

INCH-POUND

MIL-R-24337A(SH)

29 March 1990

SUPERSEDING

MIL-R-24337(SHIPS)

17 June 1968

(See 6.8)

## MILITARY SPECIFICATION

## ROPE, NYLON, EIGHT STRAND PLAITED

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers the requirements of 8 strand plaited nylon rope.

## 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 document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

- UU-T-81 - Tags, Shipping and Stock.
- PPP-F-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.

## MILITARY

- MIL-C-3131 - Cordage; Packaging of.
- MIL-L-17331 - Lubricating Oil, Steam Turbine and Gear, Moderate Service.
- MIL-L-19140 - Lumber and Plywood, Fire-Retardant Treated.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## STANDARDS

## FEDERAL

FED-STD-191 - Textile Test Methods.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 885 - Standard Methods of Testing Tire Cords, Tire Cord Fabrics, and Industrial Filament Yarns Made From Man-Made Organic-Base Fibers.
- D 1141 - Standard Specification for Substitute Ocean Water.  
(DoD adopted)
- D 1577 - Standard Test Methods for Linear Density of Textile Fibers.
- D 2257 - Standard Test Method for Extractable Matter in Yarns.  
(DoD adopted)
- D 2258 - Standard Practice for Sampling Yarn for Testing.
- D 4268 - Standard Methods of Testing Fiber Ropes.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

3.2 Application. Unless otherwise specified, the requirements specified in 3.10 and 3.11 apply only to plaited nylon rope purchased directly by the Government. All other requirements apply to plaited nylon rope purchased as a component for an end item by a contractor and to plaited nylon rope purchased directly by the Government.

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3.3 Materials. The rope shall be fabricated from bright white, virgin continuous filament, heat and light resistant nylon fiber of at least six denier size, having at least 8.0 grams per denier strength. The nylon shall be a long chain polymer made of hexamethylene diamine and adipic acid, or a long chain polymer of epsilon amino caproic acid. Mixtures of nylon fiber types shall not be employed in any one rope.

3.4 Construction. The ropes shall be made of 8 strands arranged in four pairs, where one individual strand shall be laid adjacent to the second strand in each pair and shall conform to the requirements specified herein. Individual strands of 3/4 through 4-1/2 inch circumference shall be made of one size of 1-ply yarns, 5 inch circumference and larger shall be made of one size of balanced 3-ply yarns and shall have equal numbers of yarns. The single yarns shall be made from group filaments conforming to the sizes specified in table I for the respective sizes of rope.

TABLE I. Construction.

| Rope size<br>(circumference)<br>(inches) | Turns per foot<br>minimum | Denier of<br>single yarns |
|--|---------------------------|---------------------------|
| 3/4 to 4-1/2                             | 11                        | 5,000 to 35,000           |
| 5 to 9                                   | 11                        | 15,000 to 35,000          |
| 10 to 16                                 | 11                        | 24,000 minimum            |

3.4.1 Preparation. For single yarn construction the pattern shall be ZS and SZ. In the preparation of the constituent rope strands, the "SZS" pattern shall be employed in the twisting of the singles yarns, the 3-ply yarns and the individual strands of two pairs, while the components of the remaining pairs shall be twisted in the "ZSZ" pattern.

3.4.2 Finished rope. The finished rope shall be constructed so that in the interweaving procedure, pairs of strands of the former structure shall be twisted in the "Z" direction, while alternating pairs of the latter structure shall be twisted simultaneously in the "S" direction. Heat setting of the rope or any of its components with the exception of fibers shall not be permitted.

3.5 Physical requirements. The finished rope shall conform to the physical properties specified in table II, when tested as specified in 4.6. The circumference in accordance with table II shall be as specified (see 6.2).

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TABLE II. Physical properties.

| Circumference at load P nominal (inches) | Tolerance plus or minus (inches) | Diameter nominal (inches) | Load P (200 x D <sup>2</sup> ) (pounds) | Hardness minimum no maximum (pounds) | Linear density plus 5 percent or minus 0 percent (pounds/100 Ft) | Breaking strength (minimum) (pounds) |
|--|----------------------------------|---------------------------|---|--------------------------------------|--|--------------------------------------|
| 3/4                                      | 1/16                             | 1/4                       | 12                                      | 5                                    | 1.35   | 1,500                                |
| 1  | 1/16                             | 5/16                      | 20                                      | 5                                    | 2.3  | 2,500                                |
| 1-1/8                                    | 1/16                             | 3/8                       | 28                                      | 5                                    | 3.5  | 3,700                                |
| 1-1/4                                    | 1/16                             | 7/16                      | 38                                      | 5                                    | 4.9  | 5,000                                |
| 1-1/2                                    | 1/16                             | 1/2                       | 50                                      | 5                                    | 6.2  | 6,400                                |
| 1-3/4                                    | 1/16                             | 9/16                      | 63                                      | 5                                    | 7.5  | 8,000                                |
| 2  | 1/8                              | 5/8                       | 78                                      | 5                                    | 10.2   | 11,000                               |
| 2-1/4                                    | 1/8                              | 3/4                       | 112                                     | 5                                    | 14.1   | 17,000                               |
| 2-1/2                                    | 1/8                              | 13/16                     | 132                                     | 5                                    | 16.2   | 20,000                               |
| 2-3/4                                    | 1/8                              | 7/8                       | 153                                     | 5                                    | 19.5   | 24,000                               |
| 3  | 3/16                             | 1                         | 200                                     | 20                                   | 25.0   | 31,000                               |
| 3-1/2                                    | 3/16                             | 1-1/8                     | 253                                     | 20                                   | 33.9   | 38,000                               |
| 3-3/4                                    | 3/16                             | 1-1/4                     | 312                                     | 20                                   | 40.0   | 46,000                               |
| 4  | 3/16                             | 1-5/16                    | 345                                     | 20                                   | 43.0   | 53,000                               |
| 4-1/2                                    | 1/4                              | 1-1/2                     | 450                                     | 20                                   | 50.0   | 63,000                               |
| 5  | 1/4                              | 1-5/8                     | 528                                     | 20                                   | 68.0   | 73,000                               |
| 5-1/2                                    | 1/4                              | 1-3/4                     | 613                                     | 20                                   | 82.0   | 78,000                               |
| 6  | 5/16                             | 2                         | 800                                     | 20                                   | 95.0   | 95,000                               |
| 6-1/2                                    | 5/16                             | 2-1/8                     | 903                                     | 20                                   | 109.0  | 106,000                              |
| 7  | 3/8                              | 2-1/4                     | 1012                                    | 20                                   | 125.0  | 125,000                              |
| 7-1/2                                    | 3/8                              | 2-1/2                     | 1250                                    | 20                                   | 141.0  | 137,000                              |
| 8  | 7/16                             | 2-5/8                     | 1378                                    | 20                                   | 167.0  | 165,000                              |
| 9  | 7/16                             | 3                         | 1800                                    | 20                                   | 214.0  | 200,000                              |
| 10                                       | 1/2                              | 3-1/4                     | 2112                                    | 20                                   | 262.0  | 250,000                              |
| 11                                       | 9/16                             | 3-1/2                     | 2450                                    | 20                                   | 319.0  | 300,000                              |
| 12                                       | 5/8                              | 4                         | 3200                                    | 20                                   | 384.0  | 360,000                              |
| 13                                       | 3/4                              | 4-1/4                     | 3612                                    | 20                                   | 446.0  | 380,000                              |
| 14                                       | 3/4                              | 4-1/2                     | 4050                                    | 20                                   | 517.0  | 441,000                              |
| 15                                       | 3/4                              | 5                         | 5000                                    | 20                                   | 595.0  | 507,000                              |
| 16                                       | 3/4                              | 5-1/4                     | 5512                                    | 20                                   | 676.0  | 572,000                              |

3.5.1 Elongation. The elongation of the ropes shall not exceed 65 percent at the breaking strength (see 4.6.5). The load elongation curve, drawn autographically, shall not exhibit evidence of sudden changes in load applications greater than 5 percent of the load weighed at the instant of change. Changes due to splice slippage shall not be considered in this determination.

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3.5.2 Hardness. The finished rope shall meet the minimum hardness specified in table II (see 4.6.9).

3.6 Finish. No extraneous material shall be added for the purpose of weighting the rope. The extractable matter of the finished rope shall not exceed 5.0 percent (see 4.6.6).

3.7 Moisture content. The moisture content of the rope shall not exceed 5.0 percent (see 4.6.8).

3.8 Spliceability. The finished ropes shall be spliceable and shall not develop yarn displacement or strand cockles (distortion formed by a back twist in the strand) in the splicing test specified in 4.6.10.

3.9 Identification marker. The contractor shall identify his product by inserting a kraft paper or water repellent cotton marker within one strand in all ropes 2 inches in circumference and larger. The marker shall be completely enveloped by the cover yarns in the strand in which enclosed. Unless otherwise specified (see 6.2), the manufacturer's name, year of manufacture, and type of fiber (NYLON) shall be clearly printed on the marker. Italic or script type shall not be used. The printing shall not be affected upon exposure to water or mineral oil (see 4.6.7).

3.10 Identification ticket. In addition to the requirements specified in 3.9, a ticket (identification tag) shall be attached to each package unit. The ticket shall be in accordance with type B, class 1, size 4 or 5, 15 CSU Grade Designator as specified in UU-T-81. 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) Specification.
- (d) Length.
- (e) Contract number and date.
- (f) Contractor's name.
- (g) Year of manufacture.

3.11 Put-up. Unless otherwise specified (see 6.2), the rope shall be furnished without knots or splices on non-returnable reels (spools) not larger than 7 feet in diameter. Unless otherwise specified (see 6.2), multiple lengths shall be permitted in the same put-up. When specified (see 6.2), continuous lengths other than a standard length may be used. The rope shall be ordered by weight, as specified (see 6.2). Delivered weight per reel shall be within plus 10 percent minus 0 percent of weight specified in table III. The weight for lengths other than standard shall be determined in accordance with table III with the proper length ratio applied. However, the actual length shall not be less than the standard length, as specified in table III when measured in the relaxed condition.

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TABLE III. Put up.

| Circumference<br>(inches) | Minimum length<br>(feet) | Weight<br>(pounds) |
|---------------------------|--------------------------|--------------------|
| 3/4                       | 1200                     | 18                 |
| 1                         | 1200                     | 30                 |
| 1-1/8                     | 1200                     | 47                 |
| 1-1/4                     | 1200                     | 65                 |
| 1-1/2                     | 1200                     | 82                 |
| 1-3/4                     | 1200                     | 102                |
| 2                         | 1200                     | 135                |
| 2-1/4                     | 1200                     | 187                |
| 2-1/2                     | 1200                     | 214                |
| 2-3/4                     | 1200                     | 265                |
| 3                         | 1200                     | 332                |
| 3-1/2                     | 1200                     | 448                |
| 3-3/4                     | 600                      | 265                |
| 4                         | 600                      | 286                |
| 4-1/2                     | 600                      | 333                |
| 5                         | 600                      | 449                |
| 5-1/2                     | 600                      | 543                |
| 6                         | 600                      | 629                |
| 6-1/2                     | 600                      | 721                |
| 7                         | 600                      | 826                |
| 7-1/2                     | 600                      | 932                |
| 8                         | 600                      | 1106               |
| 9                         | 600                      | 1415               |
| 10                        | 600                      | 1734               |
| 11                        | 600                      | 2111               |
| 12                        | 600                      | 2540               |
| 13                        | 600                      | 2951               |
| 14                        | 600                      | 3420               |
| 15                        | 600                      | 3937               |
| 16                        | 600                      | 4472               |

3.12 Workmanship. The ends of all rope shall be cut off squarely and be securely whipped, taped, or heat sealed. The reels shall be wound so that each turn and layer is free from entanglement. The rope shall conform to the quality and grade of product established by the requirements of 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 contractor is responsible for the performance of all inspection requirements (examinations and tests) 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 specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.3).
- (b) Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall consist of the examinations specified in 4.5.1 and 4.5.2 and the test specified in 4.6 (see 6.3).

4.3.1 First article sample. The first article sample for ropes shall be a continuous finished length of 70 feet, and submitted for inspection and test as specified in 4.3.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examinations specified in 4.5.1 and 4.5.2 and the tests specified in 4.4.1 and 4.6. Sampling for inspection shall be performed in accordance with table IV and V.

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TABLE IV. Sampling for visual examination and testing of the end item.

| Lot size     | Sample size |
|--------------|-------------|
| 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          |

TABLE V. Examination for length and winding.

| Lot size     | Sample size |
|--------------|-------------|
| 1 - 10       | All         |
| 11 - 500     | 10          |
| 501 - 3200   | 13          |
| 3201 - 10000 | 20          |

4.4.1 Material and component inspection. Determination shall be made for all characteristics specified in table VI, except material (see 6.3 and appendix). The linear density per filament and the tenacity of the fiber shall be determined in accordance with ASTM D 885, ASTM D 1577 and ASTM D 225.

TABLE VI. Component test.

| Characteristics                   | Requirement | Test method |
|-----------------------------------|-------------|-------------|
| Material                          | 3.3         | 4.4.1       |
| Denier per filament               | 3.3         | 4.4.1       |
| Tenacity (grams per denier)       | 3.3         | 4.4.1       |
| Denier (singles yarn)             | 3.4         | Table I     |
| Turns per foot (singles yarn)     | 3.4         | Table I     |
| Direction of twist (singles yarn) | 3.4         | 4.4.1       |
| Direction of twist (plied yarn)   | 3.4         | 4.4.1       |
| Direction of twist (strand)       | 3.4         | 4.4.1       |

4.5 Examinations.

4.5.1 Examination of the end item for visual defects. A lot size for examination for visual defects specified in table VII shall be expressed in units of reels or spools each. Ten percent of the gross length contained on each unit of product, but not less than 100 feet shall be subjected to the visual examination. The inspection level shall be in accordance with table IV. Any sample unit



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having one or more defects specified in table VII shall be rejected. If any defects are noted in the original sample units, additional units shall be randomly selected and if any defects specified in table VII are not, the entire lot shall be rejected.

TABLE VII. Visual examination and classification of defects.

| Examine | Defect   |
|---------|--|
|         | <u>Appearance and workmanship</u>  |
| 101     | Cut, chafed and damaged, affecting serviceability                                |
| 102     | Kinks, darting yarns 1/ broken or loose ends, bulged strands, strand knots       |
| 103     | Other than eight strands (four pair)   |
| 104     | Ends not securely whipped, taped or heat sealed to prevent fraying or untwisting |
|         | <u>Identification marker 2/</u>  |
| 105     | Omitted, incorrect illegible   |
| 106     | Italic or script type used   |
|         | Not completely covered by cover yarns  |
| 107     | Not as specified   |
|         | <u>Identification ticker</u>   |
| 108     | Omitted, incorrect, illegible, insecurely attached                               |
| 109     | Not as specified (hand written entries)  |
|         | <u>Cleanliness</u>   |
| 116     | Spot or stain, clearly visible 3/  |
| 117     | Objectionable odor   |

1/ Darting yarns are internal yarns which project through the cover yarns of the strand at intervals along the rope.

2/ Identification marker for 2 inch in circumference and larger.

3/ At normal inspection distance (approximately 3 ft).

4.5.2 Examination for length and winding. The sample unit for this examination shall be one reel or spool. The inspection level shall be in accordance with table V and shall be 0 percent defective. The lot size shall be the number of units in the inspection lot. Defects shall be as listed in 4.5.2.1 and 4.5.2.2.

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

- (a) Length of unit less than specified (see 3.11).
- (b) Length of unit less than marked on ticket.
- (c) Any piece less than 600 feet in length for sizes up to and including ropes of 16-inch circumference.

4.5.2.2 Defects with regard to winding. 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 kinks, knots, entangling or slippage during unwinding or otherwise affecting free unhampered unwinding of rope.
- (b) Rope ends knotted or spliced to make a continuous length.

4.6 Testing of the end item. Testing of the end item shall be as specified in table VIII and 4.6.2 through 4.6.10. The physical and chemical values specified herein apply to the average of the determinations made on a sample unit apply to the test purposes as specified in the applicable test methods. The sample size shall be in accordance with table IV. The sample size shall be in accordance with table IV and shall be 0 percent defective. The lot size shall be expressed in units of reels. The sample unit for test purposes shall be 70 feet.

TABLE VIII. Test methods. 1/

| Characteristics               | Require-<br>ment | Test<br>method | No. of detr.<br>per indiv.<br>unit of product | Results :<br>(see 6.3)                                   |
|-------------------------------|------------------|----------------|---|--|
| Plied yarn; per strand        | 3.4              | Visual         | 1   | Pass or fail   |
| Direction of rope twist       | 3.4              | 4.4.1          | 1   | Pass or fail   |
| Circumference                 | 3.5              | 4.6.2          | 3   | Average of 3<br>determinations to<br>nearest 1/16 inch   |
| Breaking strength<br>of ropes | 3.5              | 4.6.4          | 3   | An accuracy of<br>1 percent                              |
| Linear density                | 3.5              | 4.6.3          | 1   | See 4.6.3.2  |
| Elongation                    | 3.5.1            | 4.6.5          | 3   | Average of 3<br>determinations to<br>nearest 0.1 percent |
| Hardness                      | 3.5.2            | 4.6.9          | 3   | Average of 3<br>determinations to<br>nearest 1.0 lb.     |

See footnote at end of table.

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TABLE VIII. Test methods 1/ - Continued.

| Characteristics                   | Requirement | Test method | No. of det.<br>per indiv.<br>unit of product | Results<br>(see 6.3)                               |
|-----------------------------------|-------------|-------------|--|--|
| Extractable matter                | 3.6         | 4.6.6       | 2  | Average of 2 determinations to nearest 0.1 percent |
| Moisture content                  | 3.7         | 4.6.8       | 2  | Reported to nearest 0.1 percent                    |
| Spliceability                     | 3.8         | 4.6.10      | 1  | Pass or fail                                       |
| Identification marker<br>Material | 3.9         | 4.6.7       |  |  |
| Fastness to<br>oil and water      | 3.9         | 4.6.7       | 2  | Pass or fail                                       |
| Identification ticket<br>Material | 3.10        | 2/          | 1  | Pass or fail                                       |

1/ Tests to determine compliance with specification requirements including quantity of delivery may be made under prevailing atmospheric conditions except in settlement of dispute in which case the tests shall be made upon material which has reached equilibrium under standard conditions as defined in ASTM D 4268.

2/ See 4.4.1 and appendix.

4.6.1 Specimen preparation. The designated length and the number of test specimens shall be removed from the selected test reels in accordance with ASTM D 4268.

4.6.2 Determination of circumference. The circumference shall be measured in accordance with ASTM D 4268. Results reported shall be the average of three determinations to the nearest 1/16 inch.

4.6.3 Linear density.

4.6.3.1 The linear density shall be determined in accordance with ASTM D 4268.

4.6.3.2 Linear density. Linear density results shall be as follows:

| <u>Circumference<br/>(inches)</u> | <u>Degree of accuracy<br/>(pounds per 100 feet)</u> |
|-----------------------------------|---|
| Less than 1-3/4                   | Nearest 0.01  |
| 2 to 6                            | Nearest 0.10  |
| 6-1/2 to 12                       | Nearest 1.0   |
| More than 12                      | Nearest 10.0  |

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4.6.4 Breaking strength. Breaking strength determinations shall be conducted in accordance with ASTM D 4268. Results reported shall be the average to an accuracy of 1 percent. The load applied need not cause a failure provided that all individual tests exceeds the specified minimum breaking strength in table II.

4.6.5 Elongation. The elongation at the minimum breaking strength shall be determined in accordance with the initial single loading procedure as specified in ASTM D 4268. The results shall be the average of the determination to the nearest 0.1 percent.

4.6.6 Extractable matter. The extractable content shall be determined in accordance with ASTM D 2257, using a Soxhlet apparatus in the procedure. Results shall be the average of two determinations to the nearest 0.1 percent.

4.6.7 Identification marker. Three lengths of the identification marker shall be used to determine the fastness of the printed matter of the identification marker to saltwater and mineral oil. Each length shall be approximately 1-1/2 feet. One length shall be retained as a control, one length shall be immersed for 2 hours in synthetic seawater conforming to ASTM D 1141, stock solution no. 1, 2, or 3 and one length shall be soaked for 2 hours in mineral oil conforming to symbol 2190-TEP as specified in MIL-L-17331. Following removal from the respective environments, the two exposed specimens shall be visually compared with the control specimen. The fastness of the printed matter shall be considered satisfactory when no perceptible change in color or legibility is observed.

4.6.8 Moisture content. The moisture content shall be determined in accordance with method 2600 as specified in FED-STD-191. Results shall be the average of two determinations to the nearest 0.1 percent.

4.6.9 Hardness. The length of rope previously used in the weight determination shall be taped off each end. The tip of a 14-inch marlinespike, conforming to method 6020 of FED-STD-191, shall be started through the center of the rope so that two pairs of strands shall be visible on each side thereof. With the spike inserted, the rope shall be placed in a compression type testing machine in such a manner that the force necessary to push the spike through the rope will be measured with the rope in a relaxed state without tension and completely free to absorb the force of the penetrating spike. The rate of loading shall be  $6 \pm 1$  inches per minute. Care shall be taken to assure that the spike shall not be inserted less than 5 feet from an end and no less than 4 feet from an area which has been subjected to a previous hardness test. The load necessary to force the spike to the 1/2-inch diameter mark shall be measured on ropes up to and including 2-3/4 inch circumference and to the 1-inch diameter mark for larger size ropes, the marks shall be considered to be reached when the respective mark just disappears behind two pairs of strands.

4.6.10 Determination of spliceability. A breaking strength specimen shall be prepared and spliced at each end with four full double strand tucks. The specimen shall then be allowed to rest for 24 hours. Three of the tucks shall then be backed out of the rope. The portion of the rope from which the tucks have been removed shall be examined for yarn displacement and strand cockles.

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

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## 5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging or preparation for delivery requirements of referenced documents listed in section 2, see 6.7.)

5.1 General.5.1.1 Navy fire-retardant requirements.

- (a) Treated lumber and plywood. When specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping container, reel (spools), and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B - Type II - weather resistant.

Category 1 - general use.

Level C - Type I - non-weather resistant.

Category 1 - general use.

- (b) Fiberboard. When specified (see 6.2), fiberboard used in the construction of class-domestic, non-weather resistant fiberboard and cleated fiberboard boxes including interior packing forms shall meet the flamespread index and specific optic density requirements of PPP-F-320 and amendments thereto.

5.2 Packaging requirements. The packaging (preservation, packing and marking) requirements shall be in accordance with MIL-C-3131 for the level (A; C or commercial) of preservation, except as specified herein for 13 through 16-inch circumference rope, level (A, B, C, or commercial) of packing, and marking including packaging acquisition options therein as specified (see 6.2). For level A preservation of 13 through 16-inch circumference rope, reels shall be constructed in accordance with the wood and plywood requirements specified in MIL-C-3131 and the following:

(a) Wood.

- (1) The thickness of the reel head boards shall be minimum 1-inch, two or three ply.
- (2) The barrel shall consist of minimum 1-1/2 inch thick wood staves mortised into the reel heads.
- (3) The reel shall be assembled with a minimum of five, 1/2 or 3/4 inch diameter steel bolts having cup washers on each end.

(b) Plywood.

- (1) 1-1/4 inch, two sheets of 3/4 inch thick for net weights 700 through 1675 pounds; in addition, minimum of five, 1/2 inch nuts and bolts shall be used for the flange and barrel assembly.

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## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The rope covered by this specification is intended for use where relative freedom from torque deformation is required in addition to high strength and high elongation.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- (c) Circumference size required (see 3.5).
- (d) When first article inspection is required (see 3.1).
- (e) When information on identification marker is other than specified (see 3.9).
- (f) Put-up and length when other than specified (see 3.11).
- (g) When multiple lengths per unit are not allowed (see 3.11).
- (h) When fire-treated requirements are required (see 5.1.1).
- (i) Levels of preservation, packing and marking required (see 5.2).
- (j) That the purchaser will accept at original weight, any unit which has been shortened or cut for test specimen, if in complete compliance with this specification. Reel shall be marked as to actual length.
- (k) That plaited nylon rope will be purchased on a price-per-pound-basis-net-weight.

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

| <u>Reference Paragraph</u> | <u>DID Number</u> | <u>DID Title</u>                | <u>Suggested Tailoring</u> |
|----------------------------|-------------------|---------------------------------|----------------------------|
| 4.3                        | DI-T-4902         | First article inspection report | ----                       |
| 4.4                        | DI-T-5329         | Inspection and test reports     | ----                       |
| 4.4.1 and appendix         | DI-MISC-80678     | Certification/data report       | ----                       |

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

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6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.1), and the number of items to be tested as specified in 4.3. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 Adjustment for high moisture content. Material furnished containing an excess of moisture will be accepted by an adjustment in weight to the 5-percent moisture basis.

6.6 Subject term (key word) listing:

Splices  
Strands, rope  
Yarns

6.7 Sub-contracted material and parts. The packaging or preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:  
Navy - SH  
(Project 4020-N019)

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APPENDIX

CERTIFICATION/DATA REPORT TECHNICAL CONTENT REQUIREMENTS

10. SCOPE

10.1 Scope. This appendix covers the technical content requirements that shall be included in certification/data reports when required by the contract or order. This appendix is mandatory only when data item description DI-MISC-80678 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

30. CERTIFICATION/DATA REPORT

30.1 Certification/data report. When required by the contract or order, certification/data reports shall contain the following information to show compliance:

- (a) Conformance of material characteristics to the requirements specified herein (see 3.3).
- (b) Conformance to the requirement for heat setting of yarns or finished rope (see 3.4).
- (c) Conformance to the requirement for the mixing of fiber types, fiber grades, or fibers of different manufacturers within the rope (see 3.3).



## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

MIL-R-24337A(SH)

2. DOCUMENT TITLE

ROPE, NYLON, EIGHT STRAND PLAITED

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

d. DATE OF SUBMISSION (YYMMDD)