

INCH-POUND

MIL-DTL-13241D
2 February 2010
SUPERSEDING
MIL-DTL-13241C
20 February 2009

DETAIL SPECIFICATION

WIRE, ELECTRICAL; ANTENNA,
(WIRE WS-12()/U AND WIRE WS-13()/U)

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 bare, copper-clad steel, stranded wire having 40 percent electrical conductivity.

1.2 Classification. The wire offered under this specification as specified in table I.

TABLE I. Wire classification.

Type designation	Number strands	AWG. size	Nominal o.d. (inch)	Nominal wt./1000 ft.
WS-12()/U	7	12	0.242	128.1 lbs.
WS-13()/U	3	12	0.174	54.8 lbs.

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 Government documents.

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Columbus, ATTN: DSCC-VAI, P.O. Box 3990, Columbus, Ohio 43218-3990, or email to 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 <http://assist.daps.dla.mil>.

2.3 Non-Government publication. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

NCSL INTERNATIONAL

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

(Copies of these documents are available online at <http://www.ncsli.org> or from NCSL International 2995 Wilderness Place, Suite 107 Boulder, Colorado 80301-5404.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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.

3. REQUIREMENTS

3.1 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.

3.2 Materials. The material used shall be as specified herein.

3.3 Strand. The strands shall be grade 40 HS, 40% conductivity, 0.0808 inch nominal diameter in table II.

TABLE II. Physical requirements grade 40 HS.

Nom. dia. (in.)	Tensile strength, min. psi	Breaking strength, min. lb. ^{1/}	Mass/unit length, lb (per 1000 ft.) ^{1/}	Mass/unit length, lb (per mile) ^{1/}	Max.resistance @ 20°C Ω/1000 ft.
.0808	115,000	602	18.12	95.68	4.206

^{1/}: For information purposes only.

3.4 Construction. The wire shall be constructed of the number and kind of strands as specified in 1.2 and 3.3. The strands shall lay naturally in their true positions and not tend to unstrand at the ends when severed at any point. They shall permit restranding by hand after being forcibly unraveled (unstranded).

3.4.1 Lay. The stranded wire shall be constructed with a left-hand lay.

3.4.2 Pitch.

3.4.2.1 WS-12()/U. The pitch of the 7 strand wire WS-12()/U shall be from 10 to 16 times the nominal wire diameter.

3.4.2.2 WS-13()/U. The pitch of the 3 strand wire WS-13()/U shall be from 14 to 20 times the nominal wire diameter.

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3.4.3 Breaking strength.

3.4.3.1 WS-12()/U. The breaking strength of WS-12()/U shall be not less than 4,946 pounds.

3.4.3.2 WS-13()/U. The breaking strength of WS-13()/U shall be not less than 2,236 pounds.

3.4.4 Elongation. The elongation of the stranded wire WS-12()/U and WS-13()/U shall be not less than 1.0 percent.

3.5 Electrical characteristics.

3.5.1 DC resistance of strands. The dc resistance when measured on samples taken not more than 25 feet from either end of any length of strand shall correspond to a resistivity not greater than 28.6 ohms per circular mil-foot at 68°F. The resistance when measured on samples taken from the mid-portion of any coil or reel shall correspond to a resistivity not greater than 26.5 ohms per circular mil-foot at 68°F. When temperatures differ from 68°F, corrections shall be based on a temperature coefficient of resistance of 0.0021 per °F.

3.6 Workmanship. Strands and completed wire furnished under this specification shall be manufactured in a thoroughly workmanlike manner. All material shall be sound, of uniform quality and condition, and free of cracks and other defects which may adversely affect its serviceability.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as conformance inspection (see [4.3](#)).

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 inspections shall be used. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with [NCSL Z540.3](#) or equivalent.

4.3 Conformance inspection. Conformance inspection shall consist of groups A and B inspections as specified in [4.3.5](#) and [4.3.6](#) respectively, and shall be performed on every lot of cable procured under this specification. Sampling inspection shall be accomplished for each lot in accordance with [4.3.2](#).

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

4.3.1.1 Lot size. The lot size shall be defined as the number of units of product submitted for inspection.

4.3.1.2 Unit of product. A unit of product shall be defined as the continuous length of cable contained on a single reel, spool, or in a package.

4.3.1.3 Specimen. A specimen is a single piece of finished wire which is taken from a sample unit and subjected to inspection.

4.3.2 Sampling. A random sample shall be selected from each lot as specified in table III.

TABLE III. Inspection sample.

Inspection lot size ^{1/}	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

^{1/} Lot size is based on the number of units of product.

4.3.3 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 4.3.4).

4.3.4 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 product. Acceptance and shipment of the product shall be discontinued until corrective action has been taken. After 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.

4.3.5 Group A inspection. This inspection, including sampling, shall consist of the examinations of 4.4 to determine compliance with the requirements of 3.2 through 3.4.3.2, as applicable, and 3.6.

4.3.6 Group B inspection. This inspection, including sampling, shall consist of the inspections conforming to 4.5 and 4.6 to determine compliance with 3.4.3, 3.4.4, and 3.5.1 respectively.

4.4 Visual and dimensional inspection. Strands and completed wire shall be inspected to verify that the materials and all workmanship comply with this specification.

4.4.1 Stranding. Specimens shall be inspected for compliance with the requirements of 3.4.

4.4.2 Pitch and lay. Specimens shall be inspected for compliance with the pitch and lay requirements of 3.4.1 through 3.4.2.2.

4.5 Breaking strength and elongation test. Specimens shall be tested for compliance with the requirements of 3.4.3 and 3.4.4 in a tensile testing machine equipped with suitable jaws or sockets. No specimen shall have less than 10 inches of its length between the jaws or sockets. Elongation measurement shall be made on the samples at the same time that the tensile strength test is being performed. In making the elongation measurements, the length, when under a load equal to 10 percent

of the required minimum breaking strength, shall be denoted as the zero length of the specimens. The final length shall be the reading when fracture occurs. The finished wire shall be considered to have fractured when one strand breaks. Any test in which the tensile strength or elongation is below the required value and in which fracture occurs within one inch from the gripping jaws or sockets shall be disregarded and another adjacent specimen from the same sample shall be tested as required above.

4.6 DC resistance. Specimens shall be tested for compliance with the dc resistance requirements of 3.5.1.

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 personnel 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 wires covered by this specification are intended for use in radio antennas.

6.2 Nomenclature. The parenthesis in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: WS-12W/U. As soon as possible after the award of contract, the contractor should apply to the Government office specified in the contract for such information.

6.3 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. If required, the specific issue of individual documents referenced.
- c. Packaging requirements (see 5.1).
- d. Classification of wire required (see 1.2).
- e. Length of wire required.
- f. Size of spool or reel and length on each.
- g. Coil, spool, and reel marking requirements.

6.4 Subject term (key word) listing.

Copper-clad steel
Radio
Stranded

6.5 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](#)).

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Army – CR
DLA - CC

Preparing activity:
DLA - CC

(Project 6145-2010-001)

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 this information above using the ASSIST Online database at <http://assist.daps.dla.mil>.