

Metric

A-A-50435B
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SUPERSEDING
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COMMERCIAL ITEM DESCRIPTION

ROPES (ARAMID)

The General Services Administration has authorized the use of this commercial item description.

ABSTRACT. This commercial item description covers four strand Aramid Fiber Rope which is intended for use as mooring lines and floating dry dock tending lines.

SALIENT CHARACTERISTICS.

1 **DESCRIPTION** The Aramid Fiber Rope shall be fabricated from four strands right regular laid with a three strand right regular laid polypropylene core. Each strand of the rope shall consist of 36 parallel aramid yarns left laid helically around the strand core (1X36) with a braided jacket of alternating aramid and polyester yarns. The center core shall consist of three strand polypropylene with a braided jacket of alternating aramid and polyester yarns. The color of the finished rope shall be natural.

1.1 **BRAIDED JACKET.** The type of braid, number of strands, yarns per strand and multipliers shall be in accordance with tables I and II. The jacket shall fit firmly around each aramid strand and polypropylene core when inspected with the rope in a relaxed state.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data which may improve this document should be sent by letter to: Commander, Naval Sea Systems Command, ATTN: 55Z33, Washington, D.C. 20362-5101.

AMSC N/A

FSC 4020

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Table I. Structural Requirements for Strand Jacket

Rope mm	Circumference (Inches) ^{1/}	Type Braid	Number of Strands	Pick Count Per MM + or - 10%
85	(3-3/8)	Plain	24	.40
89	(3-1/2)	Plain	24	.40
94	(3-3/4)	Plain	24	.40
105	(4-1/8)	Plain	24	.40
120	(4-3/4)	Plain	24	.40
		Plain	32	.40
136	(5-3/8)	Plain	24	.40
		Plain	32	.40
148	(5-7/8)	Plain	24	.40
		Plain	32	.40
		Plain	36	.40
		Plain	48	.40
160	(6-1/4)	Plain	24	.40
		Plain	32	.40
		Plain	36	.40
		Plain	48	.40
193	(7-5/8)	Plain	32	.40
		Plain	36	.40
		Plain	48	.40
207	(8-3/16)	Plain	32	.40
		Plain	36	.40
		Plain	48	.40

^{1/} Inches are approximate, added for information only

Table II. Structural Requirement for Core Jacket

Core mm	Circumference (Inches) ^{1/}	Type Braid	Number of Strands	Pick Count Per MM + or - 10%
19	(3/4)	Plain	16	1.00
		Plain	24	1.00
21	(13/16)	Plain	16	0.93
		Plain	24	0.93
25	(1)	Plain	16	0.75
		Plain	24	0.75
28	(1-3/32)	Plain	16	0.69
		Plain	24	0.69
30	(1-3/16)	Plain	16	0.63
		Plain	24	0.63
32	(1-1/4)	Plain	16	0.60
		Plain	24	0.60
41	(1-5/8)	Plain	24	0.46
		Plain	32	0.46

^{1/} Inches are approximate, added for information only

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Table II. Structural Requirement for Core Jacket
(Continuation)

Core Circumference mm (Inches) ^{1/}	Type Braid	Number of Strands	Pick Count Per MM
48 (1-7/8)	Plain	24	0.40
	Plain	32	0.40
57 (2-1/4)	Plain	24	0.33
	Plain	32	0.33
64 (2-1/2)	Plain	24	0.30
	Plain	32	0.30

^{1/} Inches are approximate, added for information only.

1.2 Fiber finish. The rope manufacturer shall use aramid and polyester fibers with an overlay finish that will ensure, in the marine environment, that the rope will give improved performance, that is, better than that of a rope made of fibers without an overlay finish. Manufacturer shall maintain a record of verifiable information attesting to the fact that marine overlay finish has been applied to the fibers. The overlay finish provided shall not violate any other requirements of this specification.

2 PHYSICAL PROPERTIES. The finished rope shall conform to the physical properties specified in Table III when tested in accordance with with in Fed Std 191.

Table III. Physical Properties

Circumference + or -5% mm (inches) ^{1/}	Linear Density + or -5% kg/100M	Lay Length maximum mm	Breaking strength minimum
85 (3-3/8)	49	120	kN (pounds) ^{2/} 222 (50000)
89 (3-1/2)	55	127	267 (60000)
94 (3-3/4)	62	133	311 (70000)
105 (4-1/8)	75	143	427 (96000)
120 (4-3/4)	98	164	601 (135000)
136 (5-3/8)	128	184	801 (180000)
148 (5-7/8)	168	215	1000 (225000)
160 (6-1/4)	211	229	1245 (280000)
193 (7-5/8)	259	270	1557 (350000)
207 (8-3/16)	312	290	1868 (420000)

^{1/} Inches are approximate and for information only.

^{2/} Pounds are included for information only.

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2.1 **ELONGATION**. The total elongation of the rope shall not exceed six percent at the minimum breaking strength value of Table III. The load elongation curve, drawn autographically, shall not exhibit evidence of sudden changes in load applications greater than five percent of the load measured at the instant of change. Changes due to splice slippage shall not be considered in this determination.

2.2 **FAILURE MECHANISM**. The failure mechanism shall consist of sequential rupturing of the individual strands.

2.3 **LAY LENGTH**. The lay length shall not exceed the values in table III.

3 **IDENTIFICATION MARKER**. The manufacturer shall identify each product by inserting a water resistant marker inside one strand in all sizes of ropes. The manufacturer's name, the year of manufacture, and type of fiber (aramid) shall be printed on the marker in bold, easy-to-read type. Italic or script type shall not be used. The printing shall not be affected by exposure to salt water or mineral oil.

4 **IDENTIFICATION TAG**. In addition to the requirements specified in 3, each package unit shall have a ticket (identification tag) attached for identification purposes. The ticket shall be legibly printed, stamped, or typed with water insoluble ink. The ticket shall contain the following information:

- a. stock number
- b. nomenclature
- c. CID number
- d. length
- e. contract number and date
- f. date of manufacture and year
- g. contractor's name

5 **SPLICEABILITY**. The finished rope shall be spliceable and shall not develop yarn displacement or strand cockles (distortion formed by back twist in the strand).

6 **PUT UP**. Unless otherwise specified, the rope shall be provided in standard lengths of between 183 meters (600 feet) and 201 meters (660 feet) when measured in the relaxed condition and shall be furnished without knots or splices on nonreturnable reels not larger than 2 meters (7 feet) in diameter. Multiple lengths shall be permitted but no piece shall be less than 183 meters (600 feet).

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QUALITY ASSURANCE PROVISIONS.

1 QUALITY CONFORMANCE INSPECTION. Unless otherwise specified, sampling for inspection shall be performed in accordance with Tables IV and V.

Table IV. Sampling for Visual Examination and Testing of the End Item

Lot Size	Sample Size ^{1/}
2 - 15	2
16 - 25	3
26 - 90	5
91 - 150	8
151 - 280	13
281 - 500	20
501 - 1200	32
1201 - 3200	50
3201 - 10000	80

^{1/} One additional sample specimen shall be selected for testing failure mechanism in 4.5.

Table V. Examination for Length and Winding

Lot Size	Sample Size
1 - 10	all
11 - 500	10
501 - 3200	13
3201 - 10000	20

2 END ITEM VISUAL EXAMINATION. Each lot shall be examined for the following defects:

Defects in design, construction, or workmanship; any cut, kink, broken or loose ends, bulged strands; not of continuous length, contains knots, splices or otherwise secured to make a continuous length; any spot or stain clearly noticeable; ends not secured, whipped or taped; and 201 meters (660 feet) when measured in the relaxed condition and shall be furnished without knots or splices on nonreturnable reels not larger than 2 meters (7 feet) in diameter. Multiple lengths shall be permitted but no piece shall be less than 183 meters (600 feet).

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The unit for this examination shall be one reel. The length of 31 meters (100 feet) shall be subjected to the visual examination. The sample units shall be randomly selected and the sample size shall be as specified in Table IV. If any sample unit has one or more defects, the entire lot shall be rejected.

3 LENGTH AND WINDING. The end item shall be examined for the following defects:

Length of unit more or less than specified (including permitted tolerances); Length of unit less than marked on ticket; Reels not in continuous length; Reels improperly or not firmly wound, resulting in slippage during winding; and Rope ends knotted or spliced to make a continuous length.

The sample unit for this examination shall be one reel. The sample size shall be as specified in Table V. If there is any defect in any sample, the lot shall be rejected.

4 TESTING OF END ITEM. The rope shall be tested as specified in 4.1 thru 4.7. The physical and chemical values apply to the average of the determinations made on the sample unit for test purposes as specified in the applicable test methods. The sample size shall be in accordance with Table IV and shall be zero percent defective. The lot size shall be expressed in units of reels. The sample unit for test purposes shall be 22 meters (70 feet) of rope.

4.1 CIRCUMFERENCE AND PICKS PER MILLIMETER. The circumference shall be measured in accordance with method 6003 of Fed Std 191, and picks per millimeter shall be determined in accordance with method 6001 of Fed Std 191, Textile Test Methods.

4.2 LINEAR DENSITY. The linear density shall be determined in accordance with method 6004 of Fed Std 191.

4.3 BREAKING STRENGTH. Breaking strength determination shall be in accordance with method 6015 of Fed Std 191 except each sample specimen shall have a breaking strength not less than that specified in Table III. Eye splices on aramid parallel fiber four strand cordage shall be accomplished by tucking with the lay for a minimum of six full tucks. Tapered splices are permitted.

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4.4 **ELONGATION.** The elongation shall be determined in accordance with method 6015 of Fed Std 191 except the length shall be measured when the load applied during the test is 30 percent and 50 percent of the minimum breaking strength of the specimen being tested. A stress-strain curve shall be plotted to the rope's breaking strength.

4.5 **FAILURE MECHANISM.** The failure mechanism shall be determined by testing one rope sample from each lot. The distance between the outer ends of the splices shall be 16 meters (50 feet) in length. The sample failure will be considered satisfactory if the time between the first and second ruptures of the strands is at least 10 seconds when tested in accordance with method 6015 of Fed Std 191. This sample shall meet the breaking strength requirements of Table III.

4.6 **LAY LENGTH.** The lay length shall be determined in accordance with method 6000 of Fed Std 191.

4.7 **DETERMINATION OF SPLICEABILITY.** A breaking strength specimen shall be prepared and tuck spliced with the lay at each end with six full strand tucks. The specimen shall then be allowed to rest for 24 hours. Four of the tucks shall then be backed out of the rope. The portion of the rope from which the tucks are removed shall be examined for distortion of the strands.

4.8 **TEST PROCEDURES.** The manufacturer shall submit testing procedures in writing to the Government Inspector prior to any testing.

4.8.1 **SAMPLE IDENTIFICATION.** Each sample unit or sample specimen shall be marked for identification in determining the lot or sample unit from which the specimens were taken.

CONTRACTOR CERTIFICATION. The contractor shall certify and maintain substantiating evidence that the rope offered meets the characteristics of this Commercial Item Description, and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices. The Government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

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RESPONSIBILITY FOR COMPLIANCE. All items shall meet all requirements of this Commercial Item Description. The Government will provide a Quality Assurance Representative to select the samples to be tested, witness all visual inspections, physical testing, and certify that each lot meets all requirements of this Commercial Item Description at the source. Sampling and inspection 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. Failure to meet any of the requirements of this Commercial Item Description shall be cause for rejecting the entire lot. Retesting of the lot shall not be permitted.

The Naval Sea Systems Command (Code 56W2) reserves the right to observe each test of conformance prior to the first delivery of each size of aramid rope specified in the Commercial Item Description offered by each manufacturer to the Government. The Manufacturer shall inform the Naval Sea Systems Command (Code 56W2) and the contracting officer of testing schedules at least 3 weeks prior to testing.

PRESERVATION, PACKAGING, PACKING, AND MARKING. Unless otherwise specified in the contract or purchase order, preservation, packaging, packing, and marking shall be in accordance with ASTM D 3951.

NOTES.

Ordering Data. Purchaser should specify the following:

- (a) Title, number, and date of this commercial item description.
- (b) Circumference required (see Physical Properties).
- (c) When continuous lengths, other than standard, are required (see Put Up).
- (d) If purchaser will accept any unit which has been shortened or cut for test specimens if in complete compliance with this Commercial Item description. The reel shall be marked as to actual length.

MILITARY INTERESTS:

Custodians
Navy - SH

Preparing activity:
Navy - SH
(Project 4020-N028)

Review activity
DLA-DISC

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. 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.

I RECOMMEND A CHANGE		1. DOCUMENT NUMBER CID A-A-50435B	2. DOCUMENT DATE (YYMMDD) 24 March 1992
3. DOCUMENT TITLE ROPES (ARAMID)			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	e. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY			
a. NAME Technical point of contact (TPOC) Black Hall, Code 56W23		b. TELEPHONE (Include Area Code) (1) Commercial (703) 602-1844 (2) AUTOVON 332-1844	
c. ADDRESS (Include Zip Code) COMMANDER NAVAL SEA SYSTEMS COMMAND WASHINGTON, D.C. 20360-5101		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	