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SUPERSEDING
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MILITARY SPECIFICATION

WIRE STRAND, NONFLEXIBLE, FOR AIRCRAFT APPLICATION

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

1. SCOPE

1.1 Scope. This specification covers the requirements for carbon steel and corrosion-resistant steel wire strand used in aircraft application other than over pulleys.

1.2 Classification. The wire strand covered by this specification shall be of the following types and composition:

Type I - Non-Flexible 1x7 class: Construction 1 - Right Lay
Construction 2 - Left Lay

Type II - Non-Flexible 1x19 class: Construction 1 - Right Lay
Construction 2 - Left Lay

Composition A: Carbon Steel, Zinc Coated
Composition B: Corrosion-Resistant Steel

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issues listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS), and supplement thereto, in effect on the date the qualifying activity authorizes the conduct of the qualification tests, form a part of this specification to the extent specified herein.

2.1.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENESS, Wright-Patterson AFB, OH 45433 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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SPECIFICATIONS

FEDERAL

QQ-S-781 Strapping, Steel, and Seals
 PPP-S-760 Strapping, Nonmetallic (and Connectors)

MILITARY

MIL-B-121 Barrier Material, Greaseproofed, Waterproofed, Flexible
 MIL-W-83420 Wire Rope, Flexible, for Aircraft Control

STANDARDS

MILITARY

MIL-STD-129 Marking for Shipment and Storage

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issues listed in the current DoDISS and the supplement thereto, if applicable.

American Society for Testing and Materials

ASTM A 90 Weight of Coating on Zinc Coated (Galvanized) Iron or Steel
 Articles, Test for
 ASTM B 246 Tinned Hard-Drawn and Medium-Hard-Drawn Copper Wire for
 Electrical Purposes, Specification for
 ASTM E 8 Tension Testing of Metallic Materials

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

Uniform Freight Classification Committee

Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606).

3. REQUIREMENTS

3.1 Qualification. Wire strand furnished under this specification shall be products that are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3.1, 6.2). Products must be qualified by a test facility located in the continental United States or Canada (see 4.1).

3.2 Materials and protective coating

3.2.1 Steel for composition A. Carbon steel shall be used for composition A wire strand and shall be of one type. The carbon steel shall be capable of meeting the requirements of this specification.

3.2.2 Steel for composition B. Corrosion resistant steel shall be used for composition B wire strand and shall be of one type. The steel shall conform to the following composition limits:

Carbon	0.15 Max.
Manganese	2.00 Max.
Silicon	1.00 Max.
Phosphorous	0.045 Max.
Sulfur	0.03 Max.
Chromium	17.0 to 20.0
Nickel	8.0 to 12.0

3.2.3 Protective coating. Composition A wires shall be thoroughly and uniformly coated by the methods specified in 3.2.3.1 and 3.2.3.2.

3.2.3.1 Zinc coating for composition A. Composition A wire shall be zinc coated by the hot-dipped or electroplated process and shall conform to the following:

<u>Wire diameter</u>	<u>Min. weight of zinc coating oz./sq.ft.</u>
0.005 to 0.010	0.03
Over 0.010 to 0.015 inch	0.05
Over 0.015 to 0.028 inch	0.10
Over 0.028 to 0.060 inch	0.20
Over 0.060 to 0.090 inch	0.30

3.2.3.2 Tin coating for composition A. Tin coating of composition A wires shall be of the hot-dipped or electroplated process and shall conform to the following:

<u>Wire diameter</u>	<u>Min. weight of tin coating oz/sq.ft.</u>
0.005 to 0.010 inch	0.003
Over 0.010 to 0.015 inch	0.005
Over 0.015 to 0.028 inch	0.010
Over 0.028 to 0.0625 inch	0.015
Over 0.0625 to 0.090 inch	0.030

3.2.4 Lubricant. The wire strand shall be coated with lubricant, to be applied so that each wire is coated. The lubricant shall have good lubrication properties at temperatures from -54°C (-65°F) to +121°C (+250°F). Lubricant breakout at the higher temperatures shall be minimal.

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3.3 Construction

3.3.1 Wire. The wire used in steel wire strand shall be cylindrical, smooth and of uniformly high quality. It shall be free from splits, cold shuts, and other defects.

3.3.1.1 Wire properties. Tensile strength of wire and wire sizes shall be such that the steel wire strand will be capable of meeting the requirements of this specification.

3.3.1.2 Preforming of wires. The individual wires composing each type of steel wire strand shall be shaped into the exact helical position they will have in the finished strand, so that if the strand is cut or severed, the measured diameter of the strand at the un-seized cut ends shall not increase by more than the amount specified in table I.

3.3.1.3 Splicing and joining. All wire splices shall be brazed or welded. In a type I, 1 x 7 wire strand, there shall be no more than 1 wire splice or joint in any 150-ft. section of a completed strand. In a type II 1 x 19 wire strand, joints and splices in individual wires shall be well spaced and not less than 20 feet apart (see 5.3.1f).

3.3.2 Strand lengths. The steel wire strand shall be furnished on reels in lengths specified by the procuring activity. There shall be no more than two pieces of wire strand on the reel. The shortest piece shall be not less than 20 percent of the reel length. The reel length shall be marked on the reel and package. In addition, when two pieces are supplied, both lengths shall be marked on the reel and package (see 5.3.1f).

3.3.3 Types of construction. Steel wire strand shall be either type I, 1 x 7 class, construction 1 or 2, or type II, 1 x 19 class, construction 1 or 2. The type of strand for the respective diameters, the dimensional tolerances, and the physical properties shall be as specified in table I.

3.3.3.1 Type I, 1 x 7 class, construction 1. Strand of this type, class and construction shall consist of a layer of 6 wires laid around a center wire in a right-hand direction. The length of lay shall be not more than 11 nor less than 9 times the respective nominal strand diameters.

3.3.3.2 Type I, 1 x 7 class, construction 2. Strand of this type, class, and construction shall consist of a layer of 6 wires laid around a center wire in a left-hand direction. The length of lay shall be not more than 11 nor less than 9 times the respective nominal strand diameters.

3.3.3.3 Type II, 1 x 19 class, construction 1. Strand of this type shall consist of a layer of 6 wires laid around a center wire in a left-hand direction and a layer of 12 wires laid over the 7-wire strand in a right-hand direction. The length of lay of the first operation 7-wire strand shall not exceed 60 percent of the lay of the second operation 12-wire outside layer. The length of lay of the second operation 12-wire outside layer shall not be more than 11 nor less than 9 times the respective nominal strand diameter.

TABLE I. Construction, physical properties; type I and II, composition A and B wire strand.

STRAND TYPE	NOMINAL DIAMETER OF WIRE STRAND In.	TOLERANCE ON DIAMETER (Plus Only) In.	ALLOWABLE INCREASE IN DIAMETER AT THE END In.	CON-STRUC-TION	MINIMUM BREAK STRENGTH COMP A & B Lbs.	APPROXIMATE WEIGHT PER 100 FT. (30.5 m) Lbs.
I	1/32	.003	.006	1x7	185	.25
I	3/64	.005	.008	1x7	375	.55
I	3/64	.005	.008	1x7	375	.55
II	3/64	.005	.008	1x19	375	.55
I	1/16	.006	.009	1x7	500	.85
II	1/16	.006	.009	1x19	500	.85
II	5/64	.008	.009	1x19	800	1.40
II	3/32	.009	.010	1x19	1200	2.00
II	7/64	.009	.010	1x19	1600	2.70
II	1/8	.013	.011	1x19	2100	3.50
II	5/32	.013	.016	1x19	3300	5.5
II	3/16	.013	.019	1x19	4700	7.7
II	7/32	.015	.020	1x19	6300	10.2
II	1/4	.018	.021	1x19	8200	13.5
II	5/16	.022	.024	1x19	12,500	21.0
II	3/8	.026	.027	1x19	17,500	30.0

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3.3.3.4 Type II, 1 x 19 class, construction 2. Strand of this type shall consist of a layer of 6 wires laid around a center wire in a right-hand direction and a layer of 12 wires laid over the 7-wire strand in a left-hand direction. The length of lay of the first operation 7-wire strand shall not exceed 50 percent of the lay of the second operation (outside) layer of 12 wires. The length of lay of the second operation 12-wire outside layer shall not be more than 11 nor less than 9 times the respective nominal strand diameter.

3.4 Performance

3.4.1 Breaking strength. When tested in accordance with 4.5.2, the steel wire strand shall have the minimum breaking strength as shown in table I.

3.4.2 Stretch limits. When tested in accordance with 4.5.3, the stretch in the steel wire strand shall not exceed 1 percent when it is loaded to 60 percent of the minimum breaking strength as shown in table I.

3.4.3 Adherence of coating. The tin or zinc coating shall not crack or flake when tested in accordance with 4.5.5.

3.4.4 Ductility of steel. Composition A or B wire shall not fracture when tested in accordance with 4.5.6.

3.4.5 Test load. Each wire strand shall carry 80 percent of its respective minimum strength load, as shown in table I, without any failures.

3.5 Identification of product

3.5.1 Identification by number. Each manufacturer shall assign a significant identification number on each manufacturing reel or steel wire strand. When the steel wire strand on the manufacturing reel is cut to specified lengths for transfer to the shipping reel, each shipping reel shall be marked with the identification number of the manufacturing reel, and a sequential transfer number.

3.5.2 Identification by color tracer filaments. Each manufacturer shall identify every wire strand made to this specification by the use of color tracer filaments manufactured into the wire strand. The specification preparing activity shall assign a combination of two or three colors to each manufacturer desiring qualification. The inclusion of color-tracer filaments does not assure that the steel wire strand is in full conformance, but only serves to identify the manufacturer.

3.6 Workmanship and finish. All details of workmanship and finish shall be in accordance with the best practice for high quality aircraft steel wire strand consistent with the requirements of this specification. The finished wire strand shall be uniform in construction and securely laid, free from kinks, loose or protruding wire or other defects (see 4.5.1.2).

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 order, the contractor may use his own or any other suitable facilities for the performance of the inspection requirements specified herein, unless disapproved by the Government. Due to the critical nature of this product and the urgent and ongoing requirement for quality control it is required that test facilities be located within the continental United States or Canada for ready accessibility to government personnel. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of inspection. The inspection and testing of the wire strand shall be classified as follows:

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

4.3 Qualification inspection

4.3.1 Qualification inspection samples. When conducting qualification tests specified herein, one sample lot for each size and construction wire strand listed in 4.3.1.1 shall be taken after any discard has been removed from the head or starting end of the first manufacturing reel for each lot of wire strand.

4.3.1.1 Sample sizes. Sizes of samples shall be as follows:

<u>Diameter</u>	<u>Construction</u>
1/32	1 x 7
3/64	1 x 7
3/32	1 x 19
1/8	1 x 19

4.3.1.2 Lot. A qualification inspection lot shall consist of 50 feet of wire strand of the same construction and diameter produced continuously by one machine or by one series of progressive processing machines.

4.3.2 Qualification testing. The qualification tests shall include all of the examinations and tests as specified in table II.

4.3.3 Qualification test report and certification. Upon request, the steel wire strand manufacturer shall furnish a certified qualification test report showing that the product conforms to this specification. The test report shall include actual results of the tests specified herein (see 6.2.2).

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TABLE II. Qualification tests and quality conformance tests and inspection.

TESTS	REQUIREMENT * PARA	QUALIFICATION PARA	QUALITY CONFORMANCE TEST PARA
Tin or zinc coating test, Comp. A	3.2.3.1 - 3.2.3.2	4.5.7	4.5.7
Preforming check	3.3.1.2	---	4.5.8
Breaking strength	3.4.1	4.5.2	4.5.2
Stretch test	3.4.2	4.5.3	4.5.3
Adherence of coating	3.4.3	4.5.5	4.5.5
Ductility of steel	3.4.4	4.5.6	4.5.6
Test loading	3.4.5	4.5.4 - 4.5.4.1	4.5.4 - 4.5.4.1
Identification of product	3.5 - 3.5.2	4.5.1.1	4.5.1.1

4.3.4 Retention of qualification. To retain qualification, the manufacturer shall forward certification at 2-year intervals to the qualifying activity stating that the company still has the capabilities and facilities necessary to produce the item and that the product has not been changed in any way. The qualifying activity shall establish the initial reporting date.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of individual tests (4.4.1) and sampling tests (4.4.3).

4.4.1 Individual tests. Each wire strand of each construction furnished under each government order or contract shall be subject to the following test as described under 4.5 (see table II).

Examination of product (4.5.1)

4.4.2 Sampling plan

4.4.2.1 Samples. When conducting the tests specified herein, with the exception of examination of product, one sample not less than 15 feet in length shall be taken after any discard has been removed from the head or starting end of the manufacturing reel for each lot of wire strand.

4.4.2.2 Lot. A lot shall consist of not more than 30,000 feet of wire strand of the same construction and diameter produced continuously by one machine or by one series of progressive processing machines.

4.4.2.3 Specimen. A specimen is a length of wire strand cut from a sample for the performance of a testing method. All specimens shall be taken from the lot furnished under that specific order.

4.4.3 Sampling tests. The quality conformance sampling tests shall be performed in accordance with the following paragraphs:

Breaking strength (4.5.2)

Stretch test (4.5.3)

Test loading (4.5.4, 4.5.4.1)

Adherence of coating (4.5.5)

Ductility of steel (4.5.6)

Weight of tin or zinc coating, composition A (4.5.7)

Conformance test to preforming of strand (4.5.8)

4.4.4 Rejection and retest. The failure of any specimen shall be cause for rejection of the lot. In the event of failure of one or more representative specimens, retest of additional random specimens from the same lot will be permitted. These retests shall be made at the manufacturer's expense and in the presence of a Government inspector. Retested specimens that meet all the requirements of this specification will be acceptable. If one of the retested specimens fail, the lot shall be rejected with no further retesting permitted, except for failure due to an unsatisfactory end termination, as specified in 4.5.1.

4.4.5 Test report and certification. For each government order or contract, the steel wire strand manufacturer shall certify that the product satisfactorily passed the quality conformance inspections (see 4.4.1 and 4.4.3) of this specification. The certification shall include, as a minimum, actual results of the tests specified herein (see 5.2.2).

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4.5 Test methods4.5.1 Examination of product

4.5.1.1 Identification. Each wire strand shall be inspected for proper identification as specified in 3.5.

4.5.1.2 Workmanship and finish. All steel wire strand shall be examined for workmanship and finish to determine compliance with 3.6. For this purpose, the wire strand shall travel no faster than 100 feet per minute and shall take place at the time the wire strand is wound on shipping reels. Any discard from the head or starting end of the manufacturing reel shall be removed prior to winding of the shipping reels. Protruding wires are considered a defect and none shall be allowed.

4.5.2 Breaking strength. The wire strand specimen shall be selected from the sample from each lot. The specimen may be gripped in the jaws of the testing machine or held in suitable swaged or socketed terminals. In case of failure in grips or terminal, the test may be disregarded and a new test conducted. The length of strand in the clear between grips or terminals shall be no less than 10 inches (25 cm) or 10 strand lay lengths, whichever is larger. The breaking strength shall be determined by use of a tensile testing machine in accordance with applicable requirements of ASTM E-8. The breaking strength shall conform to the requirements of table I for qualification and acceptance.

4.5.3 Stretch test. One specimen from each sample of wire strand selected as specified in 4.2.1 shall be tested to determine the percent stretch. The total length of the wire strand specimen to be tested shall not be less than 24 inches (60.9 cm). Where necessary, swaged terminals and accompanying hardware may be used to facilitate installation of the specimen in the jaws of the test machine. The amount of stretch shall be determined on a tension testing machine in accordance with ASTM E-8. The specimen shall be loaded to one percent minimum breaking strength shown in table I to straighten the wire strand. While the specimen is under tension, an adequate gauge length shall be marked on the wire strand between the end fittings of the testing specimen. The specimen shall then be loaded to 60 percent of minimum breaking strength and measured for elongation under load. From this data, the percent stretch can be read directly or calculated using the formula below:

$$\text{Percent strength} = (100) \frac{\text{elongation under load}}{\text{original length}}$$

Results of the stretch test shall not exceed 1 percent change in length.

4.5.4 Test loading. The following test loading shall be made using the same wire strand specimen used in the stretch test, or similarly prepared specimen. Load the specimen to one percent of breaking strength, then increase the loading to 85 percent of the minimum required breaking strength of the wire strand specimen test, the wire strand fittings shall be removed and the entire wire strand shall be completely unwound and every wire inspected. A suitable electronic device capable of detecting the breaking of individual wires during test loading may be used instead of unwinding the wire strand. The failure of any wire shall be cause for rejection (see 4.5.4.1 and 6.3.8).

4.5.4.1 Use of electronic device for test loading. The load shall be increased to 85 percent on the test specimen. If no ping is heard, the specimen has passed the test (see 6.3.8). If one or more pings are heard, the wire strand specimen shall be unraveled and the broken wires shall confirm failure of the specimen. If no wire breaks are found, the specimen has passed the test.

4.5.5 Adherence of coating. The tin or zinc coated wire shall be capable of being wrapped at rate not exceeding fifteen turns per minute in close helix of at least two turns around a cylindrical mandrel equal to two times the nominal diameter of the wire under tests without cracking or flaking the tin or zinc coating to such an extent that any tin or zinc can be removed by rubbing with the bare finger.

NOTE: Loosening or detachment during the adhesion test of superficial, small particles of zinc formed by mechanical polishing of the surface of zinc-coated wire shall not be cause for rejection.

4.5.6 Ductility of steel. The wire shall be wrapped in a way which does not cause indenting. The wire shall be wrapped around a cylindrical mandrel for two complete turns in a close helix at a rate not exceeding fifteen turns per minute. The cylindrical mandrel diameter shall be equal to the nominal wire diameter being tested for composition B and two times the nominal diameter being tested for composition A.

4.5.7 Weight of tin or zinc coating, composition A. Three specimens not less than 12 inches long shall be cut from the wire before or after the wire strand is fabricated. These specimens shall be cut from each size of wire to be used in making each lot of wire strand. The weight of zinc coating on the specimens shall be determined in accordance with ASTM A 90. The weight of tin coating of the specimens shall be determined in accordance with ASTM B 246 (for the stripping solution) and ASTM A 90 (for the method of weighing).

4.5.8 Conformance test to preforming of strand. To test strand for conformity to values shown in table I for increase in diameter, strand shall be cut with a cutter having constricting jaws. A plain shear with straight blades distorts the product and may void the test. After cutting, one of the following methods of measurements shall be used:

- a. Pass the strand through a hole drilled to a diameter shown in table I under "Allowable increase in diameter at cut end".
- b. A shadowgraph with a suitable magnification.

4.6 Examination of preparation for delivery. The preservation, packaging, packing and marking shall be examined for conformance to section 5.

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5. PACKAGING

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. Wire strand of one type, size and composition shall be wound on reels constructed to the dimensions specified in table III, as applicable. Reels shall be fabricated in a manner similar to those shown in figure 1. Before starting to wind strand on the reel, barrier material conforming to type I, grade A, class 1 or 2 of MIL-B-121 shall be applied to the drum of the reel and the inside of its heads against which the strand will rest. After the strand is wound on the reel and secured, a layer of the same material shall be applied over the wire strand the full width of the drum and overlap itself not less than 8 inches. The barrier material may be secured by taping, or if no further packing is specified, the barrier material shall be secured by the use of straps and wooden buffer strips as shown in figure 1D. When the distance between heads is 7 inches, two straps shall be used. Metallic strapping shall conform to QQ-S-781. Non-metallic strapping shall conform to PPP-S-760. Wire strand reels weighing in excess of 100 pounds shall be packaged as noted above. At the contractor's option, wire strand reels weighing 100 pounds or less may be packaged by winding on metal or fiber-board reels and covered with a layer of barrier paper secured by tape and packed per instructions in section 5.2.1. Otherwise, if no further packing is used, then complete barrier material protection shall be applied.

5.1.2 Level C. Each wire strand wound on a reel as specified in table III shall be preserved and packaged to afford adequate protection against corrosion, deterioration, and physical damage during shipment from supply source to the first receiving activity. This level may conform to the supplier's commercial practice when it meets the requirements of this level.

5.2 Packing. Packing shall be level A or C as specified.

5.2.1 Level A. Wire strand preserved and packaged in accordance with 5.1 shall be lagged with a layer of lumber in such a manner that the barrier material is not exposed to forces which may cause mechanical damage as shown in Figure 1C. At the contractor's option, reels weighing 150 pounds or less and having a distance between the heads of 7 inches or less may be covered with flexible plywood lagging as shown in figure 1A. All lagging, except wirebound wood lagging, shall be secured by two metallic straps conforming to QQ-S-781. Wire strand reels weighing 100 pounds or less, packaged on metal or fiber-board reels as per 5.1.1, shall be packed in an unsealed water-proof (plastic) bag and a suitable box or carton as shown in figure 1B.

5.2.2 Level B. Level B packing shall be the same as that specified in 5.2.1.

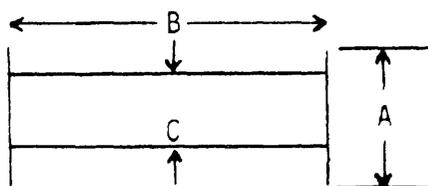
5.2.3 Level C. Packages that require overpacking for acceptance by the carrier, shall be placed in exterior shipping containers in a manner that will insure safe transportation at the lowest rate to the point of delivery. Containers shall comply with Uniform Freight Classification Rules or regulations of other carriers as applicable to the mode of transportation.

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TABLE III. Diameter of reels for wire strand.

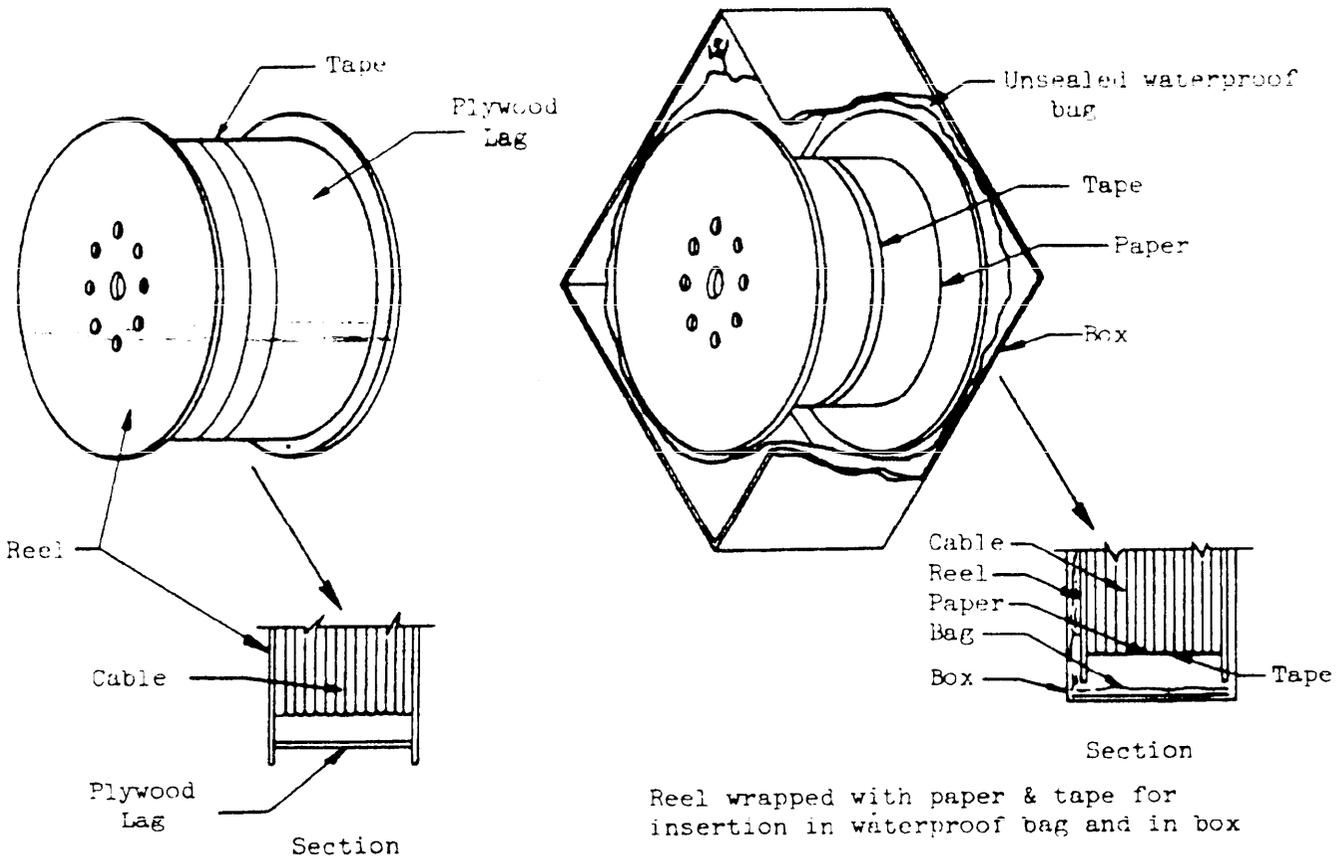
Diameter of cable (in.)	1,000 ft.				3,000 ft.			
	Diameter of head (in.)	Traverse or Distance between heads (in.)	Diameter of drum (in.)	Diameter of arbor hole (in.)	Diameter of head (in.)	Traverse or Distance between heads (in.)	Diameter of drum (in.)	Diameter of arbor hole (in.)
1/32	12	4	8	1-1/8	12	4	8	1-1/8
3/64	12	4	8	1-1/8	12	4	8	1-1/8
1/16	12	4	8	1-1/8	12	4	8	1-1/8
5/64	12	4	8	1-1/8	16	4	10	1-1/8
3/32	12	4	8	1-1/8	16	4	10	1-1/8
7/64	16	4	10	1-1/8	16	7	12	1-1/8
1/8	16	4	10	1-1/8	16	7	12	1-1/8
5/32	16	7	12	1-1/8	16	10	8	1-1/8
3/16	18	7	12	2-1/8	18	10	8	2-1/8
7/32	18	7	12	2-1/8	18	10	8	2-1/8
1/4	18	10	10	2-1/8	24	10	10	2-1/8
5/16	18	10	10	2-1/8	24	10	10	2-1/8

Diameter of cable (in.)	5,000 ft.				10,000 ft.			
	Diameter of head (in.)	Traverse or Distance between heads (in.)	Diameter of drum (in.)	Diameter of arbor hole (in.)	Diameter of head (in.)	Traverse or Distance between heads (in.)	Diameter of drum (in.)	Diameter of arbor hole (in.)
1/32	12	4	8	1-1/8	16	4	10	1-1/8
3/64	12	4	8	1-1/8	16	4	10	1-1/8
1/16	16	4	10	1-1/8	16	7	12	1-1/8
5/64	16	7	12	1-1/8	16	10	8	1-1/8
3/32	16	7	12	1-1/8	16	10	8	1-1/8
7/64	16	10	8	1-1/8	18	10	8	1-1/8
1/8	16	10	8	1-1/8	24	10	10	1-1/8
5/32	24	10	10	1-1/8	24	16	10	2-1/8
3/16	24	10	10	2-1/8	24	16	10	2-1/8
7/32	24	10	10	2-1/8	32	20	16	3-1/8
1/4	32	18	16	2-1/8	36	22	18	3-1/8
5/16	32	18	16	2-1/8	36	22	18	3-1/8



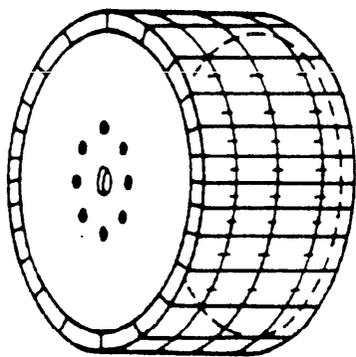
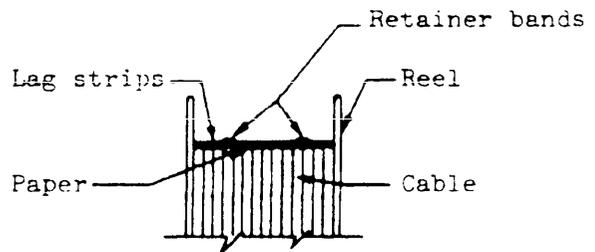
A = Dia head
 B = Traverse
 C = Dia drum

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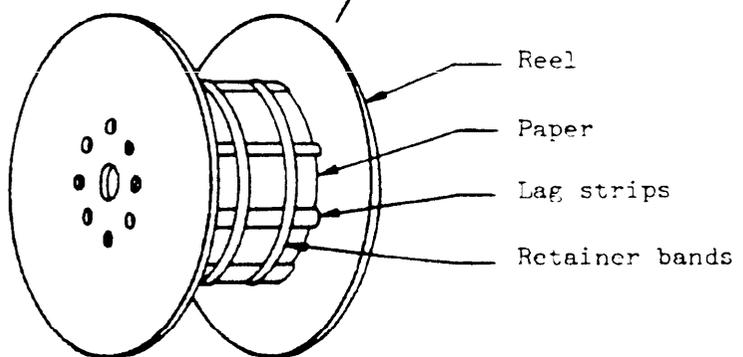


Reel wrapped with paper & tape for insertion in waterproof bag and in box

Reel enclosed with flexible plywood lagging.
 NOTE: The plywood lagging may optionally cover the outer edge of the reel.



Reel enclosed with outside wirebound wood lagging.



Reel wrapped with paper secured with spaced lagging strips held with retainer bands.

FIGURE 1. Illustrations of acceptable packaging methods.

5.3 Marking for shipment

3.1 Marking of reels and shipping containers. Each shipping reel and shipping container shall be marked in accordance with the requirements of MIL-STD-129. The following information shall be included.

a. Stock No. or identification as specified in the contract (see 6.5).

NOTE: The contractor shall enter the NSN (National Stock Number) specified in the contract or as furnished by the procuring activity. Space shall be left for the NSN when not available.

b. Nominal diameter, type, class, construction, composition, and specification number (example: MIL-W-XXXXX).

c. Name of wire strand manufacturer.

d. Name of contractor.

e. Contract order number.

f. Length of wire strand on the reel. For reels of two lengths, indicate both lengths.

6. NOTES

6.1 Intended use. The wire strand covered by this specification is intended for use in aircraft where the greater strength is desired and the flexibility of wire rope conforming to specification MIL-W-83420 is not required.

6.2 Ordering data

6.2.1 Acquisition documents. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Type, class, construction, composition, nominal diameter, and length of wire strand to be furnished.

c. Selection of applicable levels of packaging and packing required (see section 5).

6.2.2 Data requirements. The acquisition documents for wire rope conforming to this specification shall incorporate a DD Form 1423, Contract Data Requirements List (CDRL) listing the data requirements identified below, developed as specified by the Data Item Description (DD Form 1664), and delivered in accordance with the approved CDRL incorporated into the contract.

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When the provisions of DAR 7-104.9(n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs:

<u>Paragraph No.</u>	<u>Data Requirements</u>	<u>Applicable DIF No.</u>
4.5.1.1, 4.5.1.2, 4.5.3 4.5.4, 4.5.4.1, 4.5.5, 4.5.6, 4.5.7, and 4.5.8	Acceptance test reports	II-T-3721A
4.3.3, 4.5	Certificate of compliance	DI-L-2121

(Copies of DID's required by contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.3 Definitions

6.3.1 Wire. Each individual cylindrical element is designated as a wire.

6.3.2 Strand. Each group of wires helically twisted is designated as a strand.

6.3.3 Diameter. The diameter of wire strand is the diameter of the circumscribing circle, or the distance across opposite wires.

6.3.4 Lay (or twist). The helical form taken by the wires in the strand and by the strand in the wire rope is characterized as the lay (or twist) of the strands or wire rope, respectively. In a right-hand lay, the wires of the strand are the same direction as the thread on a right-hand screw, and for a left-hand lay the strands or wires lay in opposite direction.

6.3.5 Length of lay (or pitch). The distance parallel to the axis of the strand, in which a wire makes one complete turn about the axis, is designated as the length of lay (or pitch) of the strand.

6.3.6 Center wire. The center of all strand is an individual wire and is designated as a center wire.

6.3.7 Master reel. The master reel is the large manufacturing reel that is used to hold the wire strand as it is continuously manufactured. The shipping reels are cut from the master reel as needed.

6.3.8 Ping. Ping is an audible sound given off as a result of an individual wire breaking in the wire strand. The sound is amplified and fed into a speaker system to a level distinctly detectable by the human ear.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of contractors is called to this requirement, and manufacturers are urged to arrange to have products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Aeronautical Systems Division (Attn: ENES), Wright-Patterson Air Force Base, Ohio 45433, and information pertaining to qualification of products may be obtained from that activity.

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Custodians:

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Navy - AS

Air Force - 11

Preparing activity:

Air Force - 11

Project No. 4010-0112

Review activity:

Air Force - 99

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