Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 3813

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Revised

ROPE, ARAMID FIBER, JACKETED
For Antenna-Support Systems

1. SCOPE:

1.1 Form: This specification and its supplementary detail specifications cover ropes manufactured from aramid-fiber yarns and covered with a protective jacket.

1.2 Application: Primarily for nonconductive tension elements in antenna-supports where superior long-term weather resistance and extremely light weight are required.

1.3 Classification: The products specified herein and in the applicable detail specification define each rope by form, material, construction, and property characteristics. The rope construction covered by each detail specification appears as part of the title.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 3904/5 - Yarn, Organic Fiber, 1560 Denier, 4% Finish

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D1501 - Exposure of Plastics to Fluorescent Sunlamp

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

2.4 ANSI Publications: Available from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

ANSI C29.1 - Test Methods for Electrical Power Insulators
ANSI C68.1 - Techniques for Dielectric Tests

Printed in U.S.A.

2.5 ISO Publications: Available from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

ISO 1142 - Ropes - Sampling and Conditioning for Testing
ISO 2307 - Ropes - Determination of Certain Physical and Mechanical Properties

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specifications: The requirements for a specific rope shall consist of all the requirements specified herein in addition to the requirements specified in the applicable detail specification. In case of any conflict between the requirements of this basic specification and an applicable detail specification, the requirements of the detail specification shall govern.

3.2 Material and Construction: The rope shall consist of aramid fiber yarns, combined by rope-making operations into the rope construction specified in the applicable detail specification, and covered with a protective jacket as specified herein and in the applicable detail specification.

3.2.1 Yarns: Shall be as specified in the applicable detail specification. Constructional yarns shall consist of one or more single yarns gathered together and, when specified in the applicable detail specification, impregnated with a polymeric formulation.

3.2.2 Impregnation: The polymeric formulations used for impregnation of the yarns and strands, when required, shall be as specified in the applicable detail specification.

3.2.3 Jacketing: The jacket applied to the finished rope shall be tough, flexible, abrasion resistant, impervious to moisture, and weather resistant as specified in the applicable detail specification.

3.3 Properties: Rope shall conform to the requirements of this specification and the applicable detail specification; tests shall be performed on the rope supplied and in accordance with specified test methods, insofar as practicable.

3.3.1 Breaking Strength and Linear Density: Shall be as specified in the applicable detail specification, determined in accordance with ISO 2307 except that any type of high-performance end fittings or grips may be used.

3.3.2 Weatherability: The breaking strength of the finished rope shall be as specified for the rope construction and size shown in the applicable detail specification, determined as in 3.3.1 after stressed exposure to accelerated weathering conditions specified in 4.5.1.

3.3.3 Vibration Fatigue: The breaking strength of the finished rope shall be as specified for the construction and size shown in the applicable detail specification, determined as in 3.3.1 after stressed exposure to simulated aeolian vibration conditions specified in 4.5.2.

3.3.4 Flashover Voltage: The low-frequency wet flashover voltage on a 2-ft (0.6-m) long specimen of finished rope shall be as specified in the applicable detail specification, determined in accordance with 4.5.3.

3.4 Quality: Rope, as received by purchaser, shall be uniform in quality and condition, smooth, and free from foreign materials and from internal and external imperfections detrimental to usage of the rope.

3.5 Sizes and Tolerances:

3.5.1 Diameter: Shall be as specified in the applicable detail specification. Tolerances on diameters shall be as agreed upon by purchaser and vendor.

3.5.2 Length: Shall be as specified by the purchaser. Actual lengths shall be not less than the length specified.

3.5.3 In case of dispute between purchaser and vendor, diameter and length shall be measured with the rope under tension as specified in ISO 2307.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of rope shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the rope conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to the material and construction (3.2) requirements of this specification and the applicable detail specification, to the quality (3.4) and tolerance (3.5) requirements of this specification, and to the breaking strength, linear density, and flashover voltage requirements of the applicable detail specification are classified as acceptance tests.

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification and the applicable detail specification are classified as preproduction tests.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 Acceptance Tests: In accordance with ISO 1142. The number of specimens for each test shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.2 Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample rope shall be approved by purchaser before rope for production use is supplied, unless such approval be waived. Results of tests on production rope shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production rope which are essentially the same as those used on the approved sample rope. If any change is necessary in ingredients, in type of processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material and processing and, when requested, sample rope. Production rope made by the revised procedures shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Stressed Exposure to Accelerated Weathering Conditions: A tensile specimen, suitable for determining the breaking strength in accordance with 3.3.1, shall be exposed to simulated environmental conditions as specified in ASTM D1501, Procedure C, while simultaneously subjected to a tensile load of not less than 30% of the minimum breaking strength of the rope specified in the applicable detail specification. The end fittings or grips on the specimen need not be exposed to the environmental conditions.

4.5.2 Stressed Exposure to Simulated Aeolian Vibration: A tensile specimen, having length not less than 300 times the rope diameter and suitable for determining the breaking strength in accordance with 3.3.1, shall be subjected to not less than 100,000,000 cycles of forced, transverse vibration at a resonant frequency between 45 and 90 Hz, while simultaneously subjected to an axial tensile load of not less than 50% of the minimum breaking strength of the rope specified in the applicable detail specification. The double amplitude of vibration at an antinode point shall be not less than the nominal diameter of the rope.

4.5.3 Low Frequency, Wet, Flashover Voltage: Shall be determined in accordance with ANSI C29.1 with precipitation applied in accordance with ANSI C68.1, General Requirements Concerning Test Procedures.

4.6 Reports:

4.6.1 The vendor of rope shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the rope conforms to the other technical requirements of this specification and the applicable detail specification. This report shall include the purchase order number, material specification number and its applicable detail specification number, vendor's product identification, size, lot number, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its applicable detail specification number, contractor or other direct supplier of rope, part number, and quantity. When rope for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of rope to determine conformance to the requirements of this specification and the applicable detail specification, and shall include in the report a statement that the rope conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.7 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the rope may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the rope represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Product Identification: Each length of rope shall be identified at both ends by a suitable label showing not less than the applicable detail specification number, size designation, manufacturer's identification, lot number, and length.

5.2 Reeling: Ropes shall be supplied in continuous lengths, wound on reels with cores having an outside diameter not less than 24 times the rope diameter. Winding shall be uniform and shall provide for proper unreeling. The ends shall be secured. Each reel shall be identified in a suitable manner with the information of 5.1.

5.3 Packaging and Package Identification:

5.3.1 Reels of rope shall be packaged in suitable containers, or otherwise prepared for shipment in such a manner as to ensure that the rope, during shipment and storage, will not be distorted and will be protected against damage from exposure to weather or any other normal hazard.