INCH-POUND

MIL-DTL-438C
12 December 2010
SUPERSEDING
MIL-W-438B
6 May 1965

DETAIL SPECIFICATION

WIRE; PRIMER, ELECTRICAL

Reinstated after 30 November 2010 and may be used for new and existing designs and acquisitions.

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

1. SCOPE

1.1 This specification covers the requirements for electrical wire suitable for ignition or bridge wire in electrical primers.

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.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-I-45607	Inspection Equipment, Acquisition, Maintenance and Disposition of

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-2073-1	Standard Practice for Military Packaging

(Copies of these documents are available online at https://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: 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 https://assist.daps.dla.mil.

2.3 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.

ASTM INTERNATIONAL

ASTM-B684 Platinum – Iridium Electrical Contact Material

(Copies of these documents are available online at http://www.astm.org or from the ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 10012-1 - Equipment, Quality Assurance Requirements for Measuring - Part 1 Metrological Confirmation System for Measuring Equipment

(Copies of this document are available from http://www.iso.ch or from International Organization for Standardization American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY10036.)

NCSL INTERNATIONAL

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

(Copies of this document 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Material. The wire shall be an alloy of 90% platinum and 10% iridium as specified in ASTM-B684.

3.3 Diameter. The diameter of the wire shall be 0.002 ± 0.0005 inches (.051 +.0127mm).

3.4 Breaking strength. The wire shall be capable of withstanding a force of at least 6 ounces without breaking when pulled at a rate of 12 inches per minute.

3.5 Electrical resistance. The wire shall have an electrical resistance ranging from 28 to 31Ω per foot at 20 ºC.

3.6 Workmanship. 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.

3.7 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.

3.8 Marking.

3.8.1 Spools or reels. Each spool or reel shall be plainly marked on both ends with the information as listed in accordance with MIL-STD-129. If paper labels are used, they shall be protected by a transparent compound to prevent deterioration of marking. The positioning and length of all pieces shall be indicated on the spool or reel.

National Stock No.
CABLE; IGNITION, HIGH-TENSION.
Type Designation "M438 _____"
Length (ft).
Contract or Order No.
Date of manufacture.
Manufacturer's name and CAGE code.
US Government property.

3.8.2 Shipping containers. In addition to any markings required by the contract or order, shipping containers shall be marked in accordance with MIL-STD-129.

4. VERIFICATION

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

a. First article inspection (see 4.2)
b. Conformance inspection (see 4.3).

4.2 First article inspection. First inspection shall be performed on one complete electrical wire primer when a first article sample is required (see 3.1). This inspection shall include the examination of 4.2.3 and the tests of 4.5.1 through 4.5.4.

4.2.1 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 established and maintained by the contractor. 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 and ISO 10012-1.

4.2.2 Lot size. An inspection lot shall consist of all cables of the same type designation (see 1.1) produced under essentially the same conditions, and offered for inspection at the same time.

4.2.3 Sampling. The inspection sample shall consist of 5 feet of wire from each spool, randomly selected from the lot without regard to quality and shall be of the size specified in table I.

TABLE I. Inspection sample.

Production 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.

4.2.4 Examination and tests. The wire samples shall be inspected in accordance with the inspection provisions contained herein. Examinations and tests related to section 3 herein shall be performed on a defect (individual characteristic) basis in accordance with MIL-STD-2073-1. Examinations and tests for packaging, packing and marking shall be in accordance with MIL-STD-2073-1 and section 5 herein. The tabulated classification of defects shall constitute the minimum inspection to be performed by the supplier prior to Government acceptance or rejection by lot. The Government reserves the right to inspect for any applicable requirement, and to reject individual non-conforming items.

4.2.5 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.

4.2.6 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.

4.3 Conformance inspection. Conformance inspection shall consist of groups A and B inspections as specified in 4.3.2 and 4.3.3 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 4.2.3.

4.3.1 Conformance test failure. Should any one item of a control test sample fail to meet the specified test requirements, acceptance of the product will be suspended by the Government until necessary corrections have been made by the contractor and the resubmitted samples have been approved.

4.3.2 Group A inspection. This inspection, including sampling, shall consist of the examinations of 4.5.2 and 4.5.4 to determine compliance with the requirements of 3.3 and 3.5.

4.3.3 Group B inspection. This inspection, including sampling, shall consist of the inspections conforming to 4.5.1, 4.5.3 and 4.5.4 to determine compliance with 3.2, 3.4 and 3.6 respectively.

4.4 Inspection equipment. Inspection equipment and facilities shall be established and maintained. ISO 10012-1 and NCSL Z540.3 or comparable standards are available as guidance. Except as otherwise provided for by the contract, the contractor shall maintain all required measuring and testing equipment in accordance with the applicable requirements specified in MIL-I-45607. The Government reserves the right to use the test equipment for its own independent inspections to the extent that such use will not unduly interfere with the contractor's delivery schedule.

4.4.1 Government furnished inspection equipment. Where the contract provides for Government furnished test equipment, care and maintenance of test equipment shall be in accordance with the applicable requirements specified in MIL-I-45607.

4.5 Test methods and procedures.

4.5.1 Material. Laboratory tests shall be made to determine the composition of the material by approved analytical methods. The composition shall be in accordance with 3.2. Laboratory designation shall be as specified in 6.2.

4.5.2 Diameter. The diameter as specified in 3.3 shall be measured on the samples specified in 4.2.3 using standard measuring equipment that is accurate to within .0001 inch (.00254 mm). At least two readings shall be taken 90 degrees apart at the same location on the diameter being measured. Each sample shall have at least three measurements equally spaced over the entire length.

4.5.3 Breaking strength. Breaking strength as specified in 3.4 shall be determined using any standard testing machine that applies the load at a constant rate of traverse or a machine calibrated in terms of a constant rate of traverse shall be satisfactory. The capacity of the testing machine shall be such that all specimens fail at a greater than 40% of the capacity of the machine. The clamps used shall be such that there will be no slipping of, or damage to the test specimen. The testing machine shall have an accuracy of least 5 grams when the clamp is traversing at a constant 12 inches per minute. The test specimen shall be free of bends, kinks, or other imperfections. Tests where the test specimen breaks at a point less than 0.5 inch from the clamp shall be disregarded.

4.5.4 Electrical resistance. Resistance values specified in 3.5 shall be checked using standard measuring equipment, the accuracy of which shall be within 10 percent of the 30 to 80% scale range. The measured resistance shall be the average reading of not less than five 12 inch samples.

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 electrical wire covered by this specification is intended for use as the ignition or bridge wire in electrical primers.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.
b. Spool size, capacity, and approximate weight.
c. Place of inspection, test dates and tests.

6.3 Destroyed wire. All wire destroyed or consumed in conducting the tests required by this specification should be in addition to the quantity of wire ordered and the cost thereof should be included in the contract or order.

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 http://www.epa.gov/osw/hazard/wastemin/priority.htm. Included in the EPA 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 Subject term (key word) listing

Bridge
Contact
Ignition
Iridium
Material
Platinum

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 – AV
Navy – OS
Air Force – 85
DLA – CC

Review activities:
Army – CR, MI
Navy – MC

Preparing activity:
DLA-CC

(Project 6145-2010-042)

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