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MIL-L-396E(SA)
28 July 1975
SUPERSEDING
MIL-L-396D(SA)
25 March 1970

MILITARY SPECIFICATION

LACES, LEGGINGS

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 tubular braided cotton laces, of one type only.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

MILITARY

MIL-B-17757 - Boxes, Fiberboard, Corrugated (Modular Sizes)

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

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

FSC 8315

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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.)

(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 documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies shall be addressed to the American Trucking Association, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, D.C. 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

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

3. REQUIREMENTS

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

3.2 First article approval.- The requirement for first article will be as specified by the procuring activity (see 6.2).

3.3 Materials.-

3.3.1 Yarn.- The yarn shall be made from clean cotton of suitable staple length and grade, carded, drawn, and spun into two-ply yarn (see 4.4).

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3.3.2 Lace tip.- The lace tip shall be made from a transparent and colorless cellulose acetate or cellulose butyrate sheeting, with a thickness of not less than 0.010 inch nor more than 0.013 inch (see 4.3.1).

3.4 Color.- The color of the finished laces shall be bleached white.

3.5 Construction.- The laces shall be firmly and uniformly braided round without a core, using two over and one under braiding when nine carriers are used (sash cord weave); and two over and two under braiding when sixteen carriers are used; and shall conform to the physical requirements specified in Table I when tested as specified in 4.4. Any flat area 1 inch or more appearing in the finished laces shall be prohibited.

Table I - Physical requirements

Number of carriers	Ends per carrier	Picks per inch (min.)	Diameter (inches) (min.)	Diameter (inches) (max.)	Breaking strength (pounds) (min.)	Weight per gross (144 yards) (ounces) (min.)	Weight per gross (144 yards) (ounces) (max.)
9	8	8	5/64	7/64	70	21	24
or	or	or					
16	3	16	5/64	7/64	70	21	24

3.5.1 Tipping.- One end of the lace shall be provided with a firmly attached and secured tip made from the material specified in 3.3.2 with the end of the tip and braid evenly aligned. The tip shall finish 3/4 (± 1/16) inch in length.

3.5.1.1 Gripping strength.- The plastic tip used shall have a minimum gripping strength of 18 pounds when tested as specified in 4.4.

3.6 Length.- The finished laces including the tip shall be 30 1/2 (± 1/2) inches in length (see 4.4).

3.7 Finish.- The laces shall be smoothly finished and polished.

3.8 Non-fibrous material.- The starch and protein content including chloroform soluble and water soluble material of the finished laces, shall not exceed 7.0 percent when tested as specified in 4.4.

3.9 Workmanship.- The finished laces shall conform to the quality 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 or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 such items to determine the validity of the certification.

4.2 First article inspection.- When required, the first article submitted in accordance with 3.2, shall be inspected as specified in 4.3.2.1 for compliance with design, construction, workmanship, and dimensional requirements.

4.3 Inspection.- Inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated herein.

4.3.1 Component and material inspection.- In accordance with 4.1 above, components and material shall be tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document. In addition, the supplier shall furnish a certificate of compliance for the material and thickness requirements of the lace tip specified in 3.3.2.

4.3.2 Examination of the end item.- The defects found during the examination of the end item shall be classified in accordance with 4.3.2.1. The inspection level shall be I and the AQL shall be 2.5 defects per 100 units. The lot size shall be expressed in units of pairs. The sample unit shall be one finished lace.

4.3.2.1 Visual examination.-

Examine	Defect
Laces	Hole, cut, or tear Any broken yarn Pulled yarn or uneven tension, resulting in uneven width Frayed Rub or abrasion mark, affecting serviceability

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Examine	Defect
Laces (cont'd)	Unevenly braided, resulting in open place or break in continuity of braid
	Other than tubular braided without a core
	Flat area for a distance of 1 inch or more
	Slub, knot, or abruptly thickned place which may affect utility
	Color not as specified
	Spot, stain, or other discoloration affecting appearance
	Not smoothly finished or not polished
Tip	Any tip missing, damaged, malformed, or insecurely attached
	Tipping of lace not neatly accomplished
	Free end of lace uneven
	Color of tip end not transparent and colorless
	End of tip projects beyond the braid more than 1/16 inch
	End of braid projects beyond the tip end more than 1/16 inch
	Finished length of tip less than 11/16 inch or more than 13/16 inch

4.3.3 Examination of preparation for delivery requirements.- An examination shall be made to determine that packaging, packing, and marking complies with the 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 except that it need not be closed. Defects of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per 100 units.

Examine	Defect
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, or inadequate stapling. Bulged or distorted container. When applicable, polyethylene bag with heat sealed seams open, non-continuous, or crooked. Incorrectly fabricated bag.

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Examine	Defect
Content	Number of bundles per container is more or less than specified. Number of laces per bundle is more or less than specified. 1/

1/ One bundle from each shipping container in the sample shall be examined.

4.4 Testing of the end item.- Testing of the completely fabricated laces shall be performed in accordance with Table II and FED-STD-191 for characteristics shown therein. The inspection level shall be S-1 and the AQL shall be 6.5 test failures per hundred units. The sample unit shall be 20 completely fabricated laces. The lot size shall be expressed in units of pairs. When the data in the "Number of determinations per sample unit" and "Results reported as" columns are not specified, they shall be as specified by the referenced test method.

Table II - End item tests

Characteristic	Requirement paragraph	Test method	Number of determinations per sample unit	Results reported as
Cotton identification	3.3.1	1200 1/	-	-
Yarn ply	3.3.1	Visual	1	Pass or Fail
Braiding type	3.5	Visual	1	Pass or Fail
Number of carriers	3.5	Visual	1	Pass or Fail
Ends per carrier	3.5	Visual	1	Pass or Fail
Picks per carrier	3.5	Visual 2/	3	Average of 3 determinations to nearest whole number
Diameter	3.5	4.4.1	3	Average of 3 determinations to nearest whole number
Breaking strength	3.5	4102 3/	-	-
Weight, ounces per gross (144) yards	3.5	4.4.2	-	-
Gripping strength (tip)	3.5.1	4.4.3	10	Average of 10 determinations to nearest 1.0 pound
Overall length	3.6	4.4.4	1	To nearest 1/16 inch
Non-fibrous material	3.8	2611	-	-

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

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2/ A pick glass or a suitable magnifying glass may be used.
3/ Except that the clamps shall be not less than 2 inches in diameter, and the distance between the center of the clamps at the start of the test shall be 6 (± 1/16) inches.

4.4.1 Diameter.- The diameter shall be determined at 3 points at least 9 inches apart by a steel rule graduated in sixty-fourths of an inch, or by a caliper type gauge, and the results averaged. The measurements shall be taken with the test lace suspended vertically under a tension of 3 ounces.

4.4.2 Weight.- Ten (10) finished laces shall be each measured for its actual length and averaged. While in standard condition as defined in FED-STD-191, each finished lace shall be weighed on a balance or scale and averaged. The weight shall be determined as follows:

$$\frac{\text{Weight (grams)} \times 144 \text{ yds/gross} \times 36 \text{ inches/yd}}{\text{Actual length (inches)} \times 28.35 \text{ grams/ounce}} = \text{ounces per gross (144) yards}$$

4.4.3 Gripping strength of tip.-

4.4.3.1 Test specimen.- The specimen shall be one finished lace.

4.4.3.2 Apparatus.-

4.4.3.2.1 Testing machine.- The testing machine shall be as described in method 5100 of FED-STD-191, except a slotted metal plate as shown in Figure 1 shall be used in connection with the top jaw assembly and the distance between the upper jaw (slotted metal plate) and the lower jaw or clamp shall be 4 inches ± 1/16 inch. The lower jaw shall be as described in method 5100 or 4102 of FED-STD-191.

4.4.3.2.2 Metal plate (Figure 1).- The rigid metal plate shall be of the approximate dimensions 5 inches long by 1 1/2 inches wide and shall contain a 4 inch tapered slot centered widthwise and running lengthwise from an inside dimension of 1/32 inch in width, increasing to a width of 1/4 inch at the outside edge. The slot shall be smoothly finished. It is not required that the plate be of a single piece of metal. The slot may be formed by a clamped or bolted assembly of two metal bars of plates properly spaced apart. The plate shall be supported in a horizontal position in, or on, top jaw of the apparatus.

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4.4.3.2.3 Procedure.- The lace shall be passed upward, tip first, through the jaw assembly and through the wide end of the slot until the tip clears the plate, and then moved horizontally toward the narrow end of the slot until the end of the tip rests on top of the metal plate. The free end of the specimen (lace) shall be fastened in the lower jaw or clamp. The machine shall be started, with the pawl in contact with the ratchet, and the maximum resistance in displacing the tip shall be recorded. The force shall be applied to the specimen at such a rate that the pulling clamp will travel at a uniform speed of 12 inches ± 0.5 inch per minute. After the tip has been forced from the lace, the resultant force shall be read from the dial, scale, or chart and the value recorded to the nearest pound. If the lace tip slips through the slot without its being removed from the lace or if, for any reason attributed to faulty technique, an individual measurement falls markedly below the average test for the sample unit, such results shall be discarded and another specimen shall be tested. Buckling of the tip material at the base of the tip without the tip being removed from the lace shall not be considered as a failure of the tip.

4.4.4 Overall length.- The finished lace shall not be stretched or tensioned prior to the length test. The finished lace shall be suspended vertically under a tension of 3 ounces, and then measured from end to end including the tip.

