

MIL-B-2885F
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SUPERSEDING
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MILITARY SPECIFICATION

BOOTS, FIREMEN'S

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 rubber boots with a knurled calendered sole and molded heel or a one piece molded sole and heel with a built in spike resistant midsole.

1.2 Classification. The boots shall be of the following types and sizes (see 6.2):

Type I - Three quarter length (29 inches high)

Type II - Knee length (13-1/2 inches high)

Sizes - 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

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: Officer in Charge, Navy Clothing and Textile Research Facility, 21 Strathmore Road, Natick, MA 01760-2490 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8430

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

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* 2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

C-F-206	- Felt, Sheet: Cloth, Felt, Wool, Pressed	
NN-P-71	- Pallet, Material Handling, Wood, Stringer Construction, 2 Way and 4 Way (Partial)	

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MIL-S-5059	- Steel, Corrosion Resistant (18-8) Plate, Sheet and Strip
MIL-B-17757	- Boxes, Shipping, Fiberboard (Modular Sizes)
MIL-P-15011	- Pallet, Material Handling, Wood, Post Construction, 4 Way Entry

STANDARDS

FEDERAL

FED-STD-191	- Textile Test Methods
FED-STD-601	- Rubber, Sampling and Testing

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MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	- Marking for Shipment and Storage
MIL-STD-147	- Palletized Unit Load
MIL-STD-284	- Visual Inspection Guide for Rubber Footwear

(Copies of specifications, standards, drawings, and publications required by contractors 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. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

LAWS AND REGULATIONS

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US POSTAL SERVICE MANUAL

(Copies of the manual may be obtained from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

* 2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

- D-377 - Method of Test for Small Amounts of Copper and Manganese in Textiles
- D-573 - Rubber Deterioration in an Air Oven, Test Method For
- D-1630 - Rubber Property - Abrasion Resistance
- E-18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

(Applications for copies of ASTM methods of testing should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

AMERICAN NATIONAL STANDARDS INSTITUTE

- ANZI Z41.1-1983 - American National Standard for Personnel Protection - Protective Footwear

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

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

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

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

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

* 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. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

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

3.2 First article. When specified, the contractor shall furnish sample unit(s) for first article inspection and approval (see 4.3 and 6.2).

3.2.1 Approval sample. When required (see 6.2), the contractor shall furnish a sample of the finished boot with a list of the component parts and options contained therein to the contracting officer for approval.

3.3 Material.

3.3.1 Rubber. The rubber compounds shall be made from a natural rubber, synthetic rubber, or a mixture of the two conforming to the requirements specified herein. Unless otherwise specified, the color shall be black.

3.3.1.1 Upper compounds.

* 3.3.1.1.1 Tensile strength. The tensile strength of the upper compounds shall be not less than 1450 pounds per square inch (psi) when tested as specified in 4.4.1. After aging, the tensile strength shall be not less than 75 percent of the original minimum required.

* 3.3.1.1.2 Elongation. The ultimate elongation of the upper compounds shall be not less than 350 percent when tested as specified in 4.4.1. After aging, elongation shall be not less than 75 percent of the original minimum required.

3.3.1.2 Sole and heel compounds.

3.3.1.2.1 Abrasive index. The abrasive index of the sole and heel compounds shall be not less than 45 before aging. After aging, the abrasive index shall be not less than 75 percent of the original minimum required, when tested as specified in 4.4.1. Color is optional.

3.3.1.2.2 Hardness. The hardness of the sole and heel compounds shall be 65 (+ 5) before aging and shall not be more than 75 after aging when tested as specified in 4.4.1.

* 3.3.1.3 Accelerated aging. The test specimen shall be aged in accordance with the procedures of ASTM Test Method D-573 for 16 hours at 212°F (+ 2°F).

* 3.3.2 Foam, synthetic, or natural. When used, the foam shall be a self-blown type, calendered as applicable and activated or cured. Color is optional (see 4.4.1).

3.3.3 Cement or adhesives. The cements and adhesives used shall be compounds suitable for vulcanization.

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3.3.4 Cotton fabrics. All cotton fabrics to be coated for use in construction of the boots shall contain not more than 0.003 percent copper and not more than 0.002 percent manganese when tested as specified in 4.4.1.

3.3.4.1 Osnaburg, cotton. The osnaburg fabric shall be cotton, plain weave, undyed, and shall conform to the following minimum requirements when tested as specified in 4.4.1.

<u>Wt Per Sq Yd</u> Ounces	<u>Yarns Per Inch</u>		<u>Breaking Strength</u>		<u>Nonfibrous 1/ Materials</u> (Percent)
	<u>Warp</u>	<u>Filling</u>	<u>Warp</u> (Pounds)	<u>Filling</u> (Pounds)	
5.0	34	24	50	50	12.0

1/ Starch and protein content including chloroform soluble and water soluble material of the finished cloth.

3.3.4.2 Duck cotton. The duck fabric shall be cotton, plain weave, undyed and shall conform to the following minimum requirements when tested as specified in 4.4.1.

<u>Wt Per Sq Yd</u> Ounces	<u>Breaking Strength</u>		<u>Nonfibrous 1/ Materials</u> (Percent)
	<u>Warp</u> (Pounds)	<u>Filling</u> (Pounds)	
7.0	60	60	12.0

1/ Starch and protein content including chloroform soluble and water soluble material of the finished cloth.

