

T-T-891d
December 28, 1967
~~SUPERSEDING~~
Fed. Spec. T-T-891c
January 11, 1965

FEDERAL SPECIFICATION

TWINE, LINEN

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for linen twine.

1.2 Classification.

1.2.1 Types. The twine shall be of the following types, as specified (see 6.2):

- Type I - Natural finish, fine twine.
- Type II - Natural finish, mildew-resistant, fine twine.
- Type III - Polished finish, fine twine.
- Type IV - Polished finish, mildew-resistant, fine twine.
- Type V - Natural finish, rope twine.
- Type VI - Natural finish, mildew-resistant, rope twine.
- Type VII - Natural finish twine.
- Type VIII - Natural finish, mildew-resistant, twine.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

- CCC-T-191 - Textile Test Methods.
- PPP-B-636 - Box, Fiberboard.

Federal Standards:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

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Military Specifications:

MIL-C-3131 - Cordage; Preparation for Delivery of.
 MIL-T-3530 - Thread and Twine; Mildew Resistant or Water Repellent Treated.

Military Standards:

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

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Material. The linen twine shall be made of flax fiber processed to meet the requirements of this specification.

3.2 Types.

3.2.1 Type I. Type I, natural finish, fine twine shall conform to the physical requirements specified in table I when tested as specified in 4.2.5. Natural finish shall denote a twine for which no consistency or luster other than that inherent with the flax fiber is required.

TABLE I. Physical requirements for type I twine

Ply	Length per pound (minimum feet)	Breaking strength (minimum pounds)
3	2,280	35
4	1,710	50
5	1,368	65

3.2.2 Type II. Type II, natural finish, mildew-resistant, fine twine shall conform to the requirements specified for type I twine, and in addition shall be mildew-resistant treated in accordance with type I, class 1 treatment of MIL-T-3530. The physical and chemical requirements of MIL-T-3530 shall apply to the treated twine. Testing shall be conducted in accordance with 4.2.5.

3.2.3 Type III. Type III, polished finish, fine twine, shall be ZS-twist 2 ply; shall have not less than 3,000 feet per pound; shall have a minimum breaking strength of 29 pounds when tested as specified in 4.2.5. The finished twine shall be polished, having a lustrous and smooth dressed surface.

3.2.4 Type IV. Type IV, polished finish, mildew-resistant, fine twine shall conform to the requirements specified for type III twine, and in addition shall be mildew-resistant treated in accordance with type I, class 1 treatment of MIL-T-3530. The physical and chemical requirements of MIL-T-3530 shall apply to the treated twine. Testing shall be conducted in accordance with 4.2.5.

3.2.5 Type V. Type V, natural finish, rope twine, shall be ZSZ-twist 3 strand, 2 ply per strand; shall have not less than 120 feet per pound; shall have a minimum breaking strength of 325 pounds when tested as specified in 4.2.5. The twine shall have a natural finish as defined in 3.2.1.

3.2.6 Type VI. Type VI, natural finish, mildew-resistant, rope twine, shall conform to the requirements specified for type V twine and in addition shall be mildew-resistant treated in accordance with type I, class 1, treatment of MIL-T-3530. The physical and chemical requirements of MIL-T-3530 shall apply to the treated twine. Testing shall be conducted in accordance with 4.2.5.

3.2.7 Type VII. Type VII, natural finish, twine shall be 5 ply, shall have not less than 300 feet per pound, shall have a minimum breaking strength of 170 pounds when tested as specified in 4.2.5. The twine shall have a natural finish as defined in 3.2.1.

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3.2.8 Type VIII. Type VIII, natural finish, mildew-resistant, twine shall conform to the requirements specified for type VII twine, and in addition shall be mildew-resistant treated in accordance with the type I, class 1, treatment of MIL-T-3530. The physical and chemical requirements of MIL-T-3530 shall apply to the treated twine. Testing shall be conducted in accordance with 4.2.5.

3.3 Color. Unless otherwise specified (see 6.2), the color of the twine shall be natural. When mildew-resistant twine is specified, the color of the twine shall be natural prior to mildew-resistant treatment, and the shade imparted by the treatment will be acceptable.

3.4 Put-up.

3.4.1 Military agencies. For military procurements, the linen twine shall be put up in 1/2-pound or 1-pound minimum net weight balls or tubes (see 6.2.1).

3.4.2 Civil agencies. For civil agency procurements, the linen twine shall be furnished for types I, II, III, IV, VII, and VIII in either 1/2-pound, 1-pound, or 10-pound minimum net weight balls or tubes as specified. Types V and VI twine shall be put up in 2-pound minimum net weight balls or tubes. When specified, types I and II, 3-ply twine shall be put up 2 ends, 4 ends, or 6 ends (see 6.2).

3.4.3 Winding. A + tolerance of 10 percent in weight will be permitted on any one holder provided that the average weight is not less than the specified minimum. Each holder shall contain no more than three pieces and no piece shall be less than 25 feet in length. The holders shall be wound so that each turn and layer is free from entanglement. The ends of types V and VI twine shall be securely served or taped to prevent untwisting and fraying. Unless otherwise specified (see 6.2), there shall be no restrictions on the number of twine knots (knots in the finished twine) per ball or tube.

3.5 Staining. The linen twine shall be nonstaining when tested as specified in 4.2.5.

3.6 Workmanship. The linen twine 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.

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, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that 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 requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents.

4.2.2 Examination of the end item for visual defects. The defects listed in table II 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 sample unit for this examination shall be one ball or tube. Ten percent of the length contained in 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 balls or tubes. The acceptable quality level 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 II. Visual examination

Examine	Defect	Classification	
		Major	Minor
Appearance and workmanship	Cut, any.	X	
	Chafed or damaged.	X	
	Kink, broken or loose end.	X	
Color	Other than natural (unless otherwise specified).	X	
Cleanness	Spot or stain - clearly visible <u>1/</u> .		X
	Lump, picker waste or similar dirty waste, and linters clearly visible.		X
Finish	Objectionable odor.		X
	Other than specified.	X	

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

4.2.3 Examination for weight and winding. The sample unit for this examination shall be one ball or tube. The inspection level shall be S-3 and the acceptable quality level shall be 4.0 percent defective. For lots consisting of 500 or fewer units, the sample size (number of sample units) shall be 10 and the acceptance number 1. The lot size shall be the number of balls or tubes in the inspection lot. Defects shall be as listed in 4.2.3.2.

4.2.3.1 Examination for weight. A defect with regard to weight shall be considered to exist if the net weight of a ball or tube is less than the minimum or more than the maximum specified in 3.4. The number of holders examined shall be utilized in determining the average weight. A lot shall be unacceptable if the average weight is less than the applicable minimum weight specified.

4.2.3.2 Examination for winding. Defects with regard to winding shall be considered to exist if any of the following are determined during examination:

- (a) Improperly or not firmly wound resulting in kinks, knotting, entangling, or slippage during unwinding or otherwise affecting free unhampered unwinding of twine.
- (b) Put-up not as specified.
- (c) Any holder found to contain more than 3 pieces.
- (d) Any piece less than 25 feet in length.
- (e) Ends not served or taped (types V and VI only).

4.2.4 Examination of preparation for delivery requirements. An examination shall be made to determine that packaging and packing requirements of Section 5 of this specification are complied with. 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.

4.2.5 Testing of the end item. The methods of testing specified in CCC-T-191, wherever applicable and as listed in table IV shall be followed. When the data in the "Number of determinations" and "Results reported as" columns are not specified in the table, 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 determination made on a sample unit for test purposes as specified in the applicable test methods. The sample size shall be in accordance with table III. The sample unit for testing shall be one ball or tube of twine. The lot size shall be expressed in units of one ball or tube. 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 quality of delivery may be made under prevailing atmospheric conditions, except in settlement of dispute in which case the test shall be made upon material which has reached equilibrium under standard conditions as defined in CCC-T-191.

