MIL-C-7515F
27 June 1988
SUPERSEDING
MIL-C-7515E
23 March 1977

MILITARY SPECIFICATION

CORD, NYLON, CORELESS

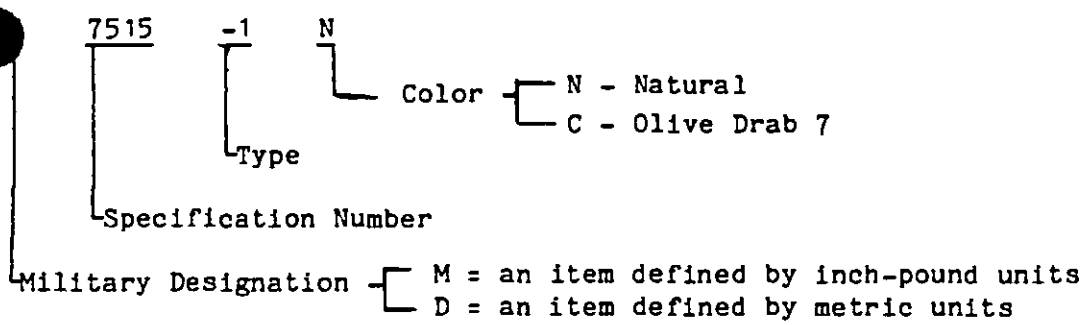
This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This document covers braided nylon coreless cord.

1.2 Classification. The cord shall be of the type specified (see table I and 6.2).

* 1.2.1 Part number. The part number shall be a combination of numbers and letters in accordance with the following:



Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 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 4020

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

UU-T-81 - Tags, Shipping and Stock

MILITARY

MIL-C-3131 - Cordage; Packaging Of

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

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

2.2 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.

3. REQUIREMENTS

3.1 Government and contractor purchases. The requirements specified in 3.7 and 3.8 apply to cord purchased directly by the Government. All other requirements apply to cord purchased by a contractor as a component for an end item and to cord purchased directly by the Government.

3.2 Standard sample. The cord shall match the standard sample for shade and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.3 Material. The nylon yarn used in the fabrication of the cord shall be bright, high tenacity, heat and light resistant polyamide (see 6.4) prepared from hexamethylene diamine and adipic acid or its derivatives, and shall have a melting point of 250° ± 6°C when tested as specified in 4.2.1. The nylon yarn or cord shall not be subjected to any bleaching process at any stage of processing.

3.4 Construction and physical requirements. The finished braided cord shall conform to the requirements specified herein and in table I, when tested as specified in 4.2.1 and 4.2.3. The cord shall be braided on braiding machines having the number of carriers specified in table I for the applicable type, and the machines shall be regulated to give a two over and two under conventional stitch, i.e., each carrier alternating with the next carrier in direction and each strand passing alternately over and under two of the opposite strands. The cord after braiding shall be heat set in continuous lengths and shall not show more than a 3 percent residual shrinkage when tested as specified in 4.2.3.

* 3.4.1 Twist. The nylon yarns shall have the following twist:

Types Ia, IIIa, XI,	- 1/2 to 1 turn per inch
Types I, II, III, IV V, VI, VII, VIII	- Minimum of 2-1/2 turns of "Z" twist per inch

*TABLE I. Physical requirements

Dash No.	Type cord	Breaking strength, pounds (min)	No. of carriers	Ends per carrier	Total ends	Basic yarn denier	Yarn ply	Picks per inch	Length per pound, feet (min) 2/	Elongation, percent (min)
-1	I	400	16	3	48	210	3 1/	11-13	330	20
-2	Ia	400	16	2	32	840	1	13-13.5	330	20
-3	II	550	16	3	48	840	1	10-12	255	20
-4	III	750	16	6	96	210	3 1/	8.5-10	150	20
-5	IIIa	800	24	3	72	840	1	10-12	175	10
-6	IV	1000	16	6	96	840	1	7-9	120	20
-7	V	1500	16	9	144	840	1	6.5-8	90	20
-8	VI	2000	16	12	192	840	1	4.5-6.5	60	20
-9	VII	2500	16	14	224	840	1	4.5-6	45	20
-10	VIII	3000	24	12	288	840	1	5.5-7.5	36	20
-11	XI	300	16	7	112	210	1	14-15.5	480	20

1/ Ten or less linear yards of ply yarns shall not contain any knots. Knots shall not be closer than 10 yards apart.

2/ A minus tolerance of 10 percent in length will be allowed for dyed cord.

