractor in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

LAWS AND REGULATIONS

U.S. POSTAL SERVICE MANUAL

(Copies of the manual may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS STANDARDS

- D-5 - Test for Penetration of Bituminous Materials
- D-412 - Tension Testing of Vulcanized Rubber
- D-570 - Test for Water Absorption of Plastics
- D-746 - Test for Brittleness Temperature of Plastics and Elastomer by Impact
- D-790 - Flexural Properties of Plastics and Electrical Insulating Materials
- D-792 - Test for Specific Gravity and Density of Plastics by Displacement
- D-1043 - Test for Stiffness Properties of Non-rigid Plastics as a Function of Temperature by Means of a Torsional Test
- D-1203 - Test for Loss of Plasticizers for Plastic Materials (Activated Carbon Methods)
- D-1238 - Measuring Flow Rates of Thermoplastics by Extrusion Plastometer
- D-1708 - Tensile Properties of Plastics by Use of Microtensile Specimens
- D-2240 - Test for Indentation of Rubber by Means of a Durometer
- E-28 - Test for Softening Point by Ring and Ball Apparatus

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

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI 241.1 - 1972 - American Standard for Men's Safety-Toe Footwear

(Application for copies should be addressed to American National Standards Institute, 1430 Broadway, New York, NY 10018).

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

NATIONAL MOTOR FREIGHT CLASSIFICATION

(Application for copies should be addressed to American Trucking Association, ATTN: Traffic Department, 1616 P Street, Washington, DC 20036).

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, ILL 60606.)

3. REQUIREMENTS

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

3.2 First article. When specified (see 6.2), the contractor shall furnish sample unit(s) for first article.

3.3 Materials.

3.3.1 Upper leather (vamps and quarters). The uppers shall be cut from the best quality green-salted, chrome tanned sides. The sides shall be full grain or corrected grain and shall be 4 1/2 to 6 ounces in thickness. The area of a side shall not exceed 28 square feet and the tannery lots shall not exceed 25,000 square feet. The grain side shall have a light application of black finish containing only a sufficient amount of pigment to assist in obtaining a smooth surface with uniform color. The color of the flesh side may be natural or black. Embossing or printing of leather shall not be permitted. The break in the leather shall not be more than a break scale of 6 (see 4.4.5.1). Cut parts shall be examined as specified in 4.4.2.2. Upper leather defects such as fat wrinkles, pits, stretchy leather, or insect damages shall not appear in the vamp unless barely perceptible. Cut parts with scratches slaughter cuts, pronounced veins, cuts on grain surface of leather, brands, or light flesh cuts that show through on the grain surface of the leather shall not be used. Flanky, boney, loose, pipey, cracked or any rough or coarse grain leather shall not appear in the vamps; however, these defects may appear in top tongue area or in the counter pocket area of the quarters.

3.3.1.1 Treatment fungicide. Leather components do not require a fungicidal treatment. However, when used, leather components shall contain not more than 0.70 percent paranitrophenol fungicide when tested as specified in 4.4.1.

3.3.2 Insoles. The leather insoles shall conform to type 1, class 1, tannage a or b of KK-L-570 except that the thickness shall be 5 1/2 to 7 1/2. As an alternate, the insoles may be cut from Texorist material. The Texorist shall contain 0.25 to 1.0 percent copper - 8 quinolinolate uniformly distributed throughout the insole. The insole shall be 0.106 to 0.126 inch thick. The insole shall be cut with the heel-to-toe direction across the machine direction of the Texorist (see 6.5).

3.3.3 Vamp lining. The vamp lining leather shall be soft, pliable calf, kip, cattlehide, glove or pigskin leather of 2 to 3 1/2 ounces thickness. The leather shall be either chrome or vegetable tanned, or a combination thereof. The leather shall be full grain or partially corrected grain. The color shall be as produced by the tanning agent. A light application of dye may be used to level the color of the grain surface.

3.3.4 Heel pads and inside counterpocket. The leather for the heel pads and inside counterpocket shall be as specified in 3.3.3 or it shall be sheepskin, kid, calf, or kip with a thickness of 2 to 3 1/2 ounces. Leather specified in 3.3.1 will be acceptable providing the top finish has been removed by buffing or splitting and the thickness requirements as stated above are met.

3.3.5 Welting, synthetic. The synthetic welting shall be of the flat top design, bright black in color and may be formed with or without a storm welt of medium size bead. The welting shall be of sufficient width to assure that the required extensions on the finished shoes are met (see 3.6.18). The thickness of the welting shall be 0.12 to 0.13 inch. The base compound shall be polyvinyl chloride, compounded with suitable non-bleeding plasticizers. The synthetic welting shall conform to the requirements of table I when tested as specified in 4.4.1.

Table I - Synthetic welting requirements

Property	Requirements
Initial	
Hardness	85-95
Specific gravity	1.32 maximum
Brittle point, before aging	-15°F or less
Brittle point, after aging	+20°F, maximum change from standard brittle point
Tensile strength, pounds per sq. inch	2100 minimum
Elongation, percent	225 minimum
Water absorption, percent gain	3.00 maximum
Solvent Resistance (After Immersion)	
Hardness	55 minimum
Tensile strength, pounds per sq. inch	1800 minimum
Elongation, percent	225 minimum
Volume swell, percent	35 maximum

3.3.6 Counters. Counters shall conform to the requirements of MIL-C-41814. When automatic back part lasting operation is performed a synthetic counter material shall be required. The synthetic counter material shall be an extruded ionomer resin sheet with a heat activated adhesive on both sides. The thickness of the extruded sheet material shall be 0.060 ± 0.003 inches. The adhesive coating shall be 0.003 to 0.006 inches thick on each side. Any suitable color of the resin is acceptable. Counters cut from the material shall be of a correct size to fill the counter pocket of the finished shoe. The material shall conform to the requirements listed below when tested as specified in 4.4.1.

Property	Requirement
specific gravity	$.95 \pm .015$ g/cc
Tensile strength	4000 ± 500 lbs/sq. inc.
Elongation	250% min.
Flex modulus	$50,000 \pm 5,000$ lbs/sq. in.
Brittle temperature	-60°C max.

* 3.3.6.1 Counter sizes. Counters shall be made in a sufficient number of sizes to cover shoes sized 4 through 14 1/2 and necessary widths. Counters shall conform to the shape of the MIL-7-last (MIL-L-43585).

3.3.7 Outsoles. The outsoles shall be 16 irons in thickness and conform to the physical requirements for type I, Grade A of MIL-S-22777. As an alternate, the outsoles tread area may be of a straight bar design or of a commercial design approved by the preparing activity of this specification (see 6.5).

3.3.8 Heels. The heels shall conform to Type II, Grade A, Class 1 of MIL-S-22777. As an alternate, the heels tread area may be of a straight-bar design or a commercial design that has been approved by the preparing activity of this specification (see 6.5).

3.3.9 Fabrics.

3.3.9.1 Backseam tape. The backseam tape, when used, shall be 1/2 inch or 7/16 inch wide conforming to type I, class 1 of DDD-T-86, except that the requirement for non-fibrous material shall not apply.

3.3.9.2 Pull strap. The front pull strap shall be 13/16 (+ 1/16) inch wide, black cotton tape with a minimum tensile strength of 70 pounds in the warp direction. As an alternate, leather specified in 3.3.1 may be used and the end of the strap shall be sufficiently skived to reduce thickness where sewn to the top tongue area.

3.3.9.3 Goring. The goring shall be a woven elastic fabric, black in color. For shoes sizes 8 and larger, the fabric shall be 4 to 4 1/2 inches in width and 3 1/2 to 4 inches in width for smaller sizes.

3.3.10 Boxtoe.

3.3.10.1 Understructure boxtoe. The understructure box toe shall conform to either 3.3.10.1.1, 3.3.10.1.2, or 3.3.10.1.3.

