

MIL-R-1670E

25 June 1971

SUPERSEDING

MIL-R-1670D

7 June 1968

## MILITARY SPECIFICATION

### ROPE, TENT-LAY

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

#### 1. SCOPE

1.1 Scope.- This specification covers the requirements for tent-lay rope.

1.2 Classification.- The tent-lay rope shall be of the following types and classes as specified (see 6.2).

Type I - Rope, Manila, Tent-Lay

Type II - Rope, Sisal, Tent-Lay

Type III - Rope, Jute, Tent-Lay

Type IV - Rope, Cotton, Tent-Lay

Class 1 - Natural Finish

Class 2 - Mildew Resistant Treated

#### 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

##### FEDERAL

T-T-616 - Treatment: Mildew Resistant, for Rope and Cord.

UU-T-81 - Tags, Shipping and Stock

FSC 4020

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MIL-C-3131 - Cordage; Preparation for Delivery of.

STANDARDS

FEDERAL

FED-STD-191 - Textile, Test Methods.

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

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

3. REQUIREMENTS

- \* 3.1 Government and supplier purchases.- The requirements specified in 3.7 and 3.8 apply only to rope purchased directly by the Government. All other requirements apply to rope purchased by a supplier as a component for an end item and to rope purchased directly by the Government.

3.2 Materials.-

3.2.1 Fibers and yarns.- The fibers and yarns used in fabrication of rope covered by this specification shall be as specified for the individual type and shall be of suitable quality and grade to meet the detailed requirements specified herein.

3.2.2 Types.-

3.2.2.1 Type I, manila.- The type I rope shall be fabricated from manila hemp (Abaca or Musa textilis) fiber.

3.2.2.2 Type II, sisal.- The type II rope shall be fabricated from sisal (Agave sisalana) fiber.

- \* 3.2.2.3 Type III, jute.- The type III rope shall be fabricated from jute (Corchorus capsularis or Corchorus olitorius or both) or the jute may be blended with other bast of istle fiber, or both.

3.2.2.4 Type IV, cotton.- The type IV rope shall be fabricated from cotton fiber. Stained or tinged cotton is acceptable.

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3.2.3 Classes.-

3.2.3.1 Class 1 (natural finish).- Class 1 rope shall be natural finish. Natural finish shall denote a rope for which no consistency or luster other than that inherent with the material is required.

3.2.3.2 Class 2 (mildew-resistant treated).- Class 2 rope shall be mildew-resistant treated in accordance with the requirements of T-T-616.

3.3 Color.-

3.3.1 Class 1.- Unless otherwise specified (see 6.2), the color of class 1 rope shall be natural.

3.3.2 Class 2.- Unless otherwise specified (see 6.2), the color of class 2 rope shall be natural prior to mildew-resistant treatment and the shade imparted by the treatment will be acceptable.

3.4 Construction.-

3.4.1 Strand.- Unless otherwise specified (see 6.2), the rope shall be three-strand and each strand shall contain the minimum number of yarns specified in table I when tested as specified in 4.2.5.

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TABLE I.- Physical requirements and construction

<u>Circumference (inches)</u>		<u>Diameter, approximate (inches) 1/</u>	<u>Yarns per strand, (minimum)</u>	<u>Length per 10 turns (inches)</u>			
<u>Size</u>	<u>Tolerance</u>			<u>Types I,II,III</u>		<u>Type IV</u>	
	<u>Minimum</u> <u>Maximum</u>			<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>
5/8	9/16	11/16	3/16	2	-	6	7-1/2
3/4	5/8	7/8	1/4	2	9	10-1/2	9-1/2
1	7/8	1-1/8	5/16	3	11-3/16	12-3/8	11-1/2
1-1/8	1	1-1/4	3/8	4	12-5/8	13-7/8	13-1/2
1-1/2	1-3/8	1-5/8	1/2	7	16-1/8	17-3/4	17
2	1-13/16	2-3/16	5/8	7	20-5/8	22-1/2	22-1/2
2-1/4	2-1/16	2-7/16	3/4	7	23	25-5/16	25-5/16
3	2-3/4	3-1/4	1	7	30	32-1/4	-
3-3/4	3-1/2	4	1-1/4	7	37	39-1/2	-

1/ Not a specification requirement, included for information purposes only:

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3.4.1.1 When specified (see 6.2), four-strand rope shall be furnished. Four-strand rope shall not be more than 7 percent heavier than three-strand rope of the same size, class and type and shall have a minimum of 95 percent of the strength required for the applicable three-strand rope (see table II). The four-strand rope shall conform to all other requirements specified for the three-strand rope of the same size, class and type.

- \* 3.5 Physical requirements.- The finished rope of the applicable type and size shall conform to the requirements specified in tables I and II when tested as specified in 4.2.5. The lay of the rope shall be right-hand or "Z" lay.

TABLE II.- Breaking strength and length per pound

Size, circum- ference (in)	Minimum breaking strength (pounds)				Minimum length per pound <sup>1/</sup> (feet)			
	Type I	Type II	Type III	Type IV	Type I	Type II	Type III	Type IV
5/8	-	-	-	220	-	-	-	71.42
3/4	630	500	480	400	55.55	55.55	50.00	43.47
1	1,030	830	750	630	38.46	38.46	34.48	27.77
1-1/8	1,410	1,130	1,000	850	27.02	27.02	24.39	18.86
1-1/2	2,720	2,170	1,630	1,400	14.70	14.70	13.33	11.49
2	4,360	3,500	2,620	2,300	8.33	8.33	7.51	6.49
2-1/4	5,560	4,450	3,320	3,000	6.66	6.66	5.98	5.10
3	9,260	-	-	-	4.11	-	-	-
3-3/4	13,900	-	-	-	2.65	-	-	-

<sup>1/</sup> A 5 percent minus tolerance on the minimum length per pound requirement is permitted for class 2 mildew resistant treated rope.

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## 3.6 Finish (chemical requirements).-

3.6.1 Extractable matter (type I and II, class 1 or 2).- No material shall be added for the purpose of weighting the rope. Types I and II rope shall contain cordage oil lubricant of suitable quality to meet the requirements of this specification. The extractable matter (chloroform soluble material) of types I and II, class 1 or 2 ropes shall be as specified in table III, when tested as specified in 4.2.5.

3.6.2 Extractable matter and water absorption (types III and IV, class 2).- No material shall be added for the purpose of weighting the rope. The chloroform soluble material and water absorption of types III and IV, class 2 rope shall be as specified in table III, when tested as specified in 4.2.5.

TABLE III.- Extractable matter and water absorption

Type	Percent extractable matter by weight		Percent water absorption by weight (maximum)
	Minimum	Maximum	
Type I - Rope, Manila	11.5	20.0	-
Type II - Rope, Sisal	11.5	20.0	-
Type III - Rope, Jute	-	20.0	25.0
Type IV - Rope, Cotton	-	25.0	35.0

- \* 3.7 Put-up.- Unless otherwise specified (see 6.2), the ropes shall be furnished in coils in the minimum lengths specified in table IV. A plus tolerance of 10 percent is allowed on the minimum length specified. The coils shall contain not more than two pieces of rope and no piece shall be less than 100 feet in length. The rope shall be continuous throughout; shall not contain splices, strand knots, or loose or broken ends; and shall be wound so that each turn and layer is free from entanglement. The ends of all rope shall be cut off equally and shall be securely whipped or taped to prevent the ends from unlaying or untwisting.

TABLE IV.- Put-up

Size, circumference (in)	Minimum length of coil (feet)				Approximate gross weight of coil $\frac{1}{2}$ (pounds)			
	Type I	Type II	Type III	Type IV	Type I	Type II	Type III	Type IV
5/8	-	-	-	3,570	-	-	-	50
3/4	2,775	2,775	2,500	2,175	50	50	50	50

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TABLE IV.- Put-up (cont'd)

Size, circum- ference (in)	Minimum length of coil (feet)				Approximate gross weight of coil <u>1/</u> (pounds)			
	Type I	Type II	Type III	Type IV	Type I	Type II	Type III	Type IV
1	1,925	1,925	1,725	1,385	50	50	50	50
1-1/8	1,350	1,350	1,220	1,200	64	50	50	50
1-1/2	1,200	1,200	1,200	1,200	82	82	90	104
2	1,200	1,200	1,200	1,200	144	144	160	185
2-1/4	1,200	1,200	1,200	1,200	180	180	200	235
3	1,200	-	-	-	292	-	-	-
3-3/4	1,200	-	-	-	452	-	-	-

1/ Not a specification requirement, included for information purposes only.

- \* 3.8 Identification.- Each coil of rope shall have a ticket (identification tag) attached for identification purposes. The ticket shall conform to the requirements for type B, class 1, size 4 or 5 of UU-T-81. The ticket shall be made of not less than 15-point paper stock and have a minimum tearing resistance of both directions (total) of 850 grams when tested as specified in UU-T-81. All ticket entries shall be legibly printed, stamped or typed with water insoluble ink. The ticket shall contain the following information:

Stock number  
Nomenclature  
Specification number  
Length  
Size (circumference)  
Contract number and date  
Supplier's name

3.9 Workmanship.- The rope shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels, established by this specification.

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## 4. QUALITY ASSURANCE PROVISIONS

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 Inspection.- Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

4.2.1 Component and material inspection.- In accordance with 4.1 above, components and materials shall be tested in accordance with all the requirements of referenced specification, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents. In addition, inspection shall be performed for the requirements in table V and a supplier's certificate of compliance thereto shall be furnished and will be accepted for the requirements.

TABLE V.- Component tests

<u>Characteristic</u>	<u>Paragraph reference</u>
Material	3.2.1
Weighting material	3.6.1 and 3.6.2

- \* 4.2.2 Examination of the end item for visual defects.- The defects listed in table VI shall be counted regardless of their proximity to each other. The sample unit for this examination shall be one coil. Ten percent of the length contained on each sample unit, but not less than 100 feet shall be subjected to the visual examination. The lot size for this examination shall be expressed in units of one coil. The acceptable quality level (AQL) shall be 1.5 major defects and 4.0 total defects (major and minor combined) per 100 units. The inspection level shall be level I.



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TABLE VI.- Visual examination

Examine	Defect	Classification	
		Major	Minor
Appearance and workmanship	Any cut	X	
	Chafed or damaged	X	
	Kink	X	
	Broken or loose strand	X	
	Bulged strand	X	
	Strand knot	X	
Type	Not as specified	X	
Class	Not as specified	X	
Cleanness	Spot or stain <u>1/</u>		X
Identification ticket	Omitted, incorrect, illegible, or insecurely attached		X
Color	Not as specified		X

1/ Clearly visible at normal inspection distance (approximately 3 feet).

4.2.3 Examination for length and winding.- The sample unit for this examination shall be one coil. The inspection level shall be level S-3 and the AQL shall be 4.0 percent defective. For lots consisting of 500 or fewer units, the sample size shall be 10 and the acceptance number 1. The lot size shall be the number of units in the inspection lot. Defects shall be as listed in 4.2.3.1 and 4.2.3.2. The length of the coil (see 3.7 and table IV) shall be determined using the following formula:

$$W \times L = \text{Length per coil in feet}$$

Where: W = net weight of the rope to nearest 0.1 pound

L = lot average of the weight-length relationship (length/pound)  
as determined in 4.2.5

4.2.3.1 Defects with regard to length shall be considered to exist if any of the following are determined during inspection:

- a. Length of coil less than or more than length specified (including permitted tolerance).
- b. Length of coil less than marked on ticket.
- c. Any coil found to contain more than two pieces.
- d. Any piece less than 100 feet in length.

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- \* 4.2.3.2 Defects with regard to winding shall be considered to exist if any of the following are determined during inspection:
  - a. Improperly or not firmly wound resulting in kinking, knotting, entangling or slippage during unwinding, or otherwise affecting free unhampered unwinding of rope.
  - b. Knot or splice or otherwise joining of ends to make a continuous length.
  - c. Ends frayed and not securely whipped.
  - d. Ends not cut off squarely or neatly.
- \* 4.2.4 Examination of preparation for delivery requirements.- An examination shall be made to determine that packaging, packing and marking complies with the section 5 requirements. The examination shall be in accordance with the provisions of MIL-C-3131, except that the inspection level shall be S-2 and the AQL shall be 2.5 defects per 100 units.
- \* 4.2.4.1 Examination for palletization.- An examination shall be made to determine that palletization complies with section 5 requirements. The examination shall be in accordance with the provisions of MIL-C-3131.
- \* 4.2.5 Testing of the end item.- The methods of testing specified in FED-STD-191, wherever applicable and as listed in table VIII shall be followed. 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 sample size shall be in accordance with table VII. The sample unit for testing shall be 50 feet of rope. The lot size shall be expressed in units of coils. All test reports shall contain the individual values utilized in expressing the final result. The lot shall be unacceptable if one or more units fail to meet any requirement. Tests to determine compliance with specification requirements, including quantity of delivery, may be made under prevailing atmospheric conditions. In cases of dispute, tests shall be made upon material which has reached equilibrium under Standard Conditions as defined in FED-STD-191.

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TABLE VII.- Sampling for tests

<u>Lot size (coils)</u>	<u>Sample size</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

TABLE VIII.- Test methods

<u>Characteristic</u>	<u>Requirement reference</u>	<u>Test method</u>
Number of strands	3.4	Visual <u>1/</u>
Circumference	3.5	6000
Lay of rope	3.5	4050
Length per 10 turns	3.5	6000
Breaking strength (type I, II and III)	3.5	6015
Breaking strength (type IV)	3.5	6016
Length per pound	3.5	6004
Extractable matter (chloroform soluble material)	3.6.1 and 3.6.2	2611
Water absorption (types III and IV, class 2 only)	3.6.2	6011

1/ One determination shall be made per sample unit and the results reported as pass or fail.

#### 5. PREPARATION FOR DELIVERY

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

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5.1.1 Levels A and C.- The rope shall be packaged in accordance with the applicable requirements of MIL-C-3131.

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

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

\* 5.3 Palletization.- When specified (see 6.2) rope packed as specified shall be palletized in accordance with the applicable requirements of MIL-C-3131. The road type shall be as specified by the procuring activity.

\* 5.4 Marking.- In addition to any special markings required by the contract or order, interior packages, shipping container, and palletized unit loads shall be marked in accordance with MIL-C-3131.

## 6. NOTES

6.1 Intended use.- The rope is intended for use in the fabrication of tent lines.

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

- (a) Title, number and date of this specification.
- (b) Type, class and size required (see 1.2 and 3.5).
- (c) Color if other than natural (see 3.3)
- (d) When four-strand rope is required (see 3.4.1.1).
- (e) Length of coil to be furnished if other than specified (see 3.7).
- (f) Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
- (g) When palletization is required (see 5.3).

6.3 Marginal notations.- 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 suppliers 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.

### Custodians:

Army - GL  
Air Force - 82

### Preparing activity:

Army - GL  
Project No. 4020-0188

### Review activities:

Army - MD, ME  
DSA - IS

### User activity:

Navy - YD

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

2. DOCUMENT TITLE

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)