

INCH-POUND

MIL-DTL-12995E  
01 November 2012  
SUPERSEDING  
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27 February 2007

## DETAIL SPECIFICATION

WIRE, ELECTRICAL, ANTENNA (WIRE, W-120)

Inactive for new design after 16 June 1997.

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

### 1. SCOPE

1.1 Scope. This specification covers one type of stranded, round electrical wire fabricated from silicon bronze, suitable for antenna applications. The classification of wire covered by this specification is type W-120 (see 3.3.1).

### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

#### NCSL INTERNATIONAL

NCSL-Z540.3 - Requirements for the Calibration of Measuring and Test  
Equipment

(Copies of this document are available from <http://www.ncsli.org> or from NCSL International, 2995  
Wilderness Place, Suite 107, Boulder, CO 80301.)

2.3 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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime Columbus, ATTN: VAI, P.O. Box 3990, Columbus, Ohio 43218-3990, or email to [WireCable@dla.mil](mailto:WireCable@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

### 3. REQUIREMENTS

3.1 Material. The material for the wire shall be as specified herein. The best material commercially available for the intended purpose shall be used when a definite material is not designated.

3.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements and promotes economically advantageous life cycle costs.

#### 3.3 Design and construction.

3.3.1 Wire W-120. Wire W-120 consists of 42 strands of 32 AWG silicon bronze wire, twisted in six groups of seven strands each and then twisted around a 3-ply or 5-ply cotton thread core forming one complete cylindrical conductor.

3.3.1.1 Strands. Each strand of silicon bronze alloy wire shall have a diameter of  $.008 \pm .001$  inch ( $.20 \pm .03$  mm) (32 AWG).

3.3.2 Joints in conductors. Joints in conductors shall be avoided and in no case shall the joints exceed two joints per strand per length of wire, with joints spaced not less than 3 feet apart. All joints shall be butt-brazed fused with silver alloy solder and a non-acid flux. The brazed joint shall be finished smoothly. No twist joints shall be used. The tensile strength of a section of any strand that includes a joint shall be not less than 90% of the tensile strength of an adjacent section of the strand of equal length without joints.

#### 3.4 Performance.

3.4.1 Tensile strength. The tensile strength of the conductor shall be not less than 200 pounds.

3.4.2 Elongation. The elongation of the conductor shall be not less than .80% for a 60 inch (1524.00 mm) length of conductor.

3.4.3 Continuity. Each conductor shall have continuous continuity.

3.5 Workmanship. The wire shall be uniform in quality and free from defects that affect performance, serviceability, or appearance, such as lumps, kinks, splits, abrasions, scrapes, corroded surfaces, and skin impurities.

### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.3).
- b. Conformance inspection (see 4.4).

4.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment (i.e., non-Government standard [NGS] or federal or military standard) shall be in accordance with [NCSL-Z540.3](#) or equivalent.

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4.3 Qualification inspection. This test shall be performed at the start of production for each order for wire under this specification and shall be as follows: Each operator required to make joints in strands shall submit a group of 12 specimens of strand that include a joint with a specimen of adjacent normal section of each. These specimens shall be tested for breaking strength. An operator will be considered qualified after submitting a group of 12 specimens that meet the requirements of 3.3.2. Records of such qualifications shall be available for verification by the Government (see 4.5.1).

4.4 Conformance inspection. Conformance inspection consists of the group A and B inspections (see 4.4.5 and 4.4.6, respectively) specified in table I and shall be performed on specimens taken from the finished wire of each lot of reels, spools, or coils to be delivered. Sampling inspection shall be accomplished for each lot in accordance with 4.4.2.

TABLE I. Group A and B inspections.

Inspection	Requirement	Verification	Group A	Group B
Visual and dimensional	3.1, 3.3, 3.5	4.5.1	X	-
Continuity	3.4.3	4.5.3	X	-
Tensile strength	3.4.1	4.5.2	-	X
Elongation	3.4.2	4.5.2	-	X

4.4.1 Lot. A lot shall consist of all wire manufactured under substantially the same conditions and offered for inspection at one time.

4.4.1.1 Unit of product. A unit of product is the continuous length of wire contained on a single reel, spool, or coil, or in a package.

4.4.1.2 Specimen. A specimen consists of the individual piece of a unit of product upon which a test is made.

4.4.2 Sampling. A random sample shall be selected from each lot in table II.

TABLE II. Inspection sample.

Inspection lot size <sup>1/</sup>	Sample size
1	1
2 to 8	2
9 to 90	3
91 to 150	12
151 to 280	19
281 to 500	21
501 to 1,200	27
1,201 to 3,200	36
3,201 to 10,000	38
10,001 to 35,000	46

<sup>1/</sup> Lot size is based on the number of units of product

4.4.3 Rejected lot. Failure of any sample to pass any inspection shall constitute a failure of the lot. If an inspection lot is rejected, the contractor may rework the lot to correct the defects or screen out the defective units, and resubmit the lot for re-inspection. Such lots shall be separated from new lots and shall be identified as re-inspected lots (see 4.4.4).

4.4.4 Noncompliance. If a sample fails to pass any inspection, the contractor shall notify the cognizant inspection activity of such failure and take corrective action on the materials or processes or both, as warranted on all units of the product. Acceptance and shipment of the product shall be discontinued until corrective action has been taken. After the corrective action has been taken, the conformance inspection shall be repeated on replacement articles. (This includes all tests and examinations, or only the test that the original sample failed, at the option of the cognizant inspection activity.) Final acceptance and shipment shall be withheld until inspection has shown that the corrective action was successful. In the event of failure after re-inspection, information concerning the failure shall be provided to the cognizant inspection activity.

4.4.5 Group A inspection. Group A inspection shall include the applicable inspections specified in table I.

4.4.6 Group B inspection. Group B inspection shall include the applicable inspections specified in table I. Unless otherwise specified (see 6.2), group B inspection shall be performed on sample units that have been subjected to and have passed the group A inspection.

#### 4.5 Inspections.

4.5.1 Visual and dimensional inspection. Inspect the strands and the finished wire to verify that the material and all workmanship comply with this specification. Certification of compliance of materials and splices (see 4.3) may be accepted at the option of the Government.

4.5.1.1 Strand diameter inspection. Strands shall be measured with a micrometer at three places, one near each end and one in the middle of the wire. The average of the measurements obtained on any piece shall be used for the finished unit.

4.5.1.2 Construction inspection. Construction of the finished wire shall be verified by physical examination.

4.5.2 Tensile strength and elongation tests. Tensile strength and elongation of the finished wire shall be performed on a tensile strength machine, preferably of the pendulum type. The tensile strength test shall be accomplished on finished wire. The free length between grips of the test specimen shall be  $60 \pm 1$  inches. The speed shall be not more than 3 inches per minute for the test machine. Care shall be taken to ensure that strands in the stranded wire are evenly gripped during testing.<sup>1/</sup> The breaking strength of strands shall be computed by using the nominal diameters and tensile strength specified (see 3.3.1.1, 3.3.2, and 3.4.1). Elongation tests shall be performed on strands and shall meet the requirements of 3.4.2.

4.5.3 Continuity test. Each finished length of wire shall be tested to verify continuity using a potential of not more than 10 volts dc.

<sup>1/</sup> Successful testing of stranded wire for tensile properties requires an adequate means of gripping the ends of the test specimen. Various means are available, such as a long tube or socket into which the wire may be soldered or in which, after insertion, the wires may be swaged or pressed without serious distortion. Ordinary jaws or clamping devices are usually not suitable.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The wire covered by this specification is most commonly used in antenna applications. This specification is retained as a military detail specification because of the unique military requirements for testing to ensure the integrity of any conductor joints.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Length of wire required.
- c. Group B inspection sample, if other than as specified (see 4.4.6).
- d. Size of spool and length on each (see 5.1).
- e. Packaging (see 5.1).

6.3 Subject term (key word) listing.

Silicon bronze

6.4 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website at <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see section 3).

6.5 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes 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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CONCLUDING MATERIAL

Custodians:  
Army - CR  
DLA - CC

Preparing activity:  
DLA - CC

(Project 6145-2012-027)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.