3.3.10.1.1 Impregnated understructure. The understructure box toe shall be made of two layers of single napped cotton fabric, having a combined finished thickness of 0.034 to 0.038 inch and shall have a minimum finished weight of 12 ounces per square yard when cemented together with a polyvinyl acetate resin. The amount of the adhesive used shall not be less than 50 percent of the fabric weight. The napped surfaces shall be on the outer sides. The polyvinyl acetate resin adhesive shall become soft and pliable when the box toe is inserted in the box toe heating equipment.

3.3.10.1.2 Unicellular understructure. The understructure box toe shall be made of a unicellular (closed cell) material, not less than 3/32 inch in thickness. The foam material shall extend approximately 1/2 inch rearward of the steel box toe breastline, completely line the steel box toe and shall be large enough to be caught in the inseaming operation.

3.3.10.1.3 Laminated understructure. The understructure box toe shall be made of ionomer resin (surlyn) laminated with a combination of flannel fabric on one side and flannel nonwoven or a sheeting fabric on the other with a combined thickness of 0.033 ± 0.005 inch (see 6.5).

3.3.10.2 Toe cushion. The material used to cushion the steel box toe and mask the breastline, shall be of wool felt conforming to Type III, classification 9A-2 of C-F-206. As an alternate, the following materials may be used in lieu of wool felt, and shall be cut large enough to extend approximately 1/2 inch rearward of the steel box toe breastline:

(a) Foamed polyvinyl material, $3/32$ ($\pm 1/32$) inch in thickness weighing 4 to 6 pounds per cubic foot.

(b) Latex foam rubber $1/8$ ($\pm 1/64$) inch thick.

3.3.10.3 Steel box toe. The steel box toe shall be fabricated from cold-rolled carbon steel, and shall conform to the toe of the last. The steel box toes shall meet the requirements of Table II after heat treatment, when tested as specified in 4.4.1. The steel box toes shall be thoroughly cleaned and completely coated with a zinc compound or any other suitable resin coating that will assure protection against corrosion and will not damage the component parts of the boot.

Table II - Physical requirements, steel box toe

Harness	Carbon Content	Thickness (inches)
43-50	0.50 to 0.82	0.0625 ± 0.0025

3.3.10.3.1 Impact resistance. The steel box toes of the finished shoes shall have a minimum inside clearance of 1/2 inch when tested as specified in 4.5.2.1.

3.3.11 Shank combination. The shank combination shall consist of a single or double rib steel shank (see 3.3.11.1) attached by four prongs or two rivets to a shank board (see 3.3.11.2). As an alternate, a fiberglass shank without shank board may be used (see 3.3.11.3).

3.3.11.1 Steel shank. The steel shank shall be constructed from 19 gage cold rolled carbon steel with a hardness from 47 to 54 Rockwell C scale when tested as specified in 4.4.1 and shaped to the manufacturer's standard number 4 bend, conforming to the arch of the MIL-7 last (MIL-L-43585). The width of the steel shank shall be $5/8$ ($\pm 1/64$) inch. The steel shank shall be made with a single rib or double rib. The overall thickness of the steel shank with rib shall be 0.080 to 0.125 inch. The steel shank shall have a zinc electroplated coating, dull or bright finish, or a zinc compound completely and uniformly applied to the base metal following a cleansing by any method of TT-C-490. Steel shanks with black oxide coating conforming to class 1 of MIL-C-13924 may be used in lieu of steel shanks with zinc coating. The rib or ribs shall taper off at a point $3/8$ to $7/8$ inch from each end.

3.3.11.2 Shank board. The shank board shall be water resistant the finished thickness of the shank board shall be $1/8 (+ 1/32)$ inch. The shank board pieces shall be molded to follow the bottom cavity of the shoes, and both ends shall be skived with a graduated scarf $1\ 3/8 (+ 1/16)$ inches wide. The shank board pieces shall be graded up or down $1/4 (+ 1/16)$ inch and shall be marked consecutively with a steel stamp starting with figure "1" on the smallest size up through "7" on the largest size. The size 4 shank board piece shall be $6 (+ 1/16)$ inches long.

3.3.11.3 Fiberglass shank. The fiberglass shank (see 6.6) shall consist of glass fibers impregnated with vinyl ester resin encased in a plastic sleeve or tube. The width of the uncured encased fiberglass resin shall be $5/8 + 1/32$ inch. The shank shall be cured and bonded to the insole and conform to the shape of the last. When fully cured the shank (glass and resin areas) shall be $5/8 + 1/16$ inch in width. The cured length of shank shall be graded as specified in 3.3.11.2. The forward end of the shank shall have a $1/2 (+ 1/8)$ inch taper. The heel end shall be tapered for a minimum of $3/8$ inch.

3.3.12 Nails, heel attaching. Heel nails shall be brass, cut or wire type and of sufficient length and gauge to produce a secure clinch on the insole.

3.3.13 Tacks and staples. Assembly tacks and staples, heel seat lasting tacks, welt butt tacks and tacks or staples used for attaching the shank shall be brass or steel and shall be of sufficient length to thoroughly attach the parts through which they are driven and leave the insole smooth on the inside.

3.3.14 Nails, heel seat fastening. Nails used for heel seat fastening shall be a No. 12 through 39 head, brass nail or steel nail of sufficient length to firmly secure all parts through which they are driven and leaving a smooth, secure clinch on the insole. Testing shall be as specified in 4.4.1.

3.3.15 Bottom filler. The bottom filler may be either thermoplastic or cold process type. The thermoplastic type shall consist of a mixture of ground cork and a suitable thermoplastic binder in the proportion of a minimum of $2\ 3/4$ part by volume of cork to each part of binder. The cork granules shall be of the best quality and free of bark. The ground cork and binder shall be thoroughly and evenly mixed. The binder shall be water insoluble and flexible. It shall have a softening point of at least 125°F and a maximum penetration of 85 millimeters at a 200 gram load for 50 seconds at 77°F when tested as specified in 4.4.1. 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 the proportion of two parts cork to one part binder by volume. The cork granules shall be the best quality and free of bark. When the spread filler is dry and set, it shall consist of four parts to one part binder. It shall not soften at less than 150°F and shall be water resistant and flexible. As an alternate to the cold process bottom filler specified above, when applied by semi-automatic equipment method, the cold process bottom filler shall consist of a mixture of ground cork and a suitable binder in the proportion by weight of one part cork to five parts binder. Upon loss of solvent, it shall consist by weight of one part cork to $3\ 3/4$ parts binder. The binder shall be water-insoluble and have a softening point of at least 125°F when tested as specified in 4.4.1.

3.3.16 Thread.

3.3.16.1 Thread, upper fitting. Upper fitting stitching operations shall be performed using nylon thread conforming to Type I or II, class 1, or Type III of V-T-295. Colorfastness requirements shall not apply. Thread size shall be E for the needle and bobbin on stitch type 401. The color shall be black.

3.3.16.2 Thread, Goodyear stitching. Thread used for Goodyear stitching shall be polyester conforming to Type I, class 1, sub-class C of V-T-285. The shuttle thread shall be natural, size 10, 3 or 6 ply. Colorfastness requirements shall not apply.

3.3.16.3 Thread, inseaming, polyester. The polyester inseaming thread shall conform to type I, class 1, subclass C of V-T-285. Thread shall be size 10, 3 or 6 ply and natural in color.

3.3.17 Wax. The wax used during the inseam sewing and Goodyear stitching operations shall be white or golden in color and shall be a permanently plasticized resin that will thoroughly penetrate the thread used for stitching through the sole, welt or inseam in a temperature range of normal machine use.

3.3.18 Cleaner solution. A suitable cleaning solution shall be used to remove grease and soil marks of manufacturing operations from the shoe uppers. The solution shall have a maximum Ph value of 8 and shall not decrease the water-resistant characteristics of the upper leather. The contractor shall furnish a certificate of compliance stating that the Ph value of the cleaner solution does not exceed the above requirement.

