SAE Aerospace
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# AEROSPACE STANDARD

SAE AS6370 | REV. A

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Superseding AS6370

## Wire, Electrical, Insulated, Antenna

FSC 6145

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature. Design authorities may determine that this document is no longer to be used for new design. This determination should be made by each design authority.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AE8-D Wire and Cable Committee, and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.





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NOTICE

This document has been taken directly from U.S. Military Specification MIL-W-6370C, Amendment 2 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-W-6370C, Amendment 2. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

1. SCOPE:

1.1 Scope:

This specification covers insulated wire for use in external aircraft antennas.

1.2 Classification:

The insulated wire shall be of three types determined by differences in conductor material, as specified (see 6.2):

Type I - Copper-covered steel, Part No. 6370-1.
Type II[1] - Copper-covered steel, Part No. 6370-2.
Type III - Beryllium copper, Part No. 6370-3.

2. APPLICABLE DOCUMENTS:

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

SPECIFICATIONS

FEDERAL

| | |
|---|---|
| L-P-390 | Plastic, Molding Material, Polyethylene, Low and Medium Density |
| NN-P-515 | Plywood, Container Grade |
| UU-P-271 | Paper, Wrapping, Waterproofed Kraft |
| PPP-F-320 | Fiberboard; Sheet, Stock and Cut Shapes |
| QQ-W-345 | Wire, Electrical, Steel, Copper-Covered |

STANDARDS

FEDERAL

| | |
|---|---|
| FED-STD-141 | Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling and Testing |

MILITARY

| | |
|---|---|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-109 | Inspection Terms and Definitions |
| MIL-STD-129 | Marking for Shipment and Storage |



1. Type II wire is cancelled for all new and existing designs and future procurements. Existing stocks of Type II wire may be used until exhausted. For future design, replacement, and procurement, Type I - Copper-covered steel Part No. 6370-1 shall be specified to replace the cancelled Type II.

2.1 (Continued):

(Copies of applicable documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity 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 shall apply.

ASTM D1868 61T Method for Corona Measurement (Tentative)

(Application for copies of the standard should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.)

3. REQUIREMENTS:

3.1 Preproduction:

The antenna wire furnished under this specification shall be a product which has been tested and has passed the preproduction tests specified herein.

3.2 Materials:

Materials shall conform to applicable specifications and shall be as specified herein.

3.3 Construction:

The antenna wire shall consist of beryllium copper or copper-covered steel tightly covered with a polyethylene insulator.

3.4 Physical properties:

3.4.1 Conductor: The conductor for Type I wire shall consist of extra-high-strength, hard drawn, 40-percent conductivity, copper covered steel wire. The conductor for Type II[1] wire shall consist of high-strength, hard-drawn, 40-percent conductivity, copper covered steel wire conforming to Specification QQ-W-345. The conductor for Type III wire shall consist of 40-percent conductivity beryllium-copper wire. The copper covering of the copper covered steel wire shall be continuous, uniform, and continuously electroplated or welded to the steel core. Each length of conductor shall be continuous, shall be free of joints, and shall be free from lumps, kinks, splints, abrasions, scraped or corroded surfaces, and surface impurities.

3.4.1.1 Conductor diameter: The conductor shall have a diameter of 0.0508 ± 0.0010 inch (AWG No. 16).

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3.4.1.2 Breaking strength: The breaking force or load for each type of conductor shall be as follows:

Type I - 400 pounds minimum.
Type II[1] - 250 pounds minimum.
Type III - 250 pounds minimum.

3.4.1.3 Elongation: The elongation in 10 inches for each type of conductor shall not exceed that amount specified below:

Type I - 2 percent
Type II[1] - 5 percent
Type III - 5 percent

3.4.2 Dielectric covering: The conductor shall be tightly covered with high molecular weight virgin polyethylene dielectric applied tightly and concentrically to the conductor so that it shall be substantially free from voids to the extent of complying with all the requirements specified herein.

3.4.2.1 Dielectric material: The dielectric shall conform to Specification L-P-390 except that a dark brown pigment and an antioxidant (for stabilizing in sunlight) shall be added. The dissipation factor shall be not more than 0.0010.

3.4.2.2 Dielectric diameter: The outside diameter of the finished antenna wire shall be 0.183 ± 0.004 inch.

3.4.3 Electricity: Unless otherwise specified, the conductor shall not be off center more than 0.010 inch.

3.5 Electrical resistance:

The d-c resistance of the conductor of each type wire shall not exceed 11.1 ohms per 1,000 feet at 20° C.

3.6 Performance:

3.6.1 High voltage: The completed wire shall withstand the application of a 25,000 volts d.c. potential, or a 60 cycle a.c. potential of 8000 volts rms, between the conductor and the outer surface of the dielectric material for 1 minute without puncturing both before and after 144 hours of accelerated weathering.

3.6.2 Corona extinction voltage: The minimum voltage at which corona exists shall be 7,000 volts rms at 60 cps both before and after 144 hours of accelerated weathering, and also before and after the temperature cycling test.



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3.6.3 Insulation shrinkage: The dielectric covering shall be applied in such a way that subjection to a temperature cycle consisting of a 30-minute exposure at +55° C followed by a 30-minute exposure at -55° C, and to accelerated weathering, shall not result in the exposure of more than 0.20 inch of conductor at either end of a 10-foot length of finished wire.

3.7 Identification of product:

Each length of antenna wire shall be permanently marked at approximately 10-foot intervals with the name or symbol of the manufacturer and the part number (see 3.7.1).

3.7.1 Wire designation: All wire shall be designated with the appropriate part number as follows:

Type I - Part No. 6370-1
Type II[1] - Part No. 6370-2
Type III - Part No. 6370-3

3.8 Workmanship:

The antenna wire shall be manufactured in accordance with the best electrical manufacturing practice.

4. QUALITY ASSURANCE PROVISIONS:

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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 shall be classified as follows:

(a) Preproduction inspection (does not include preparation for delivery). Preproduction inspection shall be performed after the award of contract on wire representative of the production item, to determine that the item meets all the requirements of this specification.

(b) Acceptance inspection

(1) Inspection of product for acceptance (see 4.4).
(2) Inspection of preparation for delivery (see 4.7).

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4.3 Preproduction inspection:

4.3.1 Sampling procedures: Preproduction inspection samples shall consist of 250 feet of wire. Samples shall be identified as required. The wire shall be inspected at a testing laboratory approved by the procuring activity, or at the contractor's plant under surveillance of the procuring activity. (See 6.3.)

4.3.2 Inspection: The Preproduction inspection of the wire shall consist of all the tests of this specification as described under 4.6, "Test Methods", and may, at the option of the procuring activity, be supplemented by tests under actual service conditions compatible with the requirements specified herein.

4.4 Inspection of product for acceptance:

Inspection of product for acceptance shall consist of groups A, B, and C inspection. These tests shall be performed before packaging.

4.4.1 Inspection lot: For groups A and B inspection, an inspection lot shall be the sum of the number of individual pieces contained in the reels submitted for Government acceptance (see 5.1.1).

4.4.2 Resubmitted Lots: Resubmittal of rejected lots shall be in accordance with MIL-STD-105.

4.4.3 Group A inspection: Group A inspection shall consist of the examination and tests specified in table I. Statistical sampling and inspection shall be in accordance with the ordinary inspection procedure of Standard MIL-STD-105.

TABLE I. GROUP A Inspection

| Inspection | Requirement paragraph | Inspection paragraph | AQL |
|---|---|---|---|
| Examination of product | 3.2, 3.3, 3.4.1, 3.4.1.1, 3.4.2, 3.4.2.1, 3.4.2.2, 3.4.3, 3.7 & 3.8 | 4.6.1 | 2.5 percent |
| High voltage | 3.6.1 | 4.6.2 | 1.0 percent |



4.4.4 Group B inspection: Group B inspection shall consist of the Electrical resistance test as specified in 4.6.4 and shall meet the requirements of 3.5.

4.4.4.1 Sampling and AQL for group B inspection: The inspection level for group B inspections shall be S-4 and the acceptable quality level (AQL) shall be 6.5 percent defective.

4.4.4.2 Disposition of sample units: Sample units which have passed the Group B inspection shall be delivered on the contract or order, if the lot is accepted.

4.4.5 Group C inspection: Group C inspection shall consist of the tests specified in Table II.

TABLE II. Group C inspection

| Inspection | Requirement paragraph | Inspection paragraph |
|---|---|---|
| Breaking strength and elongation | 3.4.1.2, 3.4.1.3 | 4.6.3 |
| Corona extinction voltage | 3.6.2 | 4.6.5 |
| Accelerated weathering | 3.6.3 | 4.6.6 |
| Temperature cycling | 3.6.3 | 4.6.7 |

4.4.5.1 Sampling for group C inspection: A 10-foot sample shall be selected at random from each 10,000 feet in the lot or fraction thereof on the order and subjected to the tests specified in 4.4.5. These tests shall be in addition to the group A and group B inspection. If this sample fails to meet any of the requirements other than the corona extinction voltage, two additional samples shall be chosen from the lot and tested. If either of these samples fails, or if the original 10-foot sample fails the corona extinction voltage test, each length of finished wire of the lot shall be sampled and tested as the basis for acceptance or rejection.

4.5 Definitions:

Standard MIL-STD-109 applies for definitions of inspection terms used herein.

4.6 Test methods:

4.6.1 Examination of product: Each sample piece of antenna wire shall be examined to determine conformance with this specification with respect to material and workmanship. Sufficient spot checks shall be made to assure conformance with the diameter tolerance, minimum insulation wall thickness, and eccentricity requirements of this specification.

4.6.2 High voltage: Each sample length of wire shall be subjected to a 25,000-volt DC, or an 8000-volt r.m.s. at commercial power frequency, potential between the conductor and the outer surface of the dielectric for a period of not less than 1 minute. This test may be conducted with the wire in a conducting bath or close-fitting conductor which serves as one electrode of the high-voltage circuit.

4.6.3 Breaking strength and elongation: Three full cross-section specimens shall be marked with a 10-inch-gage length and tested for compliance with the breaking strength and elongation requirements of this specification. The testing machine shall be sensitive to a variation of 0.4 percent of any recorded load and shall be calibrated when required by the Inspector. The speed of the testing machine shall be such that the load is accurately indicated at all times. Specimens breaking outside of the gage marks shall be disregarded and additional specimens tested.