3.3.4.3 Knit, cotton. The knitted fabric shall be cotton, dyed or undyed, plain knit, and shall be a minimum of 6 ounces per square yard. When a dyed fabric is used, the fabric shall show fair colorfastness to wet crocking and perspiration. (See 4.4.1).

3.3.5 Felt, wool. The wool felt shall be blue, gray, or black, 1/16 inch thick conforming to the requirements of Type I, class 12R 3X of C-F-206.

3.3.6 Fleece, lining. The fleece lining shall be a knit fabric, 65 (+ 5)% reprocessed wool and 35 (+ 5)% cotton. The back side shall be knitted with cotton yarn and the face side shall be knitted with wool yarn. The wool side shall be brushed or napped to give a fleece effect. The color shall be optional. The finished weight of the material shall be a minimum of 13 ounces per square yard. The material shall be knitted with 19 to 23 wales per inch and 16 to 20 courses per inch. (See 4.4.1).

3.4 Metal components.

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* 3.4.1 Steel box toe. The steel box toe shall conform to the toe of the last and shall be fabricated from cold-rolled carbon steel. After heat treatment, the steel box toe shall conform to the requirements of Table I, when tested as specified in 4.4.1. The steel box toe shall be thoroughly cleaned and given a zinc compound coating or other suitable coating that will assure protection against corrosion and will not damage component parts of the boot.

Table I - Physical requirements, steel box toe

Hardness (Rockwell C)	Carbon Content	Thickness (inch)	Trade Pattern No.
42-52	0.50 to 0.82	0.058 + - .0025	931 or equal

3.4.1.1 Impact resistance. The steel box toe of the finished boot shall have a minimum inside clearance of 1/2 inch and shall show no evidence of fracture when tested as specified in 4.4.4.

* 3.4.1.2 Compression resistance. A certificate of compliance shall be submitted by the manufacturer stating conformance to the ANSI Z41 PT compression requirement C75 (see 4.4.1).

3.4.2 Buckles (Type I). The buckle for the Type I boot shall be made of aluminum, brass, bronze, or steel. The buckle shall have two strap slots approximately 3/4 inch wide and a lever eye or stay slot approximately 9/16 inch wide (see 6.3 and 4.4.1).

3.4.3 Rivets/caps and washers/eyelets. When used, rivets and caps or washers and eyelets shall be made of brass, bronze, or steel and shall be of a size and construction suitable for the intended purpose (see 4.4.1).

3.4.4 Shanks. Steel shanks shall be used. (See 4.4.1).

3.4.5 Steel sole. The steel for the insole plate shall be corrosion resistant steel with a minimum thickness of 0.015 inches, condition hard, a dull or bright finish, and shall have a minimum puncture resistance of 200 lbs when tested as specified in 4.4.1. Any single determination below 200 lbs shall cause rejection of the lot (see 6.5).

3.5 Description. The boots specified herein shall have black rubber uppers, white or yellow rubber bumper toe caps, steel safety toes, puncture proof steel insole, with a knurled calendered outsole and molded heel or one piece molded outsole and heel. The Type I boot shall be fitted with a top strap and buckle. (See Figure 1).

3.6 Lasts and patterns. The contractor's lasts and patterns shall be used.

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3.7 Construction. The boots shall be constructed in accordance with the contractor's patterns and lasts, utilizing component parts listed herein, as applicable. Sequence of construction shall be in accordance with the contractor's standard practice. All overlapped parts shall be firmly rolled or pressed before vulcanization.

3.7.1 Leg lining. The leg lining shall consist of the material specified in 3.3.5. It shall be spread and calender coated on one side with upper compound not less than 0.006 inches thick.

3.7.2 Leg form. The leg form shall consist of material specified in 3.3.4.2. It shall be frictioned on both sides and calender coated with upper compound not less than 0.025 inches thick. Calender coating on leg form may be omitted if Leg Cover gauge is increased to 0.035 inches (see 3.7.15).

3.7.3 Toe lining.

First option. The toe lining shall consist of the material specified in 3.3.4.3. It shall be frictioned or spread and calender coated on one side with upper compound not less than 0.006 inches thick.

Second option. The toe lining shall consist of the material specified in 3.3.6. It shall be coated on the back side with upper compound not less than 0.006 inches thick.

3.7.4 Ankle reinforcements. The ankle reinforcements shall consist of the following component parts as applicable.

3.7.4.1 Ankle piece. The ankle piece shall consist of the material specified in 3.3.4.1 coated as follows:

First option. Friction one side and calender coat the other side with upper compound to an overall thickness of not less than 0.030 inch, or friction both sides and adhere to an ankle piece made of upper compound not less than 0.030 inches thick.

Second option. Friction both sides and adhere to an ankle piece made of upper compound not less than 0.020 inches thick.

3.7.4.2 Front stay. The front stay shall consist of material specified in 3.3.4.1 frictioned on both sides or the stay shall be made of upper compound not less than 0.020 inches thick.

3.7.4.3 Stiffening counter. The stiffening counter shall consist of the material specified in 3.3.4.1, frictioned on one side and calender coated on the other side to an overall thickness of not less than 0.050 inches, or shall be made of upper compound not less than 0.070 inches thick.

3.7.5 Counter form. The counter form shall consist of the material specified in 3.3.4.1 coated as follows to an overall thickness of not less than 0.030 inches.

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<u>First option.</u>	Friction both sides with upper compound.
<u>Second option.</u>	Friction both sides and calender coat one side with upper compound.
<u>Third option.</u>	Friction one side and coat the other side with stiffening compound.

3.7.6 Rubber counter. The rubber counter shall consist of upper compound 0.025 to 0.030 inches thick.

3.7.7 Inner vamp. The inner vamp shall consist of upper compound or the material specified in 3.3.4.1 coated as follows:

<u>First option.</u>	Friction both sides and adhere to an inner vamp of upper compound 0.025 to 0.030 inches thick.
<u>Second option.</u>	Friction both sides and calender coat one side with upper compound to an overall thickness of not less than 0.030 inches thick.
<u>Third option.</u>	The inner vamp shall consist of upper compound not less than 0.020 inches thick.

3.7.8 Back strip (rubber). The back strip shall consist of upper compound not less than 0.020 inches thick.

3.7.9 Back strip (fabric). The fabric back strip shall consist of material specified in 3.3.4.1 frictioned on both sides to an overall thickness of not less than 0.020 inches thick. Width of the fabric strip shall be a minimum of 3/4 inch.

3.7.10 Leg loops. The leg loops shall consist of the material specified in 3.3.4.1, 3.3.4.2, 3.3.4.3 or other suitable fabric. The coated fabric shall be a minimum of 2-1/2 inches wide by 8 inches long and shall be rolled tightly in the lengthwise direction. The ends of the leg loops shall have tapered ends and shall be inserted between the leg lining and leg form (one loop to each side of the knee). Exposed surfaces of the leg loops may be covered by material specified in 3.3.4.1, 3.3.4.3 or any other suitable material. The fabric shall be coated as follows:

<u>First option.</u>	Friction both sides to an overall thickness of not less than 0.025 inch.
<u>Second option.</u>	Friction both sides and calender coat one side to an overall thickness of not less than 0.025 inch.

3.7.11 Leg stiffener (Type I). The leg stiffener shall consist of the material specified in 3.3.4.1 frictioned on both sides and calender coated with upper compound to a minimum thickness of 0.040 inch. As an alternate, the leg stiffener shall be made of upper compound or stiffening compound not less than 0.025 inches thick or equal (see 6.6). The leg stiffener shall be approximately 2-1/2 inches wide and shall be inserted between the leg form and leg lining. The use of a leg stiffener is optional for the Type II boot.

3.7.12 Vamp form. The vamp form shall consist of the material specified in 3.3.4.2 and shall be frictioned on both sides.

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3.7.13 Rubber vamp. The rubber vamp shall consist of upper compound not less than 0.030 inches thick.

3.7.14 Throat stay. When used, the stay material shall consist of upper compound not less than 0.030 inches thick and shall be positioned between the rubber vamp and vamp form.

3.7.15 Leg cover. The leg cover shall consist of upper compound not less than 0.020 inches thick. If calender coating is omitted on the leg form, the leg cover gauge shall be a minimum of 0.035 inches thick.

3.7.16 Top lining (Type I). The top lining of the Type I boot shall consist of the material specified in 3.3.4.3. The lining shall be frictioned or spread and calender coated on one side with upper compound.

3.7.17 Gum top (Type I). The gum top of the boot shall consist of upper compound not less than 0.025 inches thick.

3.7.18 Top reinforcement (Type I). The top reinforcement of the boot shall be upper compound calendered not less than 0.015 inches thick or equal (see 6.6) and shall be a minimum of 3 inches wide. It shall be adhered to by molding or cementing on the inside of the top lining above the leg lining lap seam.

3.7.19 Knee patch (Type I). The knee patch shall consist of upper compound not less than 0.025 inches thick and not less than 175 square inches in area and positioned in the area subjected to chafing.

3.7.20 Binding. The binding for the Type I or Type II boot shall consist of upper compound not less than 5/16 inch wide. Color is optional.

3.7.21 Top and buckle strap (Type I). The top and buckle strap shall consist of the material specified in 3.3.4.1, frictioned and calender coated on both sides not less than 0.025 inch thick. The strap shall be double folded and shall include a reinforcing cord on each edge. The folded top strap shall be 9/16 to 13/16 inch wide and shall be not less than 7-1/2 inches long. The folded buckle strap shall be 1/2 (+ 1/16) inch wide and 2-1/4 (+ 1/8) inches long.

3.7.22 Top and buckle strap stays (Type I). The strap stays shall consist of the material specified in 3.3.4.1, frictioned on one side and calender coated on the other side with upper compound not less than 0.020 inches thick.

* 3.7.23 Bumper toe cap. The bumper toe cap of the Type I and II boots shall be white or yellow and shall consist of upper compound not less than 0.070 inches thick.

3.7.24 Fabric foxing. The fabric foxing when used, shall consist of the material specified in 3.3.4.1, not less than 1/2 inch wide, frictioned on both sides and calender coated on one side.

3.7.25 Foxing. The foxing shall consist of white or yellow upper compound, not less than 0.035 inch thick and shall be not less than 3/4 inch wide. The foxing may be plain or a knurled design.

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3.7.26 Heel filler. When required, the heel filler shall consist of the material specified in 3.3.4.1, frictioned on both sides, and calender coated on one side with a stiffening compound. As an alternate, rag compound may be used.

* 3.7.27 Insole-midsole construction. The insole-midsole construction for the Type I or Type II boots shall be as specified below:

First option - The insole shall consist of felt, foam, and a stiffening compound. The felt shall be next to the wearer's foot and shall be of the material specified in 3.3.5. The foam specified in 3.3.2 shall be calendered to the felt sole and shall finish not less than 0.125 inch thick. A stiffening compound not less than 0.055 inch thick shall be calendered to the sponge rubber side of the insole. The midsole shall consist of a flexible one piece steel plate (see 3.4.5), dipped or coated with cement or a suitable resin and encased between two layers of osnaburg material (3.3.4.1) which have been friction coated on both sides and calender coated on one side, with the calendered side against the steel plate, and rolled or pressed together.

Second option - The insole shall consist of felt (3.3.5), coated on one side with stiffening compound and shall have a finished thickness of not less than 0.120 inches. The midsole shall consist of a flexible one piece steel plate (see 3.4.5) dipped or coated with cement or suitable resin and encased between two layers of osnaburg material (3.3.4.1) which have been friction coated on both sides and calender coated on one side, with the calendered side against the steel plate, and rolled or pressed together.

3.7.28 Boot, bottom construction. The bottoms of the Type I or Type II boots shall be constructed of the component parts and options listed below. Sequence of construction shall be in accordance with the contractor's commercial practice. The outsole and heel shall be either a molded, one-piece unit or a calendered, knurled outsole and separate heel.

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First option - The sole construction shall consist of a filler sole, binder sole and outsole and heel. The filler sole shall consist of stiffening compound not less than 0.055 inch thick. The binder sole shall consist of osnaburg (3.3.4.1) frictioned on both sides and calender coated on one side with upper rubber compound to an overall thickness of not less than 0.030 inch. The outsole and heel shall consist of the material specified in 3.3.1.2. The outsole shall be a cleated or heavily knurled design as approved by the Contracting Officer (see 6.2). The outsole shall have an instep rise of approximately 1-1/4 inches and shall have an outside shank rise of approximately 1-1/2 inches. The sole shall be not less than 0.300 inch thick (at highest point) at the ball and shall be not less than 0.125 inch thick at the heel area. The heel shall consist of outsole compound and shall carry the manufacturer's standard tread design or a design approved by the Contracting Officer (see 6.2). The heels shall be full size, 5/8 (+ 1/16) inch thick at the thinnest point. Commercial grading between sizes shall be used. As an alternate, the outsole and heel shall consist of the material specified in 3.3.1.2 molded into a single unit carrying the manufacturer's standard tread design or a design approved by the Contracting Officer (see 6.2). The total thickness of the sole area shall be not less than 0.312 inch and the total thickness in the heel area shall be not less than 0.945 inch. The heel height, when measured from the bottom surface of the sole at the breastline, shall be not less than 0.500 inch. The heels shall have a straight breastline or may have a beveled breastline approved by the Contracting Officer.

Second option - The sole construction shall consist of a filler sole, binder sole, soleform, heel filler, toe plug, and outsole and heel. The filler sole shall consist of stiffening compound. The binder sole shall consist of osnaburg (3.3.4.1) frictioned on one side and calender coated on the other side with stiffening compound. The sole form shall consist of osnaburg (3.3.4.1) frictioned on both sides and calender coated on one side with stiffening compound. When a heel filler is used, it shall be as specified in 3.7.26. When a toe plug is used, it shall consist of stiffening compound not less than 0.050 inch thick. The outsole and heel requirements shall be as specified in the first option.

3.8 Dimensions.

3.8.1 Height. The inside height of the Type I boot shall be not less than 29 inches. The inside height of the Type II boot (excluding leg loops) shall be not less than 13-1/2 inches. The height shall be measured on a finished boot at the inside heel area to the top, back of the boot.

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3.8.2 Girth. The inside circumference of the top of the Type I boot shall be not less than 21 inches. The inside circumference of the top of the Type II boot shall be not less than 17 inches.

3.9 Marking and labeling.

3.9.1 Size marking. The size of each boot shall be embossed or branded into the breast of the heel or into the outsole in the shank area close to the heel breast. Height of the markings shall be not less than 1/2 inch.

3.9.2 Contractual marking. The contractual markings shall contain the information below, legibly stamped or printed with indelible ink of a contrasting color on the inside of the boot approximately one inch below the top edge. As an alternate, the contractual marking for the Type II boot may be located on the outside of the boot just below the inside leg loop. The boot size and letters "US" shall be a minimum of 1/2 inch in height.

US
SIZE
BOOTS, FIREMEN'S
CONTRACT NUMBER: DLA-100-00-0-0000 (Example)
NAME OF CONTRACTOR:
STOCK NO: 8340-00-000-0000

3.9.3 Labels and other identification. The contractor's label or trademark may be used if desired. Other identifying marking, such as leg bands may also be used. If a contractor's label is used, it shall be not more than 1-1/2 inches in height or width and not more than one label per boot shall be used. Label may be placed at any suitable position on the outside of upper portion of boot.

* 3.9.4 ANSI labeling. The boots shall be labeled to indicate that they conform to class 75 safety toe requirements outlined in American National Standards Institute's Standard Z41 PT. Below the contractual markings, each boot shall have the following label legibly stamped or printed with an indelible ink of contrasting color:

ANSI Z41 PT 83
M I/75 C/75

3.10 Vulcanization. Boots shall be vulcanized under pressure to insure a watertight, single unit.

3.11 Leakage. The finished boots shall show no leakage when tested as specified in 4.4.4.

3.12 Workmanship. The finished boots 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 PROVISIONS

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

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

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

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 4.4.3 for compliance with design, construction, workmanship, and dimensional requirements.

4.4 Quality conformance inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

* 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 procurement documents. In addition, a certificate of compliance shall be furnished for the foam identification of 3.3.2, fleece lining identification of 3.3.6, steel box toe requirements for material, carbon content, thickness and coating compound of 3.4.1 through 3.4.1.2, buckle requirements of 3.4.2 and material identification of rivets and caps, shanks, and steel sole of 3.4.3 through 3.4.5, and the thickness of coatings of 3.7.1 and 3.7.2. Testing shall be performed on components and materials listed in Table II. 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 requirement specified. The sample size shall be as follows:

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<u>Lot size</u>	<u>Sample size</u>
800 or less	2
801 thru 22,000	3
22,001 and over	5

NOTE: For each type of rubber compound, the sample unit shall be a composite of the rubber prepared in the form indicated below. A lot shall consist of the amount of rubber compound that is produced or compounded at any one time. The composite test sample of rubber shall be vulcanized in the same manner employed in the manufacture of the boots.

- (a) Upper compound - two pieces 9" x 9" x 0.070" (+ 0.010 inch)
 (b) Sole and heel compound - two pieces 6" x 6" x 0.070" (+ 0.010 inch) and one piece 6" x 6" x 0.250 (+ 0.025 inch).

Table II - Testing of components

<u>Component and unit of product</u>	<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Upper compound	Tensile strength:	3.3.1.1.1	
	Before aging		4111 <u>3/</u>
	After aging		4111 <u>5/ 3/</u>
	Elongation:	3.3.1.1.2	
	Before aging		4121 <u>3/</u>
	After aging		4121 <u>3/ 5/</u>
Sole and heel compound	Abrasive Index:	3.3.1.2.1	
	Before aging		D-1630 <u>4/</u>
	After aging		D-1630 <u>4/ 5/</u>
	Hardness	3.3.1.2.2	
	Before aging		3021 <u>3/</u>
	After aging		3021 <u>3/ 5/</u>
Osnaburg cotton cloth (1 yard full width)	Mat'l Ident.	3.3.4.1	1200 <u>1/ 2/</u>
	Wgt/oz/sq yd	3.3.4.1	5041 <u>2/</u>
	Yarns per inch:	3.3.4.1	5050 <u>2/</u>
	Warp		
	Filling		
	Tensile Strength:	3.3.4.1	
	Warp		5100 <u>2/</u>
	Filling		
	Weave	3.3.4.1	Visual
	Non-fibrous	3.3.4.1	2611 <u>2/</u>
	Copper and Manganese Content	3.3.4	D-377 <u>4/ 1/</u>

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Component and unit of product	Characteristic	Requirement paragraph	Test method
Duck cotton cloth (1 yard full width)	Mat'l Ident.	3.3.4.2	1200 <u>1/</u> <u>2/</u>
	Wgt/oz sq yd	3.3.4.2	5041 <u>2/</u>
	Tensile strength:	3.3.4.2	5100 <u>2/</u>
	Warp		
	Filling		
	Weave	3.3.4.2	Visual
	Non-fibrous	3.3.4.2	2611 <u>2/</u>
	Copper and Manganese Content	3.3.4	D-377 <u>4/</u> <u>1/</u>
Knit cotton (1 yard full width)	Mat'l Ident.	3.3.4.3	1200 <u>1/</u> <u>2/</u>
	Wgt/oz/sq/yd	3.3.4.3	5041 <u>2/</u>
	Colorfastness to:		
	Wet Crocking		5651 <u>2/</u>
	Perspiration		5680 <u>2/</u>
	Copper and Manganese Content	3.3.4	D-377 <u>4/</u> <u>1/</u>
Fleece, knit lining (1 yard full width)	Wgt/oz/sq/yd	3.3.6	5041 <u>2/</u>
	Yarns per inch		
	Wales per inch	3.3.6	5070 <u>2/</u>
	Courses per inch		
Steel box toe (3 steel toes)	Hardness (Rockwell C)	3.4.1	E-18 <u>4/</u> <u>1/</u>
Steel sole (3 steel soles)	Puncture resistance	3.4.5	4.5.1

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

2/ Refers to FED-STD-191.

3/ Refers to FED-STD-601.

4/ Refers to ASTM standard.

5/ Paragraph 3.3.1.3 defines the aging procedure.

4.4.2 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 or service for which in-process inspection has indicated non-conformance.

* 4.4.3 Examination of the end item. Examination of the end item shall be in accordance with 4.4.3.1 through 4.4.3.2. The inspection level and Acceptable Quality Level (AQL) shall be as specified in 4.4.3.3. In addition, the

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finished boots shall be tested for impact and leakage in accordance with 4.4.4, 4.5.2, and 4.5.3.

* 4.4.3.1 Visual examination. The finished boots shall be examined for the defects listed below and the applicable defects listed in MIL-STD-284. The sample unit shall be one completely fabricated boot and the selection shall be in pairs. For pairing examination, the pair shall be examined together. Each defect found during the examination for pairing shall be scored as a single defect.

Defect	Classification	
	Major	Minor
1. Design not as specified		X
2. Color not as specified		X
3. Any component missing or not as specified	X	
4. Dimensions of any component not as specified	X	
5. More than 1/4 inch variation in height of pair		X
6. Poor or uneven lasting affecting serviceability or appearance:		
a. Seriously	X	
b. Not seriously		X
7. Air pocket or channel in seam, any:		
a. 1/4 square inch or more in area	X	
b. Up to 1/4 square inch in area		X
8. Marking (contractual, size, etc) missing, incomplete, incorrect, not applied in the specified manner, misplaced, or illegible <u>1/</u>		X

1/ Any missing ANSI label found in the sample shall be scored and the boot repaired, replaced, or excluded from the lot.

4.4.3.2 Dimensional examination. The boots shall be examined for defects in dimensions. Any dimension not within the established tolerance shall be classified as a defect. The sample unit shall be one boot.

4.4.3.3 Inspection levels and acceptable quality levels (AQL's). The inspection levels and acceptable quality levels (AQL's) expressed in defects per 100 units shall be as follows:

	Inspection level	AQL's	
		Major	Total
For visual examination in 4.4.3.1	II	2.5	6.5
For dimensional examination in 4.4.3.2	S-3	-	4.0

4.4.4 Testing of the end item. The finished boots shall be tested for performance characteristics listed in Table III. The sample unit for the

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impact test and leakage test shall be one boot and the selection shall be by pairs. The boots used for the leakage test may be used for the impact test. For the leakage test, the inspection level shall be S-1 and the AQL shall be 1.5 (DHU). For the impact test, the inspection level shall be S-1 and the AQL shall be 4.0 (DHU). Any boot that fails to meet the requirements for leakage shall be repaired and retested before being included in the end item lot.

Table III - End item testing

Characteristics	Requirement paragraph	Test methods	No. determinations per boot	Results reported as
		4.5.3 or		
Impact	3.4.1.1	ANSI Z41.1-1983	1	Pass or fail
Leakage	3.11	4.5.2	1	Pass or fail

* 4.4.5 Examination of packaging requirements. An examination shall be made to determine that packaging, packing, and marking comply 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 prepared for delivery. Defects of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be on 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.

<u>Examine</u>	<u>Defect</u>
Marking (exterior and interior)	Omitted, incorrect, illegible, of improper size, location, sequence, or method of application.
Materials	Any component missing, damaged, or not as specified.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, loose strapping, improper taping, inadequate stapling, bulged or distorted container.
Content	Number of items per shipping container is more or less than required. Size shown on one or more items not as specified on shipping container. <u>1/</u>

1/ For this defect, one item from each shipping container in sample shall be examined.

* 4.4.6 Palletization examination. An examination shall be made to determine that the palletization complies with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one palletized unit load fully packaged. The lot size shall be the number of palletized unit loads in the end item inspected lot. The inspection level shall be S-1 and the AQL, expressed in terms of defects per hundred units, shall be 6.5 in accordance with MIL-STD-105.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirements.

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Palletization	Pallet pattern not as specified. Interlocking of loads not as specified. Load not bonded with required straps as specified.
Weight	Exceeds maximum load limits.
Marking	Omitted, incorrect, illegible, of improper size, location, sequence, or method of application.

4.5 Tests.4.5.1 Puncture resistance test for steel sole.

4.5.1.1 Apparatus. The puncture resistance test shall be performed on a testing machine having a moveable platform adjusted to travel at 1/4 inch per minute. Two blocks of hardwood, metal, or plastic shall be prepared as follows: the blocks shall be of such size and thickness as to insure a suitable rigid test ensemble and allow for at least one inch of the pointed end of an 8D nail to be exposed for the penetration. One block shall have a hole drilled to hold an 8D common nail firmly at an angle of 90°. The second block shall have a maximum 1/2 inch diameter hole drilled through it so that the hole will allow free passage of the nail after it penetrates the insole during the test.

4.5.1.2 Procedure. The test ensemble consisting of the sample unit (3 steel soles), the two prepared blocks, a piece of leather outsole 10 to 11 irons thick, and a new 8D nail, shall be placed as follows: the 8D nail in the hole, the sample of outsole stock superimposed above the nail, the area of the steel sole plate to be tested placed on the outsole, and the second block with hole so placed as to allow for free passage of the nail after it passes through the outsole stock and the steel sole plate in that order. The machine shall be started and the pressure, in pounds required for the nail to completely penetrate the outsole and sole plate, recorded to the nearest five pounds. Two determinations shall be made on each of the three sole plates and the results averaged. A new nail shall be used for each determination.

* 4.5.2 Leakage test for finished boot. Boots shall be tested for leakage by inserting a hose or pipe into the boot and applying an air pressure of 1 (+ 0.1) p.s.i.. The top of the boot shall be closed in a manner to prevent the escape of air and the boot shall be immersed in a tank of water so that the top of the boot is approximately 3 inches above the water level. Evidence of leakage shall be indicated by bubbles of air that form and rise to the surface of the water.