3.3.19 Repairers. Repairers shall be liquid spray, crayon or paste-type applied by hand. The color shall match the color of the upper leather and shall have sufficient coverage to correct minor surface imperfections of the leather.

3.3.20 Renovators. Renovators used in lieu of, or in addition to, repairers shall match the color of the upper leather. Application may be applied by sponge or spray method and the color uniform throughout.

3.3.21 Fillers. Where fillers are used, they shall be capable of providing a foundation for the application of the top finish and may be applied by sponge or spray method.

3.3.22 Top finish. The top finish may be applied by a sponge or spray method and shall be compatible with and capable of binding previously applied coatings, and provide a flexible finish.

3.3.23 Insole, stuck-on rib. The finished rib shall consist of a combination of coated fabric and fiberboard materials. The rib shall be 7/32 to 1/4 inch high with a minimum of 5/8 inch in width when measured from the inside vertical portion of the rib, and shall extend around the periphery of the insole from heel breastline to heel breastline. A cotton or cotton synthetic fabric used for the stuck-on rib shall meet the requirements as listed below when tested as

specified in 4.4.1. The fabric shall be coated on one side with a suitable adhesive and bonded to the flesh side of the insole or to the printed side of the Texorist material. The fiberboard and fabric shall cover 1/8 to 3/16 inch of the peripheral edge, and provide for the required edge extension of the finished shoe. The insole shall be scored or marked 2 5/8 inches from the end of the heel on a size 8R insole; other sizes shall be graded up and down to insure proper welt butt location on the finished last.

Fabric requirements

Weight, ounces per sq. yd. (min.)	Yarns per inch (min.)		Breaking strength, lbs. (min.) warp and filling
	Warp	Filling	
8.0	52	30	105

3.3.23.1 Rib strength. The physical requirements for the stuck-on rib shall conform to the list below when tested as specified in 4.4.4.2.

Characteristic	•Minimum <u>1/</u>	Average <u>2/</u>
Shear strength	70 (pounds)	75 (pounds)
Stitch strength	20 (pounds)	30 (pounds)

1/ No single determination shall fall below the minimum value specified.

2/ The average of all determinations shall not be less than the average value specified.

3.3.24 General adhesives. The adhesives used for bonding various parts of the shoe shall be one of the following types:

- (a) Natural rubber latex
- (b) Synthetic rubber latex (including chloroprene)
- (c) Natural rubber solvent cement
- (d) Synthetic resin cement
- (e) Synthetic rubber solvent cement
- (f) Synthetic cement for sole stock fitting

3.4 Design. The design shall be a 6 inch congress style safety shoe with Goodyear welt construction, cut from grain out upper leather, plain toe with elastic goring on each quarter, leather vamp lining and safety steel toe. The shoe shall have a non-marking, oil resistant rubber outsole and heel (see figure 1).

3.5 Patterns and lasts.

3.5.1 Patterns. Patterns shall be furnished by the contractor.

3.5.2 Lasts. The footwear shall be made on the MIL-7 last (MIL-L-43585) and the last shall be furnished by the Government.

3.6 Construction.

3.6.1 Cutting uppers. The uppers shall be cut from grain-out leather specified in 3.3.1.

3.6.2 Skiving and crimping. When necessary, vamps and vamp linings may be crimped to aid lasting. Skiving of uppers is optional to aid fitting operations.

3.6.3 Marking and labeling.

3.6.3.1 Marking. The contractor's name, number and date of contract and correct size and width shall be legibly stamped with marking ink of a contrasting color on the inside of the outside elastic gore insert. Lettering shall be 1/8 to 1/4 inch high, except that the size marking shall be a minimum of 1/4 inch in height.

3.6.3.2 ANSI labeling. The shoes shall be labeled to indicate that they conform to class 75 safety-toe requirements of American National Standards Institute Standard ANSI 241.1. Each shoe shall have an indelible cloth label stitched to the inside of the shoe on the leather tongue. The numbers and letters shall be a minimum of 3/16 inch in height and the label inscription shall read as follows:

ANSI
241.1-1967/75

3.6.4 Upper leather fitting. Line marking patterns shall be used for all upper fitting. Quarters shall be butted and closed at the back using stitch type 404, with 8 to 10 stitches per inch. All other upper fitting shall be done using stitch type 301 with 10-12 stitches per inch. All stitching shall conform to FED-STD-751.

3.6.4.1 Vamp lining fitting. Cement understructure box toe specified in 3.3.10 to flesh side of vamp lining. Stitch leather vamp lining to flesh side of vamp with two rows of stitching 3/32 to 5/32 inch apart.

3.6.4.2 Toe cushion fitting. Position and cement toe cushion material specified in 3.3.10.2 to the flesh side of the vamp with an adhesive specified in 3.3.24. The toe cushion shall be large enough to cover the steel box toe, extend approximately 1/2 inch rearward of the steel toe breastline and be large enough to be caught in the inseaming operation.

3.6.4.3 Vamp, quarter and goring fitting. Stitch vamps to quarters at vamp seam with 3 rows of stitching 1/8 to 1/4 inch wide, evenly spaced. The first row of stitching shall be close to the edge of the leather. Stitch goring to quarters and vamps all around, with 3 rows of stitching 1/8 to 1/4 inch wide, evenly spaced with the first row close to the edge of the leather. During this operation double and stitch a 5 inch long piece of material specified in 3.3.9.3 to form a 1 3/4 to 2 1/2 inches long front pull strap at the top center of the vamp on the flesh side. The goring shall extend 3/16 to 5/16 inch beyond the 3 rows of stitching.

3.6.4.4 Back stay fitting. Stitch the loop end of the back stay to the top of the backseam and quarters with two rows of stitching single or double needle. Double the backstay and stitch to the quarters with two rows of stitching, single or double needle, to form a back pull strap with an opening 1 3/4 to 2 inches long. The end of the loop strap shall be securely attached by the two rows of stitching.

3.6.5 Inside counterpocket fitting. Stitch the inside counterpocket to the quarters and backstay with two rows of stitching, single or double needle, close to the edge of the counterpocket.

3.6.6 Leather insoles. When used leather insoles shall be fleshed and cased for even weight.

3.6.6.1 Assembly of stuck-on rib. When assembled, the stuck-on rib insoles shall meet the requirements of 3.3.23.

3.6.7 Lasting. Prior to lasting, the uppers may be conditioned by any suitable means except that they shall not be dipped in water. Insoles shall be tacked to the last with no less than 5 tacks or staples; one in the center of the heel seat, one at the shank, one at each side of the ball and one at the toe. Edges of the insole shall be even on the last bottom at all points. Correct size counters coated on both sides with an adhesive specified in 3.3.24 shall be fitted to counter pockets. Counter shall be large enough to enable being caught by one or two stitches of the inseaming operation. Heel seat lasting may be done by using any suitable method or equipment that assures a flat secure heel seat and sufficient adhesion between the counterpocket material quarters and counterpocket. Back part lasting shall conform to the last and there shall be no wrinkles, pleats, puckers or fullness. Uppers shall be firmly drawn down to the last, spindled, side lasted and stapled to assure uppers are firmly held to the last. The correct size steel box toe shall be inserted between the toe cushion and understructure box toe. The vamp shall be lasted in place. The toe shall be firmly and smoothly wiped in and the toe wire or nylon monofilament securely attached around the toe at the base of the insole, rib providing a shoulder for the inseaming operation. No tacks or staples shall be used above lasting line or in the back of the quarter. As an alternate, any suitable equipment or method may be used to smoothly and securely attach the toe around the base of the insole rib. When the alternate method is used the bottom edges of the toe cushion and understructured box toe material shall be trimmed so as not to interfere with the cementing of the lasting operation. When the alternate method is used to accommodate automatic equipment, the grain surface of the leather lining may be lightly buffed to provide an adequate surface to which the adhesive will adhere. The buffed area shall be no more than 2 inches in from the front (center of toe) edge of lining and graduate out to the side of the toe in the toe lasted area.

3.6.7.1 Time allowance on lasts. The shoes shall remain on the lasts until all parts are thoroughly dry.

3.6.8 Inseaming. Inseaming shall be performed using thread specified in 3.3.16.3. The thread shall be hot waxed and a needle not larger than number 41 shall be used for stitching. The welting shall be stitched to the insole rib from rib end to rib end with not less than 8 1/4 stitches per inch and shall catch the counter with one or two stitches.

3.6.9 Tack or staple pulling, inseam trimming. All insole tacks or staples shall be removed and no broken tack or staple points shall remain. The inseam shall be closely trimmed from welt butt to welt butt without cutting or damaging the stitches. The ends of the welt shall be skived with a 1/2 to 3/4 inch bevel and tacked within the butt area.

3.6.10 Shank fitting, bottom filling. The shank assemblies (see 3.3.11) shall be selected for correct size and shall be inserted in position with a shankboard piece filling the cavity between the inside and outside ribs from the ball line rearward to the back of the heel seat. The forward end of the shankboard shall be flush with the insole, fit the contour of the shoe bottom back of the ball line, and be attached to the shoe with pitch, wax, two tacks or staples, one on each side of the steel piece at the rear end of the cover. The bottom filler shall be applied and firmly pressed into the insole channel around the toe, extending to the forward end of the shankboard with a uniform and even surface. The bottom shall present a flat, smooth surface for sole laying. Any excess areas between the shank cover and insole rib, and in the heel seat area shall be filled with bottom filler. When fiberglass shank (3.3.16.3) is used, the bottom filler shall fill all excess areas in the heel seat and shank area.

3.6.11 Sole laying. The shoe bottoms, except heel seat area, shall be thoroughly coated with any adhesive specified in 3.3.24. The outsole shall be positioned on the shoe and laid on a sole laying machine with pressure. The outsoles shall be of adequate size and laid evenly to allow for the specified edge extension.

3.6.12 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 3.6.18..

3.6.13 Goodyear stitching. The soles and welt shall be stitched together on a lockstitch machine using thread specified in 3.3.16.2, with 4 1/2 to 7 stitches per inch, except that there shall be no more than 3 1/2 stitches per any one-half inch length in the ball and toe sole stitching. A needle not larger than No. 45 shall be used. Stitches shall be laid on the surface of the welt with the starting and finishing end of the stitchline extending under the heel and close to the outer edge of the welt on the finished shoe. The lock shall be just under the surface of the outsole. The Goodyear stitching shall not fall in the traction tread design area of the outsole.

3.6.14 Heel seat fastening. Heel seat fastening shall be done using nails specified in 3.3.14, driven three to the inch and properly positioned at the edge of the insole from welt butt to welt butt to provide a secure, smooth clinch on the insole.

3.6.15 Heel seat rounding. The outsole in the heel seat area shall be smoothly rounded from butt of welt to butt of welt.

3.6.16 Heel attaching. Heels specified in 3.3.8 shall be attached with 13 nails (see 3.3.13). The nails shall be of sufficient length to insure a smooth, secure clinch on the insole. The heeling machine shall be equipped with proper length drivers to assure that all nails are driven evenly against the washers or plastic or composition cores in the heel and clinch the nails on the insole. Nails shall not be driven in the heel tread pattern.

3.6.17 Heel finishing. The heels shall be trimmed square and smoothly scoured. The beveled breastline shall not be scoured.

3.6.18 Edge trimming. Sole edges shall be trimmed square, and smoothly joined to the heel. The finished edge extension shall be not less than 3/16 inch at the top and outside ball, and not less than 1/8 inch at the inside ball.

3.6.19 Finishing.

3.6.19.1 Preparation. The shoes shall be cleaned, removing all excess wax and other foreign matter. The surface of the leather shall be conditioned to receive further application of the finish. All thread ends shall be trimmed.

3.6.19.2 Treeing. All wrinkles shall be removed from the shoes while on the last and no material shall be used that may injure the leather or thread.

3.6.19.3 Final finish. Shoes shall be repaired and properly filled and given a top finish using material and methods as specified in 3.3.18 through 3.3.22. All raw edges shall be stained to match the color of the upper leather.

3.6.20 Nails, tacks and staples. Nails, tacks and staples that have been left protruding through the insole, and cannot be pulled out, shall be cut close to the surface leaving no protruding stumps. Automatic mechanical tack detecting equipment may be used to indicate the presence of any protruding nails, tacks or staples inside the shoe.

3.6.21 Heel pads. The flesh side of the heel pads shall be coated with any suitable adhesive and shall be firmly pressed into the heel seat area at all points.

3.7 Workmanship. The finished shoes shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels.

4. QUALITY ASSURANCE PROVISION

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test items to determine the validity of the certification.

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

1. First article inspection (see 4.3).
2. Quality conformance inspection (see 4.4).

4.3 First article inspection. The first article submitted in accordance with 3.2 shall be inspected as specified in 4.4.5 for compliance with design, construction, workmanship and dimensional requirements.

4.4 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, components and materials shall be inspected and 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 document. In addition, testing shall be performed on components and materials listed in Table V. When data in the "Number of determinations per sample unit" and "results reported as" columns are not specified in Table V, 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 fail to meet any requirements specified. The sample unit shall be as follows:

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

Table V - 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	Chrome tannage	3.3.1	1/				1/2 ounce	
Insole Texorist	Mat'l Ident.	3.3.2	1/					
	Copper 8-Quin Thickness	3.3.2	1/					
Lining leather	Tannage	3.3.3	1/					
	Mat'l Ident. Color	3.3.3	1/ visual		X	1	Pass or fail	
Heel pads	Mat'l Ident. Thickness	3.3.4	1/					
	Mat'l Ident. Tannage Thickness	3.3.4	1/ gauge		X	1	nearest 1/2 ounce	5 yards
Counter pocket (leather)	Mat'l Ident. Hardness	3.3.5	1/					
	Specific gravity	3.3.5	D-2240 5/4/		X	3	number	
Synthetic welting	Brittle point (before aging)	3.3.5	4.5.1.4		X	3	nearest .01	
	(after aging)	3.3.5	D-746 & 4/ 4.5.1.6		X	10	nearest 1°F	
	Tensile strength	3.3.5	D-412 4/ "Die E"		X	5	nearest 10 psi	

Table V 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			
Synthetic counter material	Elongation	3.3.5	D-412 4/ "Die E"	X		5	nearest 5%	
	Water absorption	3.3.5	4.5.1.5	X		3	nearest .01%	
	Tensile strength	3.3.5	D-412 & 4/ 4.5.1.2	X		5	nearest 10 psi	
	Elongation	3.3.5	D-412 & 4/ 4.5.1.2	X		5	nearest 5%	
	Volume swell	3.3.5	4.5.1.3	X		3	nearest %	
	Hardness	3.3.5	D-2240 & 4/ 4.5.1.1-5/	X		3	No.	
	Specific gravity	3.3.6	D-792 1/					
	Tensile strength	3.3.6	D-1708 1/					
	Elongation	3.3.6	D-1708 1/					
	Flex modulus	3.3.6	D-790 1/					
Full strap	Brittle temperature	3.3.6	D-746 1/					
	Mat'l Ident.	3.3.9.3	1/					
	Width	3.3.9.3	1/					
	Tensile strength	3.3.9.3	1/	X		1	Pass or fail	1 yard
Elastic Goring	Color	3.3.9.3	Visual					
	Mat'l Ident.	3.3.9.4	1/	X		1		
	Width	3.3.9.4	gauge	X		1		
	Color	3.3.9.4	visual	X		1	Pass or fail	1 yard full width