* 3.4.2 Carrier run-off. In the manufacture of the cord, no more than one carrier shall be allowed to be run off per length of cord specified in table II for the applicable type. When carrier ends run off, they shall be spliced a minimum distance of 5 inches to a maximum of 10 inches in length. When spliced, the outgoing carrier ends shall be joined with the new ends and hand braided for four to five picks and the tail of the splice shall be run into the center of the braided cord.

TABLE II. Carrier run-off

Types	Distance between carrier run-offs feet (min) 1/
I, Ia, XI	100
II, III	50
IIIa, IV	40
V	25
VI	20
VII, VIII	10

1/ A minus tolerance of 10 percent in length will be allowed on dyed cord.

3.5 Color. Unless otherwise specified (see 6.2), the color of the cord shall be natural. When colored cord is specified, the cord shall be piece dyed to match the approved standard shade of Olive Drab 7 (see 6.3). The cord shall be piece dyed under uniform tension at all times during the dyeing process. The dyeing of cord in skeins is prohibited.

* 3.5.1 Matching. The color of the dyed cord shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of 7500 ± 200K, with illumination of 100 ± 20 foot candles and shall be a good match to the standard sample under incandescent lamplight at 2300 ± 200K.

* 3.5.2 Colorfastness. The dyed cord shall show fastness to light and laundering equal to or better than the standard sample or equal to or better than a rating of "good" when tested as specified in 4.2.3.

3.6 Extractable matter. The chloroform soluble material of the finished cord shall not exceed 2.0 percent when tested as specified in 4.2.3.

3.7 Put-up. Unless otherwise specified (see 6.2), the cord shall be furnished in continuous length 700-yard spools (reels), except types I, IV, VI, and XI lengths shall be as specified by the procuring activity (see 6.2), without knots or splices and wound so that each turn and layer is free from entanglement. A plus tolerance of 10 percent shall be allowed on the length specified. The ends of all cords shall be taped, served, or heat sealed to prevent fraying.

* 3.8 Identification. Each spool (reel) of cord shall have a ticket (identification tag) or label attached to it for identification purposes. The ticket shall conform to the requirements for type B, grade 15SU or 15CSU, size 4 or 5 of UU-T-81. When labels are used, the label shall be attached in such a manner as to remain in place and be clearly legible until all cord has been removed. The ticket or label shall be legibly printed, stamped, or typed with water insoluble ink. Handwritten entries shall be prohibited. The ticket or label shall contain the following information:

Stock number
Item description
Document number
Length
Color
Number and length of pieces (when applicable)
Contract number and date
Date of manufacture (month and year)
Length of pieces of cord per spool (when applicable)
Contractor's name
Bar code

3.9 Workmanship. The finished cord shall conform to the quality of product established by this document and the occurrence of defects shall not exceed the applicable acceptable quality levels.

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 purchase 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 this document 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 document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document 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 inspect such items to determine the validity of the certification.

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

* 4.2.1 Component and material certification. Unless otherwise specified, a certificate of compliance will be acceptable as evidence that the characteristics listed in table III conform to the specified requirements.

TABLE III. Component and material certification

Characteristic	Requirement paragraph
Material identification (1530 1/)	3.3
Tenacity	3.3
Heat and light resistance	3.3
Melting point (1534 1/)	3.3
Prohibition of bleaching	3.3
Twist (4054 1/)	3.4.1

TABLE III. Component and material certification (cont'd)

Characteristic	Requirement paragraph
Denier (4021 1/)	Table I
Ply	Table I
Plied yarn knots	Table I
Carrier run-off splicing	3.4.2

1/ Refers to test method of FED-STD-191.

4.2.2 End item inspection.

4.2.2.1 End item visual examination. The end item shall be examined for the defects listed in table IV. All defects shall be counted, regardless of their proximity to each other, except where two or more defects represent a single local condition, in which case only the more serious defect shall be counted. The lot size shall be expressed in units of spools or reels. The sample unit shall be one spool or reel. Ten percent of the length contained on each sample unit, but not less than 100 feet, shall be subjected to the visual examination. The inspection level shall be III and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 6.5 total (major and minor combined) defects. Any critical defect found during sampling inspection shall be cause for rejection of the lot represented by the sample.

TABLE IV. End item visual defects

Examine	Defect	Classification Critical	Major	Minor
Appearance and workmanship	Any cut	X		
	Abrasion, chafed area, or distortion in the orientation of yarns		X	
	Kinks, knots, or unevenly braided resulting in open places, breaks in continuity of braid, or soft spots		X	

TABLE IV. End item visual defects (cont'd)

Examine	Defect	Classification Critical	Major	Minor
Appearance and workmanship (cont'd)	Floats; broken, projecting, or missing ends or picks	X		
Type	Other than specified	X		
Color	Other than specified		X	
Cleanness	Spot or stain clearly visible 1/			X
	Objectionable odor			X
Identification	Omitted, incorrect, illegible, insecurely attached			X
	Ticket or label not as specified			X
	Handwritten entries			X

1/ At normal inspection distance (approximately 3 feet).

* 4.2.2.2 Length and winding examination. The end item shall be examined for the defects listed in table IV. The lot size shall be expressed in units of spools or reels). The sample unit shall be one spool or reel. The inspection level shall be S-3 and AQL, expressed in terms of defects per hundred units, shall be 4.0.

Defects

Length less than specified or more than 10 percent in excess of length specified.
Length of cord on a spool (reel) is more than 2 yards less than length on ticket or label.
Improperly or not firmly wound resulting in kinking, knotting, entangling, or slippage during unwinding, or otherwise affecting free unhampered unwinding of cord.
Put-up not as specified.
Any end not taped, served, or heat sealed.
Any knot or splice.
Cord not in a continuous length.

4.2.3 End item testing. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table V shall be followed. When the data in the "Number of determinations" and "Results reported as" columns are not specified in table V, they shall be as required by the referenced test method. The physical and chemical values specified in section 3 apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test methods. The lot size shall be expressed in units of spools (reels) of cord. The sample unit shall be one spool (reel) of cord. The sample size shall be in accordance with table VI. The lot shall be unacceptable if one or more sample units fail to meet any requirement. All test reports shall contain the individual values utilized in expressing the final results. Tests to determine compliance with document requirements may be made under prevailing atmospheric conditions. In case of dispute, tests shall be made upon material that has reached equilibrium under standard conditions as defined in FED-STD-191.

TABLE V. End item tests

Characteristic	Requirement reference	Test method	No. of deter. per sample unit	Results reported as
Breaking strength and elongation	Table I	6016	-	-
Number of carriers	Table I	Visual	3	Pass or fail
Ends per carrier	Table I	Visual	3	Pass or fail
Total ends	Table I	Visual	3	Pass or fail
Picks per inch	Table I	6001	-	-
Length per pound	Table I	6004	-	-
Shrinkage	3.4	6010	-	-
Colorfastness to:				
Light	3.5.2	5660 1/	-	-
Laundering	3.5.2	5614	-	-
Extractable matter	3.6	2611	-	-

1/ The specimen shall be 2 feet or more of the cord wrapped around a 6-inch square of cardboard which, after the required exposure period, shall be removed from the machines and placed in the dark a minimum of 1 hour before evaluation.

TABLE VI. Sampling for tests

No. of spools (reels) in lot	Sample size
15 and under	2
16 up to and including 40	3
41 up to and including 110	5
111 up to and including 300	7
301 up to and including 500	10
501 and over	15

4.2.4 Packaging inspection. Inspection shall be made in accordance with the quality assurance provisions of MIL-C-3131 except that the inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

5. PACKAGING

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

5.1.1 Levels A and Commercial. The cord, put up on spools (reels), shall be preserved in accordance with the applicable requirements of MIL-C-3131.

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

5.2.1 Levels A, B, and Commercial. The cord shall be packed in accordance with the applicable requirements of MIL-C-3131.

5.3 Marking. In addition to any special markings required by the contract or purchase order, interior packages and shipping containers shall be marked in accordance with MIL-C-3131.

6. NOTES

* 6.1 Intended use. The cord is intended for use in cargo type parachutes. Type XI cord is intended for use as tow cables. Type Ia and IIIa cord are intended for low cost parachutes.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this document.
b. Part number and type required (see 1.2, 1.2.1, and table I).
c. When color Olive Drab 7 is required (see 3.5).
d. Put-up length required when type I, IV, VI, or XI is specified (see 3.7).
e. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

6.3 Standard sample. For access to samples, address the contracting activity issuing the invitation for bids.

6.4 Yarn. Ultraviolet resistant yarn of DuPont type 702 and 330, and Monsanto Type A02 are acceptable (see 3.3).

* 6.5 Subject term (key word) listing.

Cord, nylon
Parachutes

6.6 Changes from previous issue. The margins of this document 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, as written, irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - GL
Navy - AS
Air Force - 99

Review activities:

Army - AV, MD
Air Force - 82
DLA - IS

User activities:

Navy - OS, MC

Preparing activity:

Army - GL

Project No. 4020-0294

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-C-7515F	Cord, Nylon, Coreless

3a. NAME OF SUBMITTING ORGANIZATION

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

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

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

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

NATICK OP 1 Apr 84