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T-O-56A
December 22, 1970
SUPERSEDING
Fed. Spec. T-O-56
November 5, 1940
(See 6.3)

FEDERAL SPECIFICATION

OAKUM, MARINE

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

1. SCOPE

1.1 Scope. This specification covers the requirements for spun type marine oakum.

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 the specification to the extent specified herein.

Federal Specification:

UU-T-81 - Tags, Shipping and Stock.

Federal Standards:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).
Fed Test Method Std No. 191 - Textile Test Methods.

(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., Ft. 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.)

Military Specification:

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

Military Standards:

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

(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.)

3. REQUIREMENTS

3.1 Material. The finished product of this specification shall be manufactured of hemp (Cannabis Sativa) "line" or "tow", or from Benares Sunn fiber (Crotalaria Juncea), or a combination of these fibers. The marine oakum shall be thoroughly carded, free from lumps, dirt, and other extraneous matter.

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3.2 Manufacture. Marine oakum shall be machine spun into slivers, whose texture shall be soft and uniform in density. It shall possess sufficient strength to sustain at least ten feet of its own weight without becoming separated at any point when tested as specified in 4.3.1.

3.3 Length per pound. The weight of the spun slivers shall be 45-55 feet per pound, when tested as specified in 4.3.2.

3.4 Tar content. Marine oakum shall be thoroughly and uniformly inpregnated with a suitable grade of pine tar in an amount not less than 10 percent and not more than 25 percent when tested as specified in 4.3.3.

3.5 Put-up. Unless otherwise specified (see 6.2), marine oakum shall be wound into balls weighing approximately 3 to 5 pounds each.

3.6 Identification ticket. Each ball of oakum shall have a ticket (identification tag) attached. 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 shall have a minimum tearing resistance of both directions (total) of 850 grams. The ticket shall be legibly printed, stamped or typed with water insoluble ink. The ticket shall contain the following information:

Stock number
Nomenclature
Specification number
Weight
Contract number and date
Date of manufacture (month and year)
Supplier's name

3.7 Basis of purchase. Unless otherwise specified (see 6.2), marine oakum shall be purchased on a price per pound basis gross weight, where the tare weight shall not exceed 6 percent.

3.8 Workmanship. The marine oakum shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the applicable quality levels established by this specification.

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 that supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection.

4.2.1 Sampling for quality conformance inspection. Sampling shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

4.2.1.1 Lot. For purposes of sampling, examination and tests, a lot shall consist of marine oakum of the same form and dimensions, produced in one plant under essentially the same conditions, and offered for delivery at one time. At all times, the number of balls shall be the lot size. The sampling unit shall be one ball of oakum.

TABLE I. Sampling for visual examination

No. of units in lot (balls)	Sample size	Major		Majors and minors combined	
		Acceptance No. (Defectives)	Rejection No. (Defectives)	Acceptance No. (Defectives)	Rejection No. (Defectives)
15 and under	2	1	2	1	2
16 - 50	3	1	2	2	3
51 - 150	5	1	2	3	4
151 - 500	8	2	3	5	6
501 and over	13	3	4	7	8

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4.2.2 Examination of the end item for visua 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 unit of product for this examination shall be one ball. Ten percent of the gross length contained on each sample unit but not less than 50 feet shall be subjec ed to the visual examination. The lot size for this examination shall be expressed in units of balls. The acceptable quality level (AQL) shall be 10 major defects and 25 total defects (major and minor combined) per 100 units, in accordance with table I. The inspection level shall be S-3.

TABLE II Visual examination defects

Examine	Defect	Classification	
		Major	Minor
Appearance and Workmanship	Machine spun slivers nonuniform in density.	X	
	Excessive amounts of lumps and dirt caused by improper and inadequate carding.	X	
	Adhesion of fibers caused by localized non-uniform application of tar.	X	
	Adhesion of fibers caused by tar content in excess of allowable maximum.	X	
Put-up	Weight not as specified.	X	
Identification ticket	Omitted, incorrect, illegible insecurely attached.		X
	Not as specified.		X
	Hand written entries.		X

4.2.3 Examination or weight and tare. The sample unit for this examination shall be one ball. The inspection level shall be 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, one. The lot size shall be the number of units in the inspection lot. Defects shall be as specified in 4.2.3.1 and 4.2.3.2.

4.2.3.1 Defects with regard to weight shall be considered to exist if any of the following are found during inspection.

(a) Weight of unit less than marked on ticket.

4.2.3.2 A defect shall be consideed to exist if the tare exceeds the requirements specified in 3.7.

4.2.4 Examination of preparation for delivery requirements. An examination shall be made to determine that packaging, packing, and marking 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.

4.3 Testing of the end item. The methods of testing specified in table IV 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. All test reports shall contain individual values utilized in expressing the final result. The lot shall be unacceptable if one or more units fail to meet any requirement. The lot size, expressed in balls, sample size and the acceptance and rejection numbers shall be in accordance with table III.

TABLE III Sampling for tests

No of units in lot (balls)	No. of samples	Acceptance No. for each test characteristic	Rejection No. for each test characteristic
15 and under	2	0	1
16 - 50	3	0	1
51 - 150	5	0	1
151 - 500	8	0	1
501 and over	13	0	1

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4.3.1 Determination of sliver strength. To preclude the possibility of obtaining erroneous results, carefully and slowly remove a minimum length of 10 feet from the ball without applying tension. The ball shall be held between both hands in a horizontal position, allowing the designated length to suspend freely and unhampered in air. The sliver shall be of such composition that it will withstand its own weight without becoming separated.

4.3.2 Determination of length per pound. While exercising care not to cause any damage to the sliver, unwind from the ball, carefully and slowly, at least 10 feet of it across a smooth table top or flat surface. The actual length of the sliver shall be measured, cut from the ball, and wieghed. The length per pound shall then be calculated by using the following formula:

$$\frac{L}{W} = \text{feet per pound}$$

where

L = length in feet
W = weight in pounds

TABLE IV. Test methods 1/

Characteristic	Requirement reference	Test method par.	No. of determinations per sample unit	Results reported as
Breaking length	3.2	4.3.1	5	Pass or fail
Feet per pound	3.3	4.3.2	3	Avg. of 3 determinations to nearest foot.

1/ Tests to determine compliance with specification requirements, including weight of delivery, may be made under prevailing atmospheric conditions except in settlement of dispute, in which case the tests shall be made using material, which has reached equilibrium under Standard Conditions as defined in Fed Test Method Std. No. 191.

4.3.3 Determination of tar content.

4.3.3.1 Routine test. A sample containing approximately 10 grams of oakum shall be taken and accurately weighed. The sample shall be placed in a Soxhlet extraction apparatus (or equal), and extracted with diethylether. The diethylether is then evaporated off and the residue dried, cooled, and weighed. The difference between the final weight and the weight of the empty flask is the weight of the soluble material, and the percentage of the weight of the original sample which the weight of soluble material represents is calculated and considered as tar content.

4.3.3.2 Umpire test. If results obtained by methods meeting the requirements of 4.3.3.1 are disputed, the tar content shall be determined by the following umpire test, and the results shall be considered final. A sample containing approximately 10 grams of oakum shall be taken and conditioned to constant weight at 20° to 25°C. and at 50 to 65 percent relative humidity. After accurately determining the final weight, the sample shall be placed in a Soxhlet extraction apparatus and treated with diethylether for a period of 6 hours at an extraction rate which fills and empties the extraction tube at least 12 times an hour. The diethylether extract is collected in a weighed flask and the bulk of the diethylether is first distilled off and the remainder evaporated off over a steam bath. The residue is dried for one hour at 105° to 110°C. The flask is then cooled in a desiccator and weighed. The difference between the final weight and the weight of the soluble material, and the percentage of the weight of the original sample which the weight of soluble material represents is calculated and considered as tar content.

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements.)

5.1 Packaging and packing. Packaging and packing shall be as specified in MIL-C-3131. Packaging shall be level A or C, and packing shall be level A, B, or as specified (see 6.2).

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5.2 Marking.

5.2.1 Military activities. In addition to any special markings required by the contract or order (see 6.2), marking shall be in accordance with MIL-STD-129.

5.2.2 Civil agencies. In addition to any special markings required by the contract or order (see 6.2), exterior and interior containers shall be marked in accordance with the requirements of FED-STD-123.

6. NOTES

6.1 Intended use. The marine oakum covered by this specification is intended to be used for caulking boats and ships.

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

(a) Title, date, and number of this specification.
(b) Put-up, if other than specified (see 3.5).
(c) That purchaser will accept at original weight, any unit which has been shortened or cut for test specimens, if in compliance with this specification (see 3.7).
(d) Selection of applicable levels of packaging and packing (see 5.1).
(e) Special marking, if required (see 5.2).

6.3 Class 2 unspun marine oakum specified in T-O-56 is no longer commercially available.

MILITARY CUSTODIANS:
Army - MR
Navy - SH
Air Force - 82

Review activities

Army - MP
Navy - SH, SA
Air Force - 82
DSA-IS

User activities.

Army - MD
Navy - MC, YD

Preparing activity:

Navy - SH

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 copies and other documents referenced herein. Price 10 cents each.

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No 119-R004

INSTRUCTIONS

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

T-O-56A Oakum, Marine

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

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