Table V 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			
Understructure box toe	Mat'l Ident. Thickness	3.3.10.1	1/ 12031 2/					1 Square foot
		3.3.10.1						
Toe cushion	Mat'l Ident. Thickness	3.3.10.2	1/ 12031, 2/					1 Square foot
		3.3.10.2 (a and b)	5041 3/					
		3.3.10.2						
Steel box toe	Mat'l Ident. Hardness (Rock well C scale) Carbon content Coating ident. Plating Thickness	3.3.10.3	1/					2 box toes
		3.3.10.3	243 6/	X		3	number	
		3.3.10.3	1/					
		3.3.10.3	1/					
		3.3.10.3	1/					
Steel shank	Mat'l Ident. Hardness (Rock-well C scale) Thickness	3.3.11.1	1/					2 shanks
		3.3.11.1	243 6/ gauge		X	3	nearest number nearest .001 in.	
		3.3.11.1				1		
Shank board	Mat'l Ident. Thickness	3.3.11.2	1/ gauge		X	3	nearest 1/128 in.	1 pair
		3.3.11.2						
Heel nails	Mat'l Ident.	3.3.12	1/					

Table V - 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			
Tacks and staples	Mat'l Ident.	3.3.13	1/					
	Nails (heel seat)	3.3.14	1/					
Bottom filler	Size	3.3.14	1/					
	Percent of cord to binder	3.3.15	1/					
	Softening point of binder	3.3.15	E-28 4/		X	2	nearest degree	1 pound composite
	Penetration of binder	3.3.15	D-5 4/		X	2	number	
Stuck-on rib fabric	Solubility of binder in water	3.3.15	1/					
	Flexibility of binder	3.3.15	1/					
Adhesive	Mat'l Ident.	3.3.23	1/					
	Weight	3.3.23	1/					
	Yarns per inch	3.3.23	1/					
	Breaking strength	3.3.23	1/					5 insole units
	Mat'l Ident.	3.3.24	1/					

- 1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.
- 2/ Refers to FED-STD-601.
- 3/ Refers to FED-STD-191.
- 4/ Refers to ASTM Test Methods.
- 5/ Fifteen seconds per reading on flat portion.
- 6/ Refers to FED-STD-151.

4.4.2 Examination of components.

4.4.2.1 Examination of insoles. The leather insoles when used, shall be examined for visual and dimensional characteristics in accordance with KK-I-570. The Texorist insoles when used shall be examined for the defects listed below. The inspection level shall be level II and the AQL shall be 4.0 defects per 100 units.

Any hole, cut tear or gouge.
 Any brittle area or evidence of delamination.
 Thickness not as specified.
 Sole outline not conforming to required pattern.
 Sole not cut in specified direction

4.4.2.2 Examination of vamps prior to fitting. A 100% examination of each cut vamp for the defects listed in 3.3.1 shall be conducted prior to fitting operations. Any cut vamp containing one or more defects shall result in the rejection of that vamp.

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

4.4.4 Intermediate inspection.

4.4.4.1 Visual examination. The defects found during intermediate examinations shall be classified in accordance with 4.4.4.1.1 and 4.4.4.1.2. The applicable inspection levels and acceptable quality levels shall be as indicated in 4.4.4.1.3. NOTE: Defects designated by an asterisk (*) shall be scored as "Major" when seriously affecting serviceability and "Minor" when affecting serviceability but not seriously.

4.4.4.1.1 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 terms of the sample unit.

Examine	Defect	Classification	
		Major (*)	Minor
Construction and workmanship (general)	a. Construction not as specified	X	
	b. Any component missing or other than type specified	X	
	c. Any component misplaced or not affixed as specified		*
	d. ANSI label missing 1/		
1/ The contractor shall perform 100% examination for this defect. Any defective units found shall be repaired, replaced, or excluded from the in-process lot.			
Quality of Leather (upper leather and lining leather)	a. Not full grain or corrected grain	X	
	b. Not specified color	X	
	c. Coarse, rough fiber on the flesh side		*
	d. Slaughter cut or other wise damaged	X	
	e. Weight more than 1/2 ounce less than the minimum specified	X	
	f. Weight more than the maximum or up to 1/2 ounce less than the minimum specified		X
	g. Loose, flanky		X

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

Examine	Defect	Classification	
		Major (*)	Minor
Bottom of shoe	a. Any component missing or other than specified type.	X	
	b. Shank not properly positioned, e.g., end of steel shank extending beyond ball line	X	
	c. Shank wrong size or malformed		X
	d. Shank not fitting contour of shoe bottom		*
	e. Shank not securely attached		X
	f. Any tear in duck over 1/2 inch in stitch area	X	
	g. Any insole staple or anchor tack not removed	X	
	h. Upper damaged in lasting		*

Examine	Defect	Classification		
		Major (*)	Minor	
Bottom of shoe (cont'd)	i. Excess leather in heel seat interfering with proper fit of shank		X	
	j. Poor heel seat lasting, (including automatic method) e.g., heel seat not flat, upper not completely caught in by lasting tacks, poor adhesion between counter material and uppers	*		
	k. Poor side lasting, upper loose on last. i.e., insufficient lasting staples to hold upper to last		X	
	l. Inseam not properly trimmed	*		
	m. Stuck-on rib not adhering	X		
	n. Less than three stitches per inch on inseam	X		
	o. Less than 3 1/4 stitches but not less than three stitches per inch on inseam		X	
	p. Any inseam stitch broken, skipped, cut or damaged	X		
	q. Two or more inseam stitches not at bottom of insole rib or not in welt groove		*	
	r. Broken insole rib	X		
	s. Any operation omitted or improperly performed	X		
	t. Welt butt not properly skived and tacked		X	
	u. Ends of counter not caught by inseam stitching		X	
	Upper part of shoe	Uppers not firmly down to last		X
	Steel toe assembly	Steel toe out of alignment or crooked	*	

4.4.4.1.3 Acceptable quality levels (AQL's) and inspection levels. The acceptable quality levels, expressed in defects per 100 units and the inspection levels shall be as follows:

	Inspection level	AQL's	
		Major	Total
For defects applicable to 4.4.4.1.1	I	2.5	6.5
For defects applicable to 4.4.4.1.2	I	2.5	6.5

4.4.4.2 Testing of combined rib and insole. The stuck-on rib shall be tested for compliance with the requirements of 3.3.23 method 2061 of FED-STD-311 shall be used for the shear strength test. Method 2171 of FED-STD-311 shall be used for stitch tear strength. The sample unit shall be two ribbed insoles one for end test, and the sample size shall be 5 regardless of the lot quantity. Requirements are applicable to the sample units. The lot shall be unacceptable if one or more sample units or the lot oversize fail to meet the specified requirements. All test reports shall contain the individual values utilized in expressing the final result.

4.4.5 Examination of the end item. The defects found during the examination of the end item shall be classified in accordance with 4.4.5.1 and 3.3.1. The applicable inspection level and acceptable quality levels (AQL's) shall be as indicated in 4.4.5.1.1.

4.4.5.1 Visual examination. The shoes shall be examined for defects listed below. The sample unit shall be one completely fabricated shoe and the selection shall be by pairs. Heel pads removed during Government verification inspection shall be properly replaced by the contractor. For pairing examination, the pair shall be examined together. Each defect found during the examination for pairing shall be scored as a single defect. The lot size shall be expressed in terms of the sampling unit. The vamp (except the top tongue area) shall be examined for break of leather in accordance with the procedure below:

Vamp: To examine the vamp, the shoe shall be held in an upright position with both hands. The toe of the shoe shall face away from the examiner. Position thumbs on top of vamp approximately half way between box top line and tongue area and 1 inch to 1 1/2 inches apart. Press downward with thumbs so as to form grain surface into a concave surface. The break in the leather between the thumbs and running across the vamp shall be observed and compared with the break patterns of the Satra scale (see 6.4). Any vamp exhibiting a break pattern greater than No. 6 on the Satra scale shall be scored as a defect.

NOTE: Asterisk defect listed below shall be scored "Major" when affecting serviceability or appearance seriously and "Minor" when affecting serviceability or appearance but not seriously.

Examine	Defect	Classification	
		Major (*)	Minor
Pairing	a. Not properly mated, ie. not right and left of same size	X	
	b. Variation in color or height		*
Cleanliness	Any spot, stain or foreign matter clearly noticeable		X
Color and finish	a. Not specified color	X	
	b. Color not uniform		X
	c. Any raw edges not stained to match upper leather		X
	d. Finish streaky, chipped or flaky on uppers		X

Examine	Defect	Classification	
		Major	(*) Minor
Design, type and size	Not as specified	X	
Material (general)	Any component not fabricated of the material specified	X	
Upper leather	a. Stretchy vamp	X	
	b. Leather damaged in process	X	
	c. Break of vamps not as specified	X	
Lining leather	Wrinkled or excessive fullness of lining	X	
Construction and workmanship (general)	a. Any cut, tear, hole, repair, abrasion		*
	b. Any component or assembly misplaced, operation omitted or not properly performed, e.g., backstay crooked to a degree where it is readily noticeable		*
	c. Wrinkled or bunched area at the back seam		*
	d. Any component or assembly misplaced or operation omitted or not properly performed		*
Seams and stitching (upper)	a. Any open seam (A seam shall be classified as open when one or more stitches joining a seam are broken, or when two or more consecutive or runoffs occur. On multiple stitched seams, a seam is considered open when one or more rows of stitching are open).		*
	b. Loose tension resulting in a loosely secured seam		*
	c. Tight tension resulting in puckering or cutting of leather		*
	d. Wrong stitch type or seam type	X	
	e. One or two stitches less than the minimum specified		X
	f. More than two stitches less than the minimum specified	X	
	g. More than the specified maximum number of stitches: -resulting in damage to leather	X	
	-but does not damage leather		X
	h. Gauge of stitching not as specified or irregular		X
	i. Any row of stitching omitted		*
	j. Thread ends not trimmed throughout shoe		X
k. Needle holes or needle chews		X	
Outsole stitching and bottom attaching (Goodyear)	a. Lock not just under surface of outsole	X	
	b. Lock on surface of outsole	X	
	c. Less than 3 1/2 stitches per inch	X	

Examine	Defects	Classification		
		Major (*)	Minor	
Outsole stitching and bottom attaching (Goodyear) (cont'd)	d. Less than 4 1/2 but not less than 3 1/2 stitches per inch		X	
	e. More than 7 stitches per inch, except ball and tow sole stitching		X	
	NOTE: More than 3 1/2 stitches per any one half inch length in the ball and toe sole stitching shall be defined as that portion of the sole stitching that runs from the inside ball and around the toe to the outside ball.			
	f. One or two stitches short at heel breast	X		
	g. Skipped or broken stitch	X		
	h. Goodyear stitching cutting into sole substance or deeper than specified	X		
	i. Gauge of Goodyear stitching not as specified or irregular		X	
	j. Checked sole		X	
	k. Any stitching not visible on surface or sole	X		
	l. Goodyear stitching running into thread area	X		
	Counters	Rolled or curled counter		*
Edge making	a. Edge trimmed into Goodyear stitching	X		
	b. Edge not trimmed square or trimming is irregular		X	
	c. Sole extension less than the specified minimum by more than 3/32 inch	X		
	d. Sole extension less than the specified minimum but not more than 3/32 inch		X	
Heel finishing and attaching	a. Heel not finished square, i.e., flared or tapered		X	
	b. Heel not finished smooth		X	
	c. Checked heel, i.e., separation of heel and outsole		X	
	d. Wrong size or type heel		X	
	e. Breast of heels not beveled		X	
	f. Any heel nail missing		X	
	g. Open heel seat	X		
	h. Heel crooked		X	
	i. Either corner breast nail not clinched or insole	X		
	j. Two or three nails other than corner breast nail not clinched on insole		X	
	k. More than three nails other than corner breast nail not clinched on insole	X		
	NOTE: Evidence of heel nails on insole shall not be interpreted as proper or sufficient clinching			

Examine	Defect	Classification	
		Minor (*)	Minor
Inseaming	a. Grinning seam, i.e., thread exposed	X	
	b. Strained seam, i.e., needle holes visible but thread not exposed		X
Insoles	a. Short by 3/16 inch or more	X	
	b. Short by 3/32 inch but less than 1/8 inch		X
	c. Shank attaching tack or staple not clinched	X	
	d. Any protruding point of tack, staple or nail on insole in heel area	X	
	e. Any protruding point of nail, staple or tack on insole forward of the heel breast line 1/		
Steel box toe	Missing 2/		
Marking (size, contract number, contractor's name)	Missing, incomplete, incorrect, not applied in the specified manner, misplaced, illegible or not as specified size		X
ANSI label	a. Missing ANSI label 3/	X	
	b. Illegible, incorrect, not affixed as specified, incomplete ANSI label	X	

1/ Any protruding point of tack staple or nail found in the sample shall cause rejection of the lot represented.

2/ Any missing steel box toe found in the sample shall cause rejection of lot presented.

3/ When this defect is found the defect shall be scored and the item shall be repaired, replaced, or excluded from the lot.

4.4.5.1.1 Acceptable quality levels (AQL's) and inspection level. The acceptable quality levels, expressed in defects per 100 units, and the inspection levels shall be as follows:

	Inspection level	AQL's	
		Major	Total
For defects applicable to 4.4.5.1	II	2.5	6.5

4.4.5.2 Testing of the end item. The finished shoes shall be tested for the performance characteristics listed in Table VII. The sample unit for the impact test shall be one shoe and selection shall be by pairs. The lot size shall be expressed in terms of the sample unit. All test reports shall contain the individual values utilized in expressing the final result. Requirements are applicable to the sample unit. The inspection level for the impact test shall be S-2. Any sample unit that fails to meet the requirements specified shall result in rejection of the lot.

Table VII - End Item Testing

Sample Unit	Characteristic	Requirement paragraph	Test method	Determinations per sample unit	Results reported as
One shoe	Impact	3.3.10.3.1	4.5.2 ASNI Z41.1-1967/75	1	Pass or fail

4.4.6 Examination of packaging. An examination shall be made to determine that packaging, packing and marking complies with Section 5 requirements of this specification. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged with the exception that it need not be closed. Defects of closure listed below shall be examined on shipping containers fully packaged. The lot size shall be the number containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per one hundred units.

<u>Examine</u>	<u>Defects</u>
Marking (exterior)	Omitted, incorrect, illegible, of improper size, location, sequence, or method of application. Size on item marking not in conformance with size shown on exterior container. <u>1/</u>
Materials	Any component missing, any component damaged. Any component not as specified.
Workmanship	Inadequate application of components such as: incomplete closure of container flaps, loose strapping, inadequate stapling. Bulging or distortion of containers.
Content	Number of pairs of shoes per container is more or less than specified.

1/ For this defect, one pair from each container shall be examined.

4.5 Tests.

4.5.1 Test for synthetic welting. The testing of the synthetic welting shall be carried out as specified in ASTM standards, using methods listed in Table V and as follows:

4.5.1.1 Hardness resistance. A specimen of the synthetic welting, a minimum length of 3 inches of the full width and thickness of the welting shall be immersed at a temperature of 23 (+ 2) degrees Centigrade (73.4 + 3.6 degrees Fahrenheit) for 24 (+ 1/4) hours in type III fluid of TT-S-735. The specimen shall be completely immersed in the fluid and the container shall be fitted with an air of reflux condenser so as to maintain a constant volume. At the end of the immersion period, the specimen shall be removed from the fluid, blotted dry with filter paper or other absorbent material, and tested immediately for hardness as specified in Table V.

4.5.1.2 Elongation and tensile strength. A specimen of the synthetic wetting, 6 by 0.45 by 0.125 (+ 3 percent) inches shall be completely immersed at a temperature of 23 (+ 2) degrees Centigrade (73.4 + 3.6 degrees Fahrenheit) for 24 (+ 1/4) hours in type III fluid of TT-S-735. The container shall be fitted with an air or reflux condenser so as to maintain a constant volume. At the end of the immersion period, the specimen shall be removed from the fluid, blotted dry with filter paper or other absorbent material and hung up in a temperature of 23 (+ 2) degrees Centigrade (73.4 + 3.6 degrees Fahrenheit) for 24 (+ 1/4) hours and then tested for elongation and tensile strength as specified in Table V.

4.5.1.3 Volume swell. A 50 ml. burette calibrated 0.1 ml. shall be filled with 30 ml. (V1) of methanol. The test specimen shall be 1/4 (+ 1/16) inch in length which shall be immersed in the methanol, and the increase volume shall be recorded as V2. The specimen shall then be removed, dried and immersed in fluid III of TT-S-735 for a period of 24 (+ 1/4) hours. The treated sample shall then be removed, dried and inserted in the burette filled with 30 ml. (V1b) of methanol, and the increased volume shall be recorded as V2b. The percent of volume swell shall be calculated from the following formula:

$$\begin{array}{r} \text{Volume swell percent} \\ \hline \frac{V2-V1 = VA}{VA} \times 100 \\ \frac{V2b-V1b = VB}{VA} \times 100 \end{array}$$

4.5.1.4 Specific gravity. The specific gravity of the synthetic wetting shall be determined by a Fisher Young Gravitometer using a specimen from 2 to 3 inches in length.

4.5.1.5 Water absorption. A specimen of synthetic wetting shall be cut to a length of 4 (+ 0.05) inches, weighed to the nearest 0.001 gram (W1), immersed in a beaker of distilled water. The top of the beaker shall be sealed during the test to prevent evaporation of the distilled water and maintained for seven days in an oven at a temperature of 70° (+ 2°)C. The beaker shall then be removed from the oven, cooled to a room temperature. The test specimen shall then be washed in methanol, dried for one minute and reweighed (W2). The percentage of water absorbed shall be calculated from the following formula:

$$\text{Water absorption percent} = \frac{W2-W1}{W1} \times 100$$

4.5.1.6 Brittle point after aging. A sample of synthetic wetting shall be placed in an oven and maintained at a temperature of 100° (+ 2°)C for seven days. The sample shall then be removed and allowed to remain at room temperature for 24 hours prior to testing as specified in Table V.

4.5.2 Test of steel box toe. The impact test shall be performed on the finished toe section of the finished shoe.

4.5.2.1 Impact. The impact test shall be performed in accordance with the following procedure: A falling weight of steel or other suitable material, weighing not less than 49 1/2 pounds nor more than 50 1/2 pounds, 1 inch (+0.020) inch in diameter and with a striking face made hemispherical in shape by rounding

on a 1-inch radius, equipped to drop freely in a tube or other suitable guide, shall be used. The weight shall be dropped from a distance of 18 inches, (+ 1/4) inch above the top of the toe-box. As an alternate, a falling weight of 25 (+ 1/4) pounds shall be dropped from a distance of 36 (+ 1/2) inches. The equipment shall be assembled so that the center of the striking face of the falling weight will strike the shoe at midwidth 1/2 inch in front of the back edge of the toe-box. The shoe (or toe section) shall be mounted on an anvil (or rigidly mounted bed-plate) of steel or other suitable material weighing not less than 500 pounds, equipped with suitable guides (or clamps), to hold the shoe specimen in place. In performing the test, the instantaneous clearance shall be determined by placing a lump of plastic material such as wax or molding clay inside the shoe directly below the point of impact. The plastic material shall be compressed with the fingers so that it contacts both upper and lower inside surfaces of the shoe before the test is made. When in place, the greatest horizontal dimension of the lumps should not exceed 1 inch. The plastic material shall be removed after impact and measured for compliance with 3.3.10.3.1. Other suitable methods for determining the instantaneous clearance may be used.

5. PACKAGING

5.1 Preservation packaging. Packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. Each pair of properly mated shoes shall be tied together by a 5 end cord threaded through the back stay loop. The length of the cord shall be of an adequate length to accomplish the packaging arrangement of 5.2.2.2.

5.1.2 Level C (commercial packaging). Shoes shall be packaged to afford adequate protection against physical damage during shipment from the contractor to the first receiving activity. The package and quantity per package shall be the same as that normally used the contractor for retail distribution.

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

5.2.1 Level A. Twelve (12) pairs of shoes of one size and width only, packaged as specified in 5.1.1, shall be arranged as specified in 5.2.2.2 and packed in a fiberboard shipping container conforming to type SF, class weather-resistant, size 3A, grade V2s of MIL-B-17757. The liner shall conform to Type CF, class weather-resistant, variety DW, grade V15c of PPP-B-636. Each container shall have the contents completely covered on the top and bottom with a sheet of suitable commercial grade kraft paper. Each container shall be closed, waterproofed and reinforced in accordance with the appendix of the container specification. 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 Level B. Twelve (12) pairs of shoes of one size and width only, packaged as specified in 5.1.1 shall be arranged as specified in 5.2.2.2 and packed in a fiberboard shipping container conforming to class domestic, type CF, grade 275, variety DW, style RSC-L of PPP-B-636. The box liner shall be fabricated of type CF, class domestic, variety DW or SW, grade 200 test fiberboard. The container size shall be in accordance with the list below:

Shoe size	Approximate container ID Size		
	Length	Width	Depth
All widths 4 through 9 1/2	23 1/2	15	13 1/2
10 through 14 1/2	23 1/2	15	15

Each container shall have the contents completely covered on top and bottom with a sheet of suitable commercial grade kraft paper. Each container shall be closed in accordance with Method II of the appendix of the box specification.

5.2.2.2 Packing arrangement. Arrangement of shoes within the shipping container shall be in four layers of three pairs per layer on their sides with the first layer started by placing the left shoe in the lefthand end of the container with the heel toward the front and the sole facing left, and the right shoe laid over the quarter of the left shoe in the same manner. Two more pairs shall be placed in a like manner to complete the first layer. Care shall be taken that the first layer is properly spaced in order to facilitate the packing of the other three layers. The second layer shall start at the left by placing the right shoe with the heel toward the rear, the top facing left, and the sole face to face with the heel of the second shoe in the first layer, and so on to complete the layer. The third layer shall be placed exactly as the first and fourth layer shall be the same as the second. As an alternate, shoes may be packed within the shipping container in six (6) layers of two (2) pairs per layer on their sides with the first layer started by placing the left shoe in the right hand end of the container with the heel towards the packer and the sole facing to the right. The right shoe shall be laid over the quarter of the left shoe in the same manner. Another pair shall be placed in a like manner to complete the first layer. Care shall be taken that the first layer is properly spaced to facilitate the packing of the other layers. The second layer shall start at the right by placing the left shoe with the heel away from the packer and the sole facing to the left. The right shoe shall be laid over the quarter of the left shoe in the same manner. The third and fifth layers shall be exactly as the first and the fourth and sixth layers exactly as the second layer.

5.2.3 Level C (commercial packing). Shoes packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the contractor for retail distribution. Containers shall comply with the U.S. Postal Service Manual, Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.3 Marking. In addition to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.1 Labels, mixed sizes. Each shipping container packed with mixed sizes only, 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 SIZES" plainly stamped or printed thereon, and under these words shall be legibly stamped or printed the correct quantity of pairs and sizes contained therein.

6. NOTES

6.1 Intended use. The general purpose safety shoes covered by this specification are intended for use by personnel of the Department of Defense.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

6.2.1 Procurement requirements.

- a. Title, number and date of this specification.
- b. Size and widths required (see 1.2).
- c. Whether first article sample is required (see 3.2, 4.2).
- d. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).

6.3 First article. When a first article inspection is required, the item will be tested and should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, quantity, and testing and approval of the first article.

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

6.5 Satra scale. The satra scale may be obtained from the British Shoe and Allied Trade Research Association, Satra House, Kettering, England or may be obtained from Bata Engineering, Batawa, Ontario, Canada.

6.6 Suppliers of component parts. To obtain a list of approved component part suppliers write to: Navy Clothing and Textile Research Facility, 21 Strathmore Road, Natick, MA., 01760. The list is available only to indicate possible sources of supply. Any unlisted supplies with a similar item that is equal to or better than the approved item will also be acceptable.

Custodian:
Navy - NU
Army - GL

Preparing activity:
Navy - NU

Project No. 8430-0302

Review Activities:
Army - GL, MD
DLA - CT

User Activities:
Navy - MC, AS

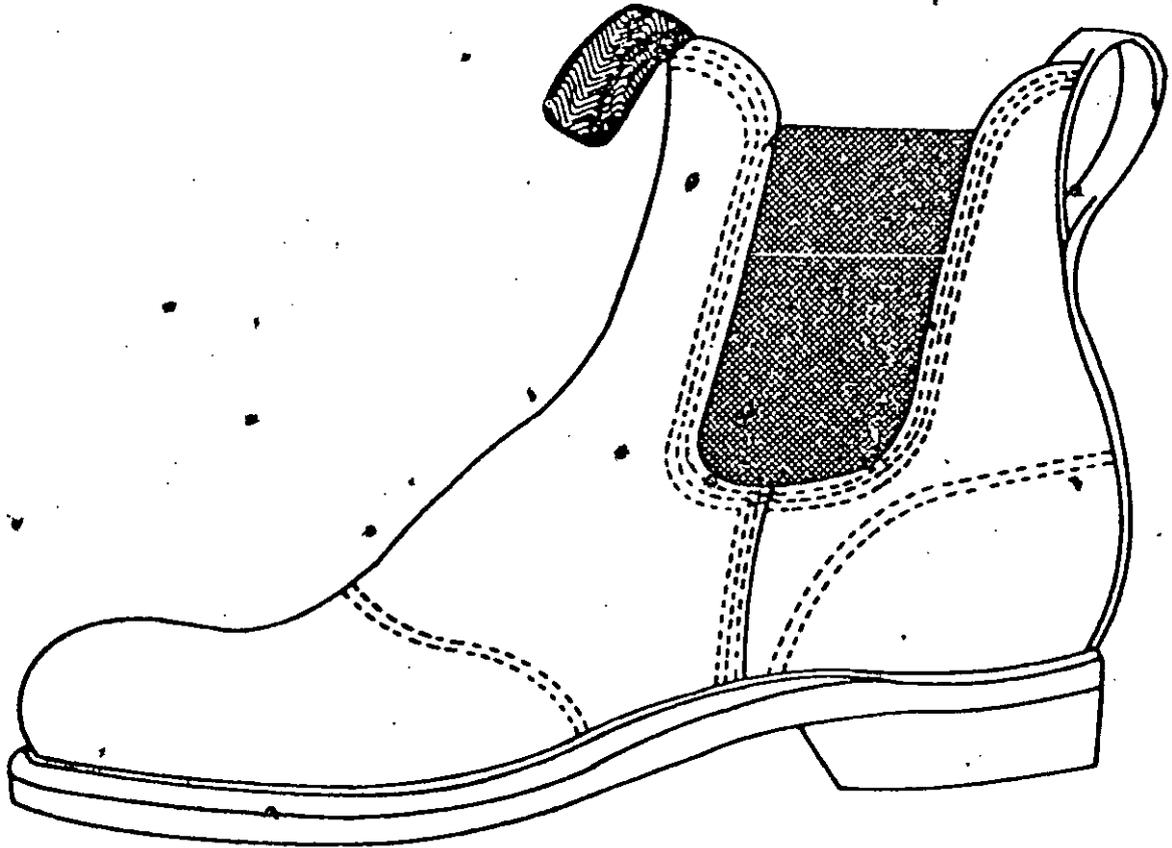
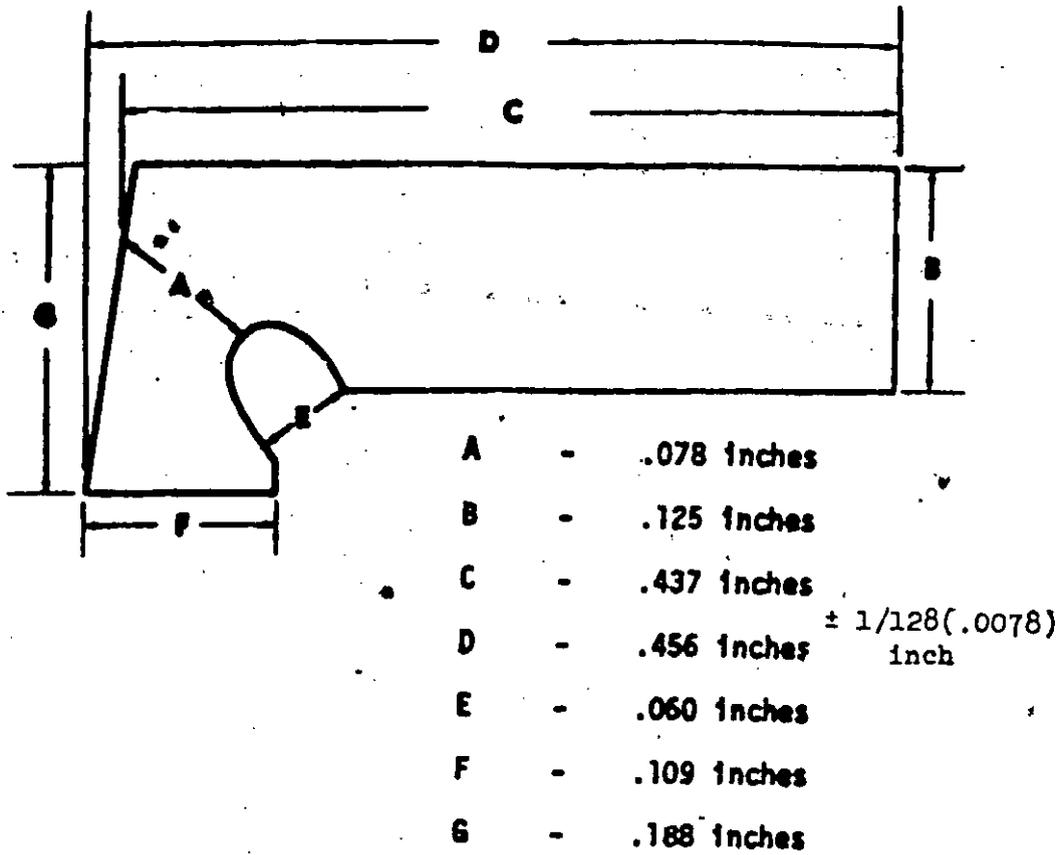


FIGURE 1 - SHOE, MOLDERS



VINYL WELTING

FIGURE 2 - SHOE, MOLDERS

FOLD

DEPARTMENT OF THE NAVY



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12803 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

OFFICER IN CHARGE
NAVY CLOTHING & TEXTILE RESEARCH FACILITY
21 STRATHMORE ROAD
NATICK, MA 01760



FOLD

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

NOTE: This form shall not be used to submit requests for 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.

DOCUMENT IDENTIFIER (Number) AND TITLE:

MIL-S-82245C Shoe Molders

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

VENDOR USER MANUFACTURER

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO.

DATE