

MIL-W-17211B(SHIPS)
 28 July 1965
 SUPERSEDING
 MIL-W-17211A(SHIPS)
 7 June 1957
 (See 6.2)

MILITARY SPECIFICATION

WIRE, ELECTRICAL, RADIO ANTENNA, 7/12, 7/14, 7/16,
 7/18, 7/20, 7/22

1. SCOPE

1.1 This specification covers stranded insulated antenna wires designed specifically for use in the construction of radio antennas.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

- QQ-B-750 - Bronze, Phosphor; Bar, Plate, Rod, Sheet, Strip, Flat Wire, and Structural and Special Shaped Sections.
- QQ-C-591 - Copper-Silicon, Copper-Zinc-Silicon, and Copper-Nickel-Silicon Alloys; Rod, Wire, Shapes, Forgings, and Flat Products, (Flat Wire, Strip, Sheet, Bar, and Plate).
- QQ-W-343 - Wire, Electrical and Nonelectrical, Copper, (Uninsulated).

MILITARY

- MIL-I-631 - Insulation, Electrical, Synthetic Resin Composition, Nonrigid.
- MIL-C-45662 - Calibration of Standards.

(Copies of specifications, standards, drawings, and publications required by suppliers connection with specific procurement functions should be obtained from the procuring activities or as directed by the contracting officer.)

2.2 Other publications. - The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

ASSOCIATION OF AMERICAN RAILROADS RULES AND REGULATIONS

(Application for copies should be addressed to the Association of American Railroads, 59 E. Van Buren St., Chicago, Ill.)

3. REQUIREMENTS

3.1 Materials. - Materials shall conform to applicable specifications specified hereinafter. Materials which are not covered by specifications or which are not specifically described herein shall be of the best quality and suitable for the purpose intended.

3.1.1 The conductor material shall be phosphor bronze or silicon bronze alloy; alloy 651 of QQ-C-591. or Composition A of QQ-B-750.

3.2 Conductor sizes. - The conductor shall consist of seven strands, stranded concentrically with a left-hand lay and meeting all the requirements specified herein. Each wire size shall be in accordance with Table I, as specified (see 6.1).

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Table I - Conductor construction and strand diameter.

Wire size	Number of strands	Individual strands		Pounds per 1000 feet (finished) (nominal)
		AWG size	(Diameter) (nominal)	
			(inch)	
7/12	7	12	0.08081	139
7/14	7	14	.06408	87
7/16	7	16	.05082	55
7/18	7	18	.04030	35
7/20	7	20	.03196	22
7/22	7	22	.02535	13.5

3.2.1 Strands - The strands shall not vary from the nominal diameter by more than the amounts shown in table II.

Table II - Dimensions of strands.

Diameter of strand Inch	Permissible variation in diameter	
	Plus	Minus
0.012 to 0.031	3 percent	1 percent
0.031 to 0.080	0.0015 inch	0.0015 inch

3.2.1.1 Lay - The length of the lay of the strands shall be not less than 12 nor more than 16 times the diameter of the layer.

3.2.2 Surface - Each strand shall be cylindrical in form, free from scale, flaws, splits, and all imperfections not consistent with the best commercial practice.

3.2.3 Brazes - All brazes in the strands shall be made in the hot rolled rod and drawn to size with the wire. Such brazes shall develop at least 95 percent of the strength of the rest of the wire.

3.3 Conductor insulation - The insulation material shall be polyvinyl chloride which shall contain a minimum of 1 percent of carbon black for ultra violet light screening, and which shall be in accordance with type F, grade B of MIL-I-631. The conductor shall be tightly covered with the insulation to the diameters specified in table III.

Table III - Diameter over insulation.

Wire size	Minimum diameter	Maximum diameter
	(inch)	(inch)
7/12	0.322	0.332
7/14	.272	.282
7/16	.232	.242
7/18	.200	.210
7/20	.166	.176
7/22	.146	.156

3.4 Length (brazed) - The finished strand shall be in minimum lengths of 500 feet. In cabling, care should be taken to stagger hard brazes and space them not less than 50 feet apart.

