J-L-2744
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SUPERSEDING
MIL-L-741D
10 August 1984

LEADS, ELECTRICAL, ARC