5. PREPARATION FOR DELIVERY

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

5.1.1 Level A.- Fifty (50) pairs of laces shall be securely tied at both ends with a suitable cotton tape or twine to form a compact bundle. Each bundle of laces shall be folded in half and adjusted when necessary, to finish approximately 15 1/4 inches in length. The bundle of laces shall be completely wrapped with any suitable commercial grade kraft paper, with the paper wrap secured with gummed paper tape (2 inch minimum width). As an alternate, each bundle of laces shall be inserted into a snug-fitting flat or square style clear polyethylene film bag of 0.0015 inch (± 20 percent tolerance). The bag may be fabricated from polyethylene film tubing or sheeting. 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. The final closure of the bag shall be heat sealed with the heat seal made as close as possible to the open end. A 1/4 inch diameter hole shall be made at one corner of the polyethylene bag to allow excess air to escape. As an alternate, the closure of the bag may be accomplished by means of a tuck or reverse flap in which a heat sealed closure and corner hole are not required or by means of a wire twist tie closure. The finished packaged bundle of laces shall measure approximately 15 1/4 by 3 1/2 by 2 1/4 inches.

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5.1.2 Level C (Commercial Packaging).- Laces shall be packaged to afford adequate protection against deterioration and physical damage during shipment from the supply source to the first receiving activity. The package and the quantity per package shall be the same as that normally used by the supplier for retail distribution.

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

5.2.1 Level A.- Five hundred (500) pairs of laces, packaged as specified in 5.1, shall be packed in a fiberboard shipping container assembled, closed, and reinforced conforming to class weather-resistant, grade V2s, size 1, of MIL-B-17757. Level A packages shall be packed on the side (width dimension) one in length, five in width, and two in depth within the shipping container.

5.2.2 Level B.- Five hundred (500) pairs of laces, packaged as specified in 5.1, shall be packed in a fiberboard shipping container assembled, closed, and reinforced conforming to class domestic, grade 275, size 1, of MIL-B-17757. Level A packages shall be packed on the side (width dimension), one in length, five in width, and two in depth within the shipping container.

5.2.2.1 When specified (see 6.2), the shipping container shall be a grade V3c, V3s, or V4s fiberboard box fabricated in accordance with MIL-B-17757 and closed in accordance with the appendix of the container specification.

5.2.3 Level C (Commercial Packing).- Laces, 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 supplier 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, intermediate packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.1 Polyethylene bagged packages.- When applicable, the polyethylene bagged packages have the required information listed below, legibly printed or stamped in black directly on the bag across the center face or on a white paper label inserted within the bag, so as to permit ready identification:

NOMENCLATURE
STOCK NO.
QUANTITY

6. NOTES

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6.1 Intended use.- The laces covered by this specification, are intended for use as a closure for leggings worn by military personnel of the Navy.

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

a. Title, number, and date of this specification.
b. Whether first article sample is required (see 3.2).
c. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
d. When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.1).

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

Custodian:
Navy - SA

Preparing activity:
Navy - SA

Project No. 8315-0177

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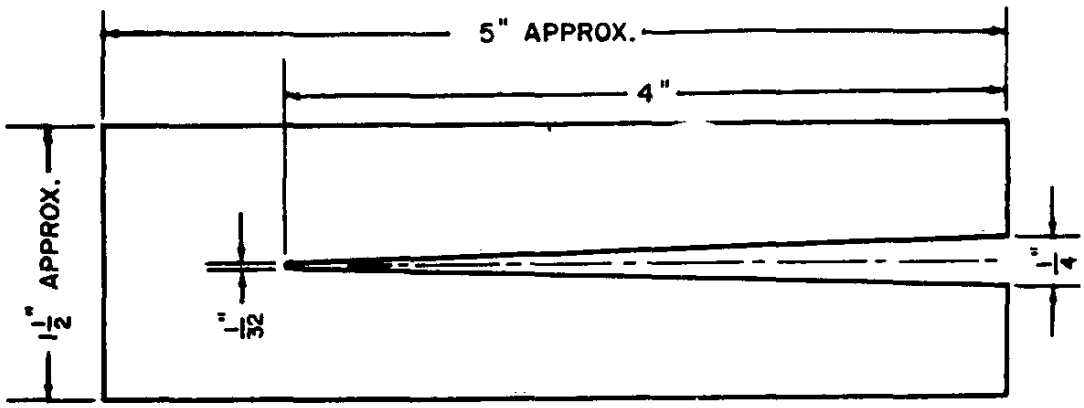

FIGURE 1 - SLOTTED METAL PLATE

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. 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. 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.

DOCUMENT IDENTIFIER AND TITLE
MIL-L-396E(SA) Laces, Leggings

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A
☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?
   ☐ YES ☐ NO *(If "Yes", in what way?)*

4. REMARKS

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

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