3.5 Breaking strength and elongation - The finished wire shall show a breaking strength and elongation not less than that specified in table IV, when tested as specified in 4.5.3.

Table IV - Breaking strength and elongation.

Wire size	Breaking strength (min.)	Elongation for a 60 inch length
	(Pounds)	(Percent)
7/12	3675	0.85
7/14	2200	.85
7/16	1600	.85
7/18	1050	.85
7/20	650	.85
7/22	420	.85

3.6 Cold bend. - The insulated wire shall satisfactorily meet the cold bend test of 4.5.4.

3.7 Resistance. - The maximum direct current resistance of the wire shall not exceed 100 OHMS per MIL-foot at 20°C. (68°F.).

3.8 Workmanship. - The workmanship shall be such that the finished product will meet all requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. 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 examination and testing of cables covered by this specification shall be classified as follows:

a. Quality conformance inspection.

- (1) Group A examination and test.
- (2) Group C tests.

4.2.1 Certification of compliance. - Certification of compliance for the basic material may be obtained from the supplier of the material provided that such certification contains actual information to verify tests, examination, or other verifiable quality data.

4.2.2 Test equipment and inspection facilities. - Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of the inspection shall comply with the requirements of MIL-C-45662.

4.3 Sampling. -

4.3.1 Inspection lot. - All cable of the same type number offered for delivery at one time, shall be considered a lot for purposes of sampling and inspection.

4.3.1.1 Unit of product. - The unit of product shall be considered as cable having the same wire size or description and length or lengths which have a total length of approximately 500 feet.

4.3.1.2 Sample. - The sample shall consist of that number of units required by the sampling plan for the lot size determined in 4.3.1.

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4.3.2 Sampling for Group A inspection. - Samples for group A inspection shall be selected in accordance with table V.

Table V - Sampling for group A inspection.

Lot size (Unit of product)	Sample	Acceptance number	Rejection number
1 to 13	All	--	-
14 to 25	13	0	1
26 to 62	20	1	2
63 to 160	32	1	2
161 to 410	50	2	3

4.3.3 Sampling for group C inspection. - The sampling procedure for Group C inspection shall be in accordance with table VI. In the event of a failure, the lot shall be rejected.

Table VI - Sampling for group C inspection.

Lot size (Unit of product)	Sample
Up to 25	3
26 to 62	5
63 to 160	8
161 to 410	13

4.3.4 Action in case of failure. - Any unit found to deviate from requirements specified herein shall be rejected, and if the number of defective units in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.3.5 Rejected lots - If an inspection lot is rejected, the supplier may replace it with a new lot, rework it to correct the defects, or screen out the defective units, and again inspect it. Reinspected lots shall be kept separate from new lots and shall be clearly identified as reinspected lots.

4.4 Quality conformance inspection. -

4.4.1 Group A inspection. - The group A inspection shall consist of the tests shown in table VII.

Table VII - Group A inspection.

Examination and test	Requirement paragraph	Test paragraph
Visual and dimensional examination	3.1 to 3.4	4.5.1
Resistance	3.7	4.5.2

4.4.2 Group C inspection. - The group C inspection shall consist of the tests shown in table VIII.

Table VIII - Group C inspection.

Tests	Requirement paragraph	Test paragraph
Breaking strength	3.5	4.5.3
Elongation	3.5	4.5.3
Cold bend	3.6	4.5.4

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4.5 Test Procedures. -

4.5.1 Visual and dimensional examination. - A 2-foot length of cable cut from each end of the sample shall be examined to verify that the number of conductors (strands), dimensions, insulation material and conductor material are in accordance with the applicable requirements. The cable shall be examined for jacket imperfections on all of the surface which is visible without unwinding the cable.

4.5.2 Conductor resistance. - The resistivity of the conductor continuity shall be measured to determine conformance with 3.7.

4.5.3 Breaking strength and elongation. - A test specimen of finished wire (with or without brazes) not less than 6 inches in length with bench marks 2 inches apart shall be placed in a testing machine and stretched until the specimen breaks. A scale shall be used to measure the elongation at instant of rupture. The break shall be between the bench marks, and the breaking strength calculated from the area of the original sample.

4.5.4 Cold bend. - After conditioning at minus 30°C. for 20 hours, the insulated wire shall be immediately wrapped around a mandrel five times the diameter of the insulated wire. There shall not be any evidence of flaws or cracks in the wire insulation.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early cable installation. -

5.1.1 Packaging. - The cable shall be shipped on reels, or coils. The diameter of the drum shall be large enough to prevent damage to the cable from reeling or unreeling. The spools or reels shall be substantial and so constructed as to prevent damage to the cable during shipment and handling. The ends of the cables shall be sealed with waterproof pressure-sensitive tape applied over the ends and back from the ends approximately 4 inches.

5.1.2 Packing. - Packing of spools or reels shall be accomplished in a manner which will insure acceptance by common carrier and will afford protection against physical and mechanical damage during direct shipment from the supply source to the using activity for early installation. The method of packing or loading shall conform to the Association of American Railroads Rules and Regulations or other carrier regulations as applicable to the mode of transportation.

5.1.3 Marking. - Shipment marking information shall be provided on both flanges of each reel in accordance with the contractor's commercial practice. The information shall include the following:

- (a) Cable description (Indicate type number) (whether shielded and so forth)
- (b) Federal stock number.
- (c) Number and size of conductors.
- (d) Quantity. (Footage of all lengths)
- (e) Contract or order number.
- (f) Contractor's name or manufacturer's code (see HDBK H4-1 & 2).
- (g) Year of manufacture.

Where paper labels are used containing the shipment marking information, labels, shall be protected by transparent compound to prevent deterioration of the markings.

5.2 Domestic shipment and storage or overseas shipment. - The requirements and levels of preservation and packaging, packing, and marking for shipment shall be specified by the procuring activity (see 6.1).

(5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment which may be required when procurement is made:

5.2.1.1 Preservation, packaging, and packing. - Preservation and packaging shall be level A or C and the packing shall be level A, B, or C in accordance with MIL-C-12000. The diameter of spool or reel core shall be not less than 20 times the diameter of the cable. Cables shall be furnished on

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returnable or non-returnable reels. The number of cable lengths shall be kept to a minimum consistent with good manufacturing practice. Not less than 80 percent of the total footage shall be in standard lengths of approximately 500 feet and 20 percent may be in lengths of not less than 100 feet. Unless otherwise specified, the reels or spools shall contain approximately 500 feet of cable. Lengths of cable which are less than the standard length (500 feet) may be shipped on reels or spools provided both ends of each piece are brought out in order that the cable may be readily tested without unreeling. All cable lengths shall be marked (tagged) with its specific length.

5.2.1.2 Marking. - In addition to any special marking required by the contract or order, marking shall be in accordance with MIL-STD-129 and both flanges of each reel shall be marked with the following information:

- (a) Cable Description type number.
- (b) Federal stock number.
- (c) Reel number.
- (d) Number of conductors in cable.
- (e) Lengths in feet.
- (f) Contract or order number.
- (g) Contractor's name or manufacturers code (See Handbook H4-1 & 2).
- (h) Gross weight.
- (i) Year of manufacture.

5.2.1.3 Where practicable, corrosion-resistant metal tags, stencils, or paper labels containing the information specified in 5.2.1. shall be securely attached to the reels or spools. Where paper labels are used, they shall be securely attached and protected by a transparent compound to prevent deterioration of the markings.)

6. NOTES

6.1 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Conductor sizes (see table I)
- (c) Preservation and packaging, packing, and marking requirements if other than specified in 5.1 (see 5.2).

6.2 CHANGES FROM PREVIOUS ISSUE. - THE EXTENT OF CHANGES (DELETIONS, ADDITIONS, ETC.) PRECLUDE THE ANNOTATION OF THE INDIVIDUAL CHANGES FROM THE PREVIOUS ISSUE OF THIS DOCUMENT.

Preparing activity:
 . Navy-Sh
 (Project 6145-N162 Sh)

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

ORGANIZATION (Of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES☐ NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE