

MIL-H-226F
30 September 1982
SUPERSEDING
MIL-H-226E
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MILITARY SPECIFICATION

HALYARDS, SIGNAL, BRAIDED TREATED

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

1. SCOPE

- * 1.1 Scope. This document covers requirements for cotton or cotton/polyester halyards braided with and without core.

1.2 Classification. Halyards shall be of the following classes and in the sizes (circumference) specified (see 6.2).

Class 1 - Without core
Class 2 - With core

2. APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

SPECIFICATIONS

FEDERAL

T-T-616 - Treatment: Mildew Resistant, For Rope and Cord

MILITARY

MIL-C-3131 - Cordage, Preparation for Delivery of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Natick Research and Development Laboratories, Natick, MA 01760 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 4020

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STANDARDS

FEDERAL

FED-STD-191 - Textile, Test Methods

MILITARY

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

(Copies of documents required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

* OTHER GOVERNMENT DOCUMENTS

Commercial Item Description

A-A-900 - Tags, Shipping, Paper

(Copies of Commercial Item Description are available from General Services Administration, Federal Supply Service, Washington, DC 20406.)

2.2 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 shall take precedence.

3. REQUIREMENTS

3.1 Purchases. The requirements specified in 3.7 and 3.8 apply only to halyards purchased directly by the Government. All other requirements apply to halyards purchased by a manufacturer as a component for an end item and to halyards purchased directly by the Government.

3.2 Materials (see 6.3).

- * 3.2.1 Fiber. The halyards shall be fabricated from 100 percent cotton or cotton/polyester blended yarns of suitable staple length and grade to meet the requirements of this document. When cotton/polyester blended yarn is used, the polyester content shall be not less than 50 percent nor more than 65 percent.

3.2.2 Prohibited materials. The use of casein, glue, gum, starch, dextrin, water-soluble materials, paint dryers, resin or vegetable oils, oxidizing oils or resins modified with such oils, and finishing or loading materials to specifically increase the weight or breaking strength are prohibited. Materials necessary for polishing class 2 halyards are acceptable.

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3.3 Construction and physical requirements.

- * **3.3.1 Class 1.** The class 1 halyard shall be braided without core from a minimum of 9-ply cotton or cotton/polyester blended yarns and shall conform to the requirements specified in table I when tested as specified in 4.2.5.
- * **3.3.2 Class 2.** The class 2 halyard shall be firmly braided around a cotton core from a minimum of 3-ply cotton or cotton/polyester blended yarns and shall conform to the requirements specified in table I when tested as specified in 4.2.5.

TABLE I. Physical requirements

| Class | Size circumference inches ($\pm 1/8$ inch) | Carriers 1/ | Ends per carrier 1/ (minimum) | Length per pound, feet (minimum untreated) | Break- ing strength, pounds (minimum) | Picks per inch (min- imum) | Core, number of yarns |
|-------|--|--------------------|--|--|---|--|-----------------------------|
| 1 | 3/4 | 8 | 4 | 35.0 | 500 | 2-3/4 | — |
| 1 | 1 | 8 | 6 | 23.0 | 750 | 2-1/2 | — |
| 2 | 1-1/4 | 12 | 23 | 19.0 | 675 | 2-1/4 | 23 |

1/ Class 2 halyards may be braided using 18 carriers with 15 ends per carrier.

3.4 Finish.

3.4.1 Class 1. The class 1 halyard shall be mildew-resistant treated with copper-8-quinolinolate in conformance with the requirements of T-T-616.

3.4.2 Class 2. The finished class 2 halyard shall have a smooth polished surface and shall have a combination mildew and water resistant finish treatment as specified in 3.4.2.1, 3.4.2.2, and 3.4.2.3.

3.4.2.1 Mildew-resistant phase. The mildew-resistant treatment shall be copper-8-quinolinolate in conformance with the requirements of T-T-616.

3.4.2.2 Water resistant phase. The water resistant treatment shall consist of a solution of amorphous wax or paraffin wax, mineral oil, asphalt, and a volatile solvent formulated to meet the requirements of this document. The use of gilsonite, petrolatum, or equivalent products will be permitted.

3.4.2.3 Water absorption. The class 2 halyard shall absorb not more than 45 percent water by weight when tested as specified in 4.2.5.

3.4.2.4 Chloroform soluble material. The finished class 2 halyard shall contain not more than 30 percent total chloroform soluble material when tested as specified in 4.2.5.