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TABLE III. Sampling for tests

Lot size (balls or tubes)	Sample sizes
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

TABLE IV. Test methods

Characteristic	Requirement paragraph	Test method	No. of deter. per sample unit	Results reported as
Material identification	3.1	1210 <u>1/</u>	-	-
Ply	3.2.1 thru 3.2.8	Visual	1	Pass or fail
Strand	3.2.5	Visual	1	Pass or fail
Breaking strength	3.2.1 thru 3.2.8	4102	5	-
Length per pound	3.2.1 thru 3.2.8	4010 <u>2/</u>	2	-
Staining	3.5	4.2.5.1	1	Pass or fail
Direction of twist	3.2.3 thru 3.2.6	4050	3	Pass or fail
Mildew-resistant treatment, concentration of copper-8-quinolinolate (percent copper)	3.2.2 3.2.4 3.2.6 3.2.8	2050 <u>3/</u>	-	-

- 1/ A supplier's certificate of compliance thereto is required and will be accepted for the requirement.
- 2/ Except that the test specimen shall be 30 yards of twine and the results shall be converted to feet per pound.
- 3/ The supplier shall also furnish a certificate of compliance certifying that copper-8-quinolinolate was used as the inhibitor in the mildew-resistant treatment.

4.2.5.1 Stain. The linen twine shall be considered nonstaining when a sample, laid between sheets of white unglazed paper, does not stain the paper under a pressure of 10 pound per square foot applied for 12 hours.

5. PREPARATION FOR DELIVERY

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

5.1.1 Civil agencies.

5.1.1.1 Level B. Unless otherwise specified, the one-half pound, one-pound, or two-pound put-ups of twine formed into balls or tubes shall not require packaging. Ten pound balls or tubes shall be wrapped in heavy weight kraft paper with the wrapping secured by suitable adhesive or tape.

5.1.1.2 Level C. Twine shall be packaged to afford adequate protection against physical damage during shipment from supply source to the first receiving activity. The supplier may use his standard practice when it meets this requirement.

5.1.2 Military agencies.

5.1.2.1 Levels A and C. The twine 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).

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5.2.1 Civil agencies.

5.2.1.1 Level B. One hundred and twenty 1/2-pound, sixty 1-pound, thirty 2-pound, or six 10-pound balls or tubes of one type and ply only, packaged as specified in 5.1 shall be packed in a snug-fitting fiberboard shipping container conforming to type CF or SF, class domestic, style CSSC, FOL, or SFF, grade 275 of PPP-B-636. Box closure shall be in accordance with the appendix of the box specification.

5.2.2 Military agencies.

5.2.2.1 Levels A, B and C. Twine packaged as specified, shall be packed in accordance with the applicable requirements of MIL-C-3131.

5.3 Marking.

5.3.1 Civil agencies. In addition to any special markings required by the contract or order, interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

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

6. NOTES

6.1 Intended use. This specification covers the requirements for linen twine used by Federal agencies for sails, baling, mattress stitching and wrapping.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

- (a) Title, number, and date of this specification.
- (b) Type and ply of twine required (see 1.2 and 3.2).
- (c) Color of twine, if other than specified (see 3.3).
- (d) Put-up, weight of balls or tubes (see 3.4).
- (e) When required, the maximum acceptable number of twine knots (see 3.4.3).
- (f) Selection of the applicable levels of packaging and packing (see 5.1 and 5.2).
- (g) Special marking required (see 5.3).

6.2.1 Department of Defense procurements. As a result of Department of Defense Standardization agreements, all DOD direct procurements should be on the basis of 1/2-pound or 1-pound minimum net weight balls or tubes.

MILITARY CUSTODIANS:

Army - GL
Air Force - 82

Review activities:

Army - MD
Air Force - 82

User activity:

Army - WC

Preparing activity:

Army - GL

CIVIL AGENCIES INTEREST:

AGR
COM-NBS
GSA-FSS
INT
VA-DMS
JUS-FPI

Orders for this publication are to be placed with General Services Administration acting as an agent for the Superintendent of Documents. See section 2 of this specification, to obtain extra copies and other documents referenced herein. Price 5 cents each.

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

YES

NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE