

MIL-B-4330C(USAF)  
 25 September 1984  
 SUPERSEDING  
 MIL-B-4330B(USAF)  
 10 Mar 1971

## MILITARY SPECIFICATION

### BOOT, EXTREME COLD WEATHER

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

#### 1. SCOPE

1.1 Scope. The boot covered by this specification is furnished in one size and style only, and provided with insoles.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

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

#### SPECIFICATIONS

##### FEDERAL

DDD-L-20	Label; for Clothing, Equipage, and Tentage (General Use).
V-T-295	Thread, Nylon.
CCC-C-419	Cloth, Duck, Cotton, Unbleached, Plied Yarns Army and Numbered.
PPP-B-636	Boxes, Shipping, Fiberboard.
PPP-F-320	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.

##### MILITARY

MIL-B-371	Braid, Textile, Tubular.
MIL-I-1986	Insole, Footwear, Felt, Insulating.

#### STANDARDS

##### FEDERAL

FED-STD-311	Leather, Methods of Sampling and Testing
FED-STD-751	Stitches, Seams and Stitchings.

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

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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-143	Standards, and Specifications, Order of Precedence for the Selection of.
MIL-STD-794	Parts and Equipment, Procedures for Packaging of.

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.

## DRAWINGS

## AIR FORCE

51F24551 Boot, Extreme Cold Weather.

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

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

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3951 Standard Practice for Commercial Materials (ASTM)

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

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

## 3. REQUIREMENTS

3.1 First article approval. Unless otherwise specified (see 6.2) and before production is commenced, one or more finished boots shall be submitted to the contracting officer or his authorized representative for inspection as specified in 4.2. The approval of the first article authorizes the commencement of production, but does not relieve the supplier of the responsibility for compliance with all provisions of this specification. The first article shall be manufactured in the same facilities to be used for the manufacture of the production items.

3.2 Selection of standards and specifications. In using materials, products, and services not specifically designated herein, applicable standards and specifications shall be selected in accordance with MIL-STD-143.

3.3 Materials.3.3.1 Leather.

\* 3.3.1.1 Upper leather. The leather used in vamp, tongue, welting and loops shall be cowhide bellies, sides, or backs, or of a size most economical for cutting. It shall be highly buffed grain natural color leather pretanned with alum, or chrome tanned leather and retanned with free polyhydric phenol and free aldehyde, or other synthetic retannage, which will produce leather meeting the requirements of this specification.

3.3.1.2 Soles. The leather used in the soles shall be the same as the leather specified in 3.3.1.1 except that it shall be lightly buffed on both sides.

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3.3.1.3 Physical properties. All leather used in the fabrication of the boot shall conform to Table I and shall be tested as specified in Section 4.

3.3.2 Upper shell. The upper shell material shall be 8.25 ounce, unbleached cotton duck, conforming to type III of CCC-C-419.

3.3.3 Lacing. The laces shall be made from unbleached cotton braid conforming to type VI, class 3 of MIL-B-371. The length shall be 106 inches  $\pm$  2 inches. The ends shall be waxed approximately 2 inches back from each end to prevent fraying. As an alternate, the ends may be dipped in a cellulose acetate butyrate solution.

3.3.4 Thread. The thread for all sewing shall be nylon, size E, type I, class 1 of V-T-295. The color of the thread shall be natural.

3.3.5 Insoles. Each boot shall be provided with an insole conforming to MIL-I-1986.

TABLE I. Physical properties

Property	Requirements
Thickness (ounce) woburn gage	3.5 to 4.0
Tensile strength (pounds per square inch)	2000 min
Stitch tear strength (pounds per inch)	450 min
Elongation at break (percent)	60 max
Moisture vapor transmission (grams/m <sup>2</sup> /24 hours)	2900 min
Stiffness, 60 degree bending angle, percent bending moment	
Minus 65° Fahrenheit (F)	45 max
Plus 70°F	10 max

3.4 Design and construction. The boot shall conform to the general design as shown in figures 1 and 2 and shall be constructed in accordance with the operations specified in Table II.

3.4.1 Each boot shall be suitable for either the right or left foot.

3.4.2 Welting 1/2 inch wide shall be used at the joining of the vamp to the sole. The welt shall be trimmed closely to avoid bulk on the inside and to give a neat appearance on the outside.

3.5 Patterns. Manufacturer's working patterns shall be identical in size and shape to the patterns referenced on Drawing No. 51F24551.

3.6 Stitches, seams, and stitching. Unless otherwise specified, the stitches shall be type 301 and all stitches, seams, and stitching shall conform to FED-STD-751. All stitching shall be backstitched at least 3/8 inch.

3.7 Labels.

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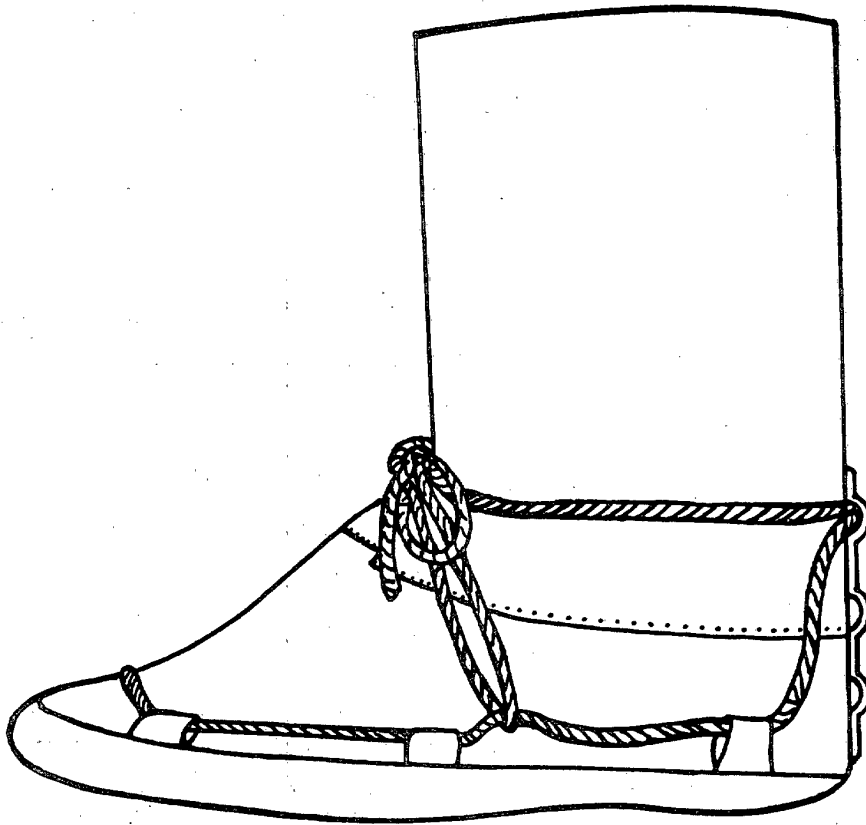


Figure 1. Boot.

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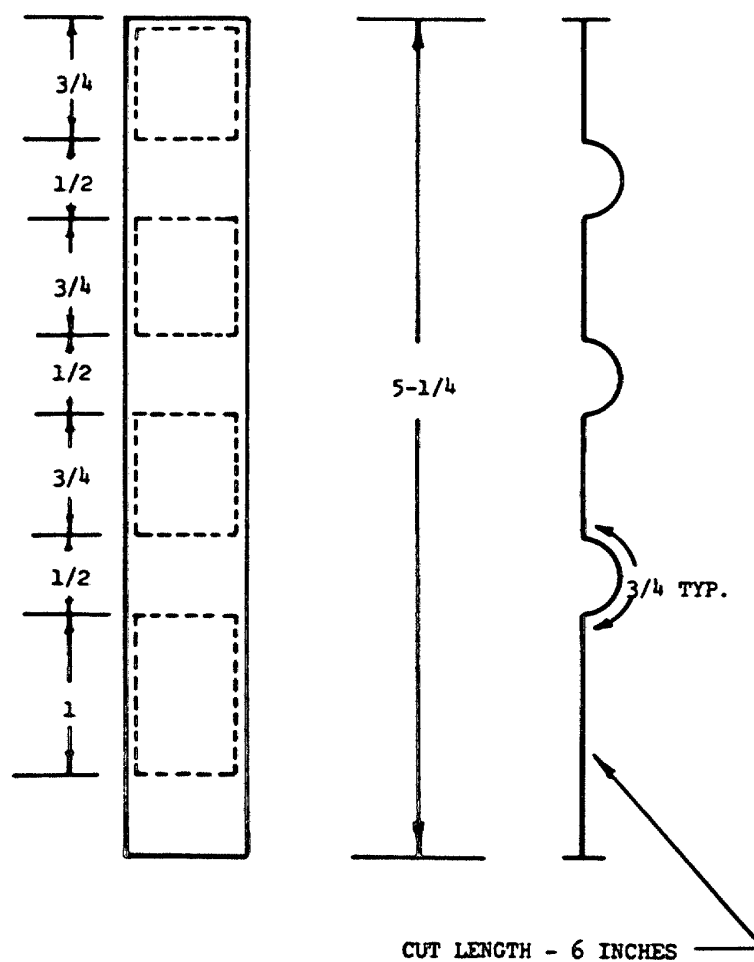


Figure 2. Cord loop C.

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3.7.1 Identification label. Each boot shall have an identification label conforming to type IV, class 1 of DDD-L-20. The label shall be placed approximately 2 inches from the top and 4 inches from the right front edge of the inner upper shell. The following information is required:

NOMENCLATURE: \_\_\_\_\_

CONTRACT NO: \_\_\_\_\_

FED STOCK NO: \_\_\_\_\_

MANUFACTURER: \_\_\_\_\_

U.S. PROPERTY

TABLE II. Sewing operation.

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
1.	<u>Cutting.</u> All component parts shall be cut in strict accordance with the patterns referenced on Drawing 51F24551 which show size, shape, and notches for proper assembly of all parts.			
2.	<u>Fabrication.</u>			
	a. The sole shall be shaped to conform to the foot by the use of a gathering stitch as designated in Drawing No. 51F24551.	301	SSa-1	6 to 8
	b. Welting shall be applied to the seam where the two sections of the vamp join over the toe area. A single row of stitching shall be used for joining the vamp sections.	301	SSa-1	8 to 10
	c. The welt shall be sewn to the vamp with a single row of stitching.	301	SSa-1	8 to 10
	d. The cord loops A and B shown in the table on Drawing No. 51F24551 shall be cut to the dimensions, folded and sewn to the inside of the vamp as shown on the drawing.	301	SSa-1	8 to 10
	e. The cord loop C shown in the table on Drawing No. 51F24551 shall be cut to the dimensions and sewn to the inside of the vamp and up the back of the heel as shown on the drawing.	301	SSa-1	8 to 10
	f. The tongue shall be joined to the vamp with a double row or stitching 1/8 inch gage between rows of stitching. The flesh side of the leather shall be out.	301	1Sa-2	8 to 10

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TABLE II. Sewing operation. - Continued.

No.	Description of Operation	Stitch Type	Seam and Stitching Type	Stitches Per Inch
	g. The heel section of the vamp shall be joined with a single row of stitching and a 3/16 inch seam allowance. Edges of the seam shall turn in.	301	SSa-1	8 to 10
	h. The vamp shall be joined to the sole with a single row of stitching. The smooth side of the leather shall be out.	301	SSa-1	8 to 10
	* i. Before joining the duck upper to the vamp the fronts and top edge shall be overedge stitched.	502	EFd-1	10 to 14
	* j. After overedge stitching the duck upper fronts and top edge they shall be folded (3/8" fold) and edge stitched 1/4" down from the folded front and top edges.	301	EFA-1	8 to 10
3.	The duck material of the upper section shall be joined to the vamp with a single row of stitching, 1/4 inch from edge, turned and raised 1/8 inch.	301	LSq-2(a) LSq-2(b)	8 to 10
	NOTE: The manufacturer is not required to follow the exact sequence of operations specified herein.			

3.7.2 Instruction label. Each pair of boots shall have an instruction label conforming to type VI, class 3 of DDD-L-20 attached to the laces. The following information is required:

## INSTRUCTIONS

Do not wear boots over other shoes. Use under dry cold conditions (below -20°F) by varying the number of socks according to the temperature. Improvise additional insulation if required by using dry grass, fur or parts from your parachute.

Lacing loops provide adjustment to foot size.

Keep socks and boots LOOSE, CLEAN, AND DRY for best results.

Pull your outer flight trousers down over the boots to prevent snow entry.

3.8 Workmanship. The boot shall be constructed in a thoroughly workmanlike manner. The finished boot, including the leather used in the construction, shall be clean and free from any defects that might affect strength, serviceability, appearance or functionability.

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## 4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to check test items to determine the validity of the certification.

4.2 First article inspection. The first article submitted in accordance with 3.1 shall be inspected for compliance with design, construction, workmanship, and dimensional requirements.

4.3 Inspection. Sampling for inspection shall be in accordance with provisions set forth in MIL-STD-105, except where otherwise indicated herein.

4.3.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected and tested to meet the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase documents. In addition, testing shall be performed as listed in Table III. All test reports shall contain the individual values utilized in expressing the final result. The lot shall be unacceptable if one or two sample units fail to meet the requirements specified. The test method specified and the sample size shall be in accordance with FED-STD-311.

TABLE III. Testing for components.

Component	Characteristic	Req. Para	Test Method
Leather, Upper	Material Identification	3.3.1.1	1/
	Tanning Compound	3.3.1.1	1/
	Tensile Strength	Table I	2021
	Stitch Tear Strength	Table I	2141
	Elongation	Table I	2021
	Stiffness:		
	at 70°F	Table I	4211
	at -65°F	Table I	4211 2/
	Thickness	Table I	1011
	Moisture vapor permeability	Table I	8011

1/ A certificate of compliance will be acceptable for requirement.

2/ Except that the leather shall be subjected to a temperature of -65°F  $\pm$  5°F for a total of 4 hours  $\pm$  5 minutes and the test shall be conducted at that temperature.

4.3.2 Examination of end item. The defects found during the examination of the end item shall be classified in accordance with 4.3.2.1. The applicable



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inspection level shall be Level II, and the acceptable quality levels shall be 2.5 for Major defects and 6.5 for totals expressed in defects per hundred units.

4.3.2.1 Visual examination. The boots shall be examined for defects listed below. The sample unit shall be one completely fabricated boot. The lot size shall be expressed in terms of the sample unit.

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Design	Not as specified	X	
Material	Component material not as specified	X	
Upper Leather	Grain not highly buffed		X
	Boney, loose, flanky or otherwise inferior		X
	Not natural color	X	
Construction and workmanship (General)	Any cut, hole, tear, rip, repair or abrasion	X	
	Any component or assembly misplaced, or operation improperly performed	X	
Seams & Stitching	Any open seam	X	
	Seam not backstitched		X
	Row of stitching missing	X	
	Wrong stitch type or seam type		X
	Needle holes or needle chews		X
Labels	Missing, incomplete, incorrect, not applied in specified manner, misplaced, illegible		X
Cord	Not specified length		X

4.3.3 Examination of preparation for delivery requirements. An examination shall be made to determine that packaging, packing, and marking comply with Section 5 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, except that it need not be sealed. The lot size shall be the number of containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per 100 units.

<u>Examine</u>	<u>Defect</u>
Marking	Omitted, incorrect, illegible, location, sequence or method of application.
Materials	Any component missing, damaged, or not as specified.
Workmanship	Incomplete closure of container flaps, loose strapping, inadequate stapling, bulging or distortion of container.

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<u>Examine</u>	<u>Defect</u>
Content	Number of boots per container is more or less than specified.

## 5. PACKAGING

- \* 5.1 Preservation. Preservation shall be level A or commercial as specified (see 6.2).

5.1.1 Level A. Each pair of boots shall be inserted in a snug-fitting clear polyethylene film bag of 0.0015 inch thickness (+20 percent tolerance). The polyethylene bag shall be formed with heat sealed seams that are straight, continuous, and parallel to each other and the formed edges of the bag. Closure of the bag shall be accomplished by means of a mechanical tie (paper or plastic covered soft steel wire, aluminum band, etc). Prior to or during the closure operation, excess air within the bag shall be expelled.

- \* 5.1.2 Level C. The level C preservation for boots shall conform to the MIL-STD-794 requirements for this level.

OR

- \* 5.1.3 Commercial. The commercial/industrial preservation of boots shall be in accordance with the requirements of ASTM D 3951.

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

- \* 5.2.1 Level A. Thirty-six pairs of boots packaged as specified shall be packed in a snug fitting shipping container conforming to style RSC-1, grade V25 of PPP-B-636. Each fiberboard container shall be fitted with a one piece taped liner conforming to grade V3C of PPP-F-320. Each shipping container shall be closed, waterproofed, and reinforced in accordance with the appendix of the box specification.

- \* 5.2.2 Level B. Thirty-six pairs of boots packaged as specified shall be packed in a snug fitting fiberboard shipping container conforming to style RSC-1, type CF or SF, class domestic, variety SW, grade 275 or PPP-B-636. Each container shall be fitted with a one piece taped box liner conforming to type CF, class domestic, variety DW, grade 275 or PPP-P-320. Each container shall be closed by method II in accordance with the appendix of the container specification.

- \* 5.2.3 Level C. The level C packing for boots shall conform to the MIL-STD-794 requirements for this level.

OR

- \* 5.2.4 Commercial. The preserved boots shall be packed in accordance with the requirements of ASTM D 3951.

- \* 5.3 Marking. In addition to any special marking required by contract or order shipping containers shall be marked in accordance with the requirements of MIL-STD-129 or ASTM D 3951, as applicable.

## 6. NOTES

- 6.1 Intended use. The boots, complete with insoles, are to be a component of survival kit

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. First article, when required (see 3.1).
- c. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).

6.3 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.

Custodian:  
Air Force - 99

Preparing activity:  
Air Force - 82

Review activity:  
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