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3.5 Staining. Class 1 and 2 halyards shall produce no stains when tested as specified in 4.2.5.

3.6 Color. The color of the halyards shall be the natural shade imparted by the treatment.

3.7 Put-up.

3.7.1 Class 1. The class 1 halyard shall be put-up in coils or spools (reels) containing a minimum of 2160 feet and a maximum of 2640 feet. The coil or spool (reel) shall contain not more than three pieces and no piece shall be less than 240 feet in length. The ends of the halyard shall have no knots nor shall the ends be otherwise attached to make a continuous length. The halyard shall be so wound that each turn and layer is free from entanglement.

* 3.7.2 Class 2. The class 2 halyard shall be put-up in coils or spools (reels) containing a minimum of 218 feet and a maximum of 222 feet. The coil or spool (reel) shall be put-up in one continuous length without knots and so wound that each turn and layer is free from entanglement. The ends of the halyard shall be cut off squarely and shall be securely whipped to prevent fraying.

* 3.8 Identification. Each coil or spool (reel) shall have a ticket (identification tag) attached to it for identification purposes. The ticket shall conform to the requirements of A-A-900, grade 15SU, wire tie with metal eyelet, manila, uncoated kraft paper, 4-1/4 by 2-1/8 inches or 4-3/4 by 2-3/8 inches. The use of identification labels on spools (reels) will be allowed provided that the labels are attached in such a manner as to remain in place and be clearly visible until all of the halyard has been removed. All entries on the ticket or label shall be legibly printed, stamped or typed with water insoluble ink. The ticket or label shall contain the following information:

Stock number
Item description
Document number
Length
Contract number and date
Contractor's name

3.9 Workmanship. The finished halyards shall conform to the quality and grade of product established by this document. The occurrence of defects shall not exceed the applicable quality levels.

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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 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 the document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

* 4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document. In addition, inspection shall be performed for the requirements in table II.

TABLE II. Component tests

| Characteristic | Paragraph reference | Test method |
|-------------------------------------|---------------------|-------------|
| Material | 3.2.1 | <u>1/</u> |
| Prohibited materials | 3.2.2 | <u>1/</u> |
| Yarn ply | 3.3.1 and 3.3.2 | <u>1/</u> |
| Water resistant finish (class 2) | 3.4.2.2 | <u>1/</u> |

1/ Unless otherwise specified a contractor's certificate of compliance shall be submitted and will be accepted for the stated requirements.

* 4.2.2 End item visual examination. The end item shall be examined for the defects listed in table III. All defects found shall be counted regardless of their proximity to each other. The sample unit shall be one coil or spool (reel). Ten percent of the length contained on each sample unit, but not less than 100 feet, shall be examined for visual defects. The lot size shall be expressed in coils or spools (reels) as applicable. The inspection level shall be I and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 1.5 for major defects and 4.0 for total (major and minor combined) defects.

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TABLE III. End item visual defects

| Examine | Defect | Classification | |
|--------------------------------|---|----------------|-------|
| | | Major | Minor |
| Appearance and workmanship | Any cut | X | |
| | Chafed or damaged | X | |
| | Kink | X | |
| | Knot | X | |
| | Unevenly braided resulting in open places, break in continuity of braid, or soft spot | X | |
| | Broken or loose end or strand | X | |
| | Loosely braided | X | |
| | Core not completely covered (class 2) | X | |
| | | | |
| Color | Other than natural | X | |
| Cleanness | Spot or stain <u>1/</u> | | X |
| Identification ticket or label | Omitted, incorrect, illegible, insecurely attached | | X |
| | Ticket or label not as specified | | X |

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

- * 4.2.3 Length and winding examination. The end item shall be examined for the length and winding defects listed in table IV. The sample unit shall be one coil or spool (reel). Any sample unit found to contain one or more defects shall be classified as a defective. The lot size shall be expressed in units of coils or spools (reels) as applicable. The inspection level shall be S-3 and the AQL, expressed in terms of percent defective, shall be 4.0.

TABLE IV. Length and winding defects

| Examine | Defect |
|---------|---|
| Length | Calculated length <u>1/</u> is less than the minimum specified or more than 10 percent in excess of the maximum length specified. |
| | Calculated length <u>1/</u> is less than length marked on ticket or label by more than 6 feet. |

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TABLE IV. Length and winding defects (cont'd)

| Examine | Defect |
|---------|--|
| Winding | <p>Improperly or not firmly wound resulting in kinks, knots, entangling or slippage during unwinding or otherwise affecting free unhampered unwinding of halyard.</p> <p>Knotting or otherwise joining of ends to make a continuous length.</p> <p>Any coil or spool (reel) containing more than three pieces (class 1).</p> <p>Any piece in coil or spool (reel) less than 240 feet in length (class 1).</p> <p>Any coil or spool (reel) not in a continuous length (class 2).</p> <p>Put-up not as specified.</p> <p>Ends not cut-off squarely and securely whipped (class 2).</p> |

1/ Calculated length (feet) = $W \times L$

Where: W = Net weight of spool (reel) or coil (to nearest 0.1 pound).

L = Lot average of length per pound results determined in 4.2.5.

- * 4.2.4 Packaging inspection. An examination shall be made to determine that preservation, packing, and marking requirements comply with the section 5 requirements. The examination shall be in accordance with the provisions of MIL-C-3131, except that the inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

4.2.5 End item testing. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table VI 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. 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 sample size shall be in accordance with table V. All test reports shall contain the individual values utilized in expressing the final result. The sample unit for testing shall be one coil or spool (reel). The lot size shall be expressed in units of coils or spools (reels). The lot shall be unacceptable if one or more sample units fail to meet any requirement. Tests to determine compliance with document requirements including quantity of delivery may be made under prevailing atmospheric conditions, except as specified herein. In cases of dispute, the test shall be made upon material which has reached equilibrium under standard conditions as defined in section 4 of FED-STD-191.

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TABLE V. Sampling for tests

| Lot size (coils or spools, reels) | Sample size |
|-----------------------------------|-------------|
| 800 and under | 2 |
| 801 up to and including 22,000 | 3 |
| 22,001 and above | 5 |

TABLE VI. End item tests

| Characteristic | Requirement paragraph | Test method | Number of determinations per individual single unit | Results reported as |
|---------------------------------------|-----------------------|----------------|---|--|
| Construction: | | | | |
| Class 1 | 3.3.1 | $\frac{1}{1/}$ | --- | --- |
| Class 2 | 3.3.2 | $\frac{1}{1/}$ | --- | --- |
| Circumference | Table I | 6003 | 3 | --- |
| No. of carriers | Table I | Visual | 3 | Avg. of 3 determinations to nearest whole number |
| Ends per carrier | Table I | Visual | 3 | Avg. of 3 determinations to nearest whole number |
| Length per pound | Table I | 6004 | 3 | --- |
| Breaking strength | Table I | 6016 | --- | --- |
| Picks per inch | Table I | 6001 | 1 | Pass or fail |
| No. of core yarns (class 2) | Table I | Visual | 1 | Pass or fail |
| Water absorption (class 2) | 3.4.2.3 | 6011 | --- | --- |
| Chloroform soluble material (class 2) | 3.4.2.4 | 2611 | --- | --- |
| Staining | 3.5 | 4.2.5.1 | 1 | Pass or fail |

1/ Unless otherwise specified, a contractor's certificate of compliance shall be furnished and will be accepted for the stated requirement.

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4.2.5.1 Determination of staining. The specimen shall be wrapped a sufficient number of times around a 4 by 4 inch steel plate to produce an exposed area of at least 2 square inches. A piece of filter paper, Whatman No. 1 or equivalent, shall be placed on the wrapped halyard to produce a load of 2 pounds per square inch for 1 hour. The weight shall then be removed and the filter paper examined for evidence of stains.

5. PACKAGING

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

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

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

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

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

6. NOTES

6.1 Intended use. The halyards are intended for use as flag halyards and distance lines.

6.2 Ordering data. Acquisition documents should specify the following:

- (a) Title, number, and date of this document.
- (b) Class required (see 1.2, 3.3, and 3.4).
- (c) Size (circumference) required (see table I).
- (d) Selection of applicable levels of packaging and packing (see 5.1 and 5.2).

* 6.3 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document (see 3.2).

6.4 Changes from previous issue. The margins of this document are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Custodians:

Army - GL
Air Force - 99

Preparing activity:

Army - GL
Project No. 4020-0227

Review activities:

Air Force - 82
DISC - SG

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DOCUMENT IDENTIFIER (Number) AND TITLE

MIL-H-226F Halyards, Signal, Braided Treated

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