* 4.5.3 Impact resistance test for steel box toe. The impact test shall be performed in accordance with the following procedures: A weight of steel or other suitable material, weighing 50 (+ 1/2) pounds, that will fall freely within suitable vertical guides to strike a steel plunger 1 (+ 0.020) inch in diameter. The bottom striking surface of the plunger shall be rounded to a 1 inch radius. 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 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 striking face of the falling weight will strike the boot at midwidth 1/2 inch in front of the back

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edge of the toe-box. The boot (or toe-section) shall be mounted on an anvil (or rigidly mounted bedplate) of steel or other suitable material weighing not less than 500 pounds, equipped with suitable guides (or clamps) to hold the boot specimen in place. In performing the test, the instantaneous clearance may be determined by placing lumps of plastic material such as wax or modeling clay inside the boot directly below the point of impact. The moldable material should be compressed with the fingers so that it contacts both upper and lower inside surfaces of the boot before the test is made. When in place, the greatest horizontal dimension of the lumps should not exceed 1 inch. An approved method for impact testing is contained in the American National Standard ANSI Z41.1-1983. The steel box toe shall be considered a failure if the moldable material is compressed to a point less than 1/2 inch in thickness.

5. PACKAGING

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

5.1.1 Level A. Each mated pair of boots of one type only, shall be secured together with cotton tape or twine to prevent separation. As an alternate, each mated pair of boots may be placed in a polyethylene bag with the open end closed by means of a aluminum band, paper, or plastic covered steel wire tie.

5.1.2 Level C (Commercial packaging). Boots shall be packaged to afford adequate protection against 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 by 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. Four pairs of type I boots or five pairs of type II boots, of one size only, preserved as specified in 5.1, shall be packed in a fiberboard shipping container assembled closed and reinforced conforming to type CF, class weather-resistant, variety DW, grade V15c, size 3A of MIL-B-17757. The fiberboard for the liner shall conform to type CF, class domestic of MIL-B-17757. The boots shall be arranged so that the first pair of boots has the sole of one boot against one end panel and the side of the sole of the second boot resting on the ankle of the first boot. The remaining pairs of boots shall then be placed in the container in the same manner with every other pair reversed. A sheet of commercial grade kraft paper shall be used to completely separate each boot from another boot and to completely cover the top and bottom of each pack. Prior to placing each type I boot in the container, the top shall be folded over so that the packing can be accomplished as specified. When boots are packaged in a polyethylene bag, the kraft paper shall be omitted and the arrangement determined by the contractor. 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 in the same container.

* 5.2.2 Level B. Four pairs of type I boots or five pairs of type II boots, of one size only, shall be packed in a fiberboard shipping container assembled, closed and reinforced conforming to type CF, class domestic,

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variety DW, grade 275, size 3A of MIL-B-17757. The fiberboard for the liner shall conform to type CF, class domestic of MIL-B-17757. The boots shall be arranged so that the first pair of boots has the sole of one boot against one end panel and the side of the sole of the second boot resting on the ankle of the first boot. The remaining pairs of boots shall then be placed in the container in the same manner with every other pair reversed. A sheet of commercial grade kraft paper shall be used to completely separate each boot from another boot and to completely cover the top and bottom of each pack. Prior to placing each type I boot in the container, the top shall be folded over so that the packing can be accomplished as specified. When boots are packaged in a polyethylene bag, the kraft paper shall be omitted and the arrangement shall be determined by the contractor. Toward the end of the contract, or when there are less than the required amount per container of the same type and size, mixed sizes may be packed in the same container.

5.2.3 Level C. Item 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 US Postal Service Manual, Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

* 5.2.4 Palletization. When specified (see 6.2) item packed as specified shall be palletized on a 4-way entry pallet in accordance with load type Ia of MIL-STD-147. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means C, K, and L or O or P. Pallet pattern shall be in accordance with the appendix of MIL-STD-147.

The pallet shall be 4-way, Type IV; Type V, Class 1, Size 2; or Type VIII, fabricated from wood group I, II, III or IV, Grade A of NN-P-71, or 4-way, Style 1, Size A, Type I, Class 1 fabricated from wood groups specified of MIL-P-15011. Interlocking of loads shall be effected by reversing the pattern of each course. If the container is of a size which does not conform to any of the patterns specified in MIL-STD-147, the pallet pattern used shall be approved by the contracting officer.

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 4 by 5 inches with the words "MIXED NSN'S" plainly stamped or printed thereon and under these words shall be legibly stamped or printed the correct quantity and National Stock Numbers contained therein.

6. NOTES

6.1 Intended use. The boots are intended for use by Military personnel, firefighting, and damage control environments.

* 6.2 Ordering data. Procurement documents should specify the following:

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- a. Title, number, and date of this specification.
- b. Type and sizes required (see 1.2).
- c. When first article inspection is required (see 3.2), the item shall be tested and should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, quantity, and testing and approval.
- d. When sample shall be submitted to contracting officer for approval (see 3.2.1).
- e. When heel and sole design must be submitted for approval (see 3.7.28).
- f. Levels of packaging and packing required (see 5.1 and 5.2).
- g. When palletization is required (see 5.2.4).

6.3 A buckle meeting the requirements of 3.4.2 may be obtained from North and Judd Mfg. Co., Conn., Style No. 587.

6.4 Sample. For access to samples, address the procuring activity issuing the invitation for bids.

6.5 Material conforming to MIL-S-5059, Steel, Corrosion Resistant (18-8) Plate, Sheet and Strip, has been found to meet the requirements of 3.4.5.

6.6 Equal item. Prior to the use of an "or equal" item the contractor shall submit the item with supporting data to the contracting officer for subsequent approval or disapproval.

* 6.7 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

6.8 Changes from previous issue. 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.

* 6.9 Subject term (key word) listing.

Boot, protective
Footwear, firefighters
Sole, steel reinforced
Steel toe, safety

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Custodian:

Navy - NU
Army - GL
Air Force - 99

Preparing Activity:

Navy - NU

Review Activity:

DLA - CT
Army - MD, EA
Air Force - 50, 82

Project No. 8430-0361

User Activity:

Navy - AS, SH
Air Force - 45

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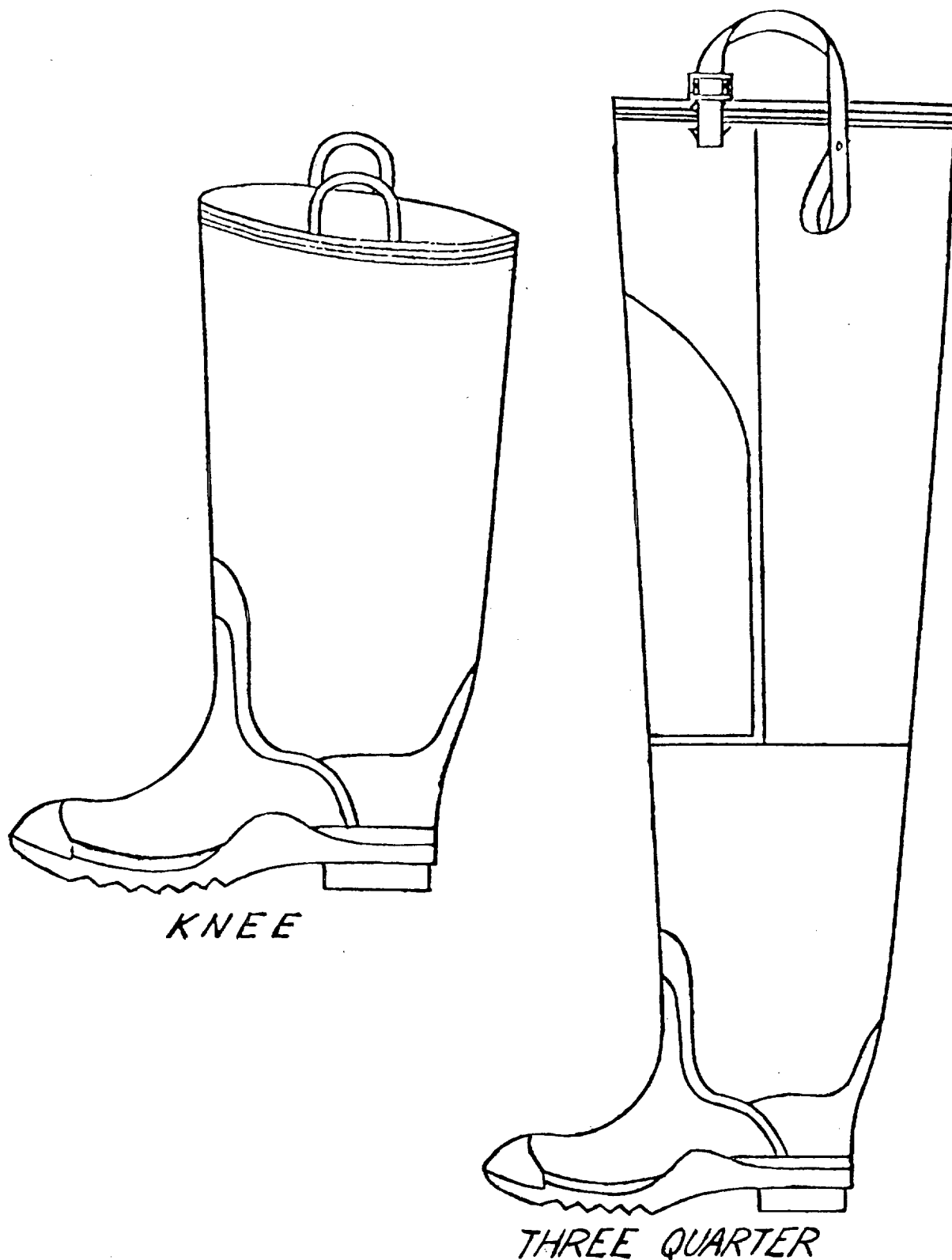


Figure 1 - Boots, Firemen's

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL*(See Instructions – Reverse Side)***1. DOCUMENT NUMBER**

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2. DOCUMENT TITLE

BOOTS, FIREMEN'S

3a. NAME OF SUBMITTING ORGANIZATION**4. TYPE OF ORGANIZATION (Mark one)**☐

VENDOR

☐

USER

☐

MANUFACTURER

☐

OTHER (Specify): _____

b. ADDRESS (Street, City, State, ZIP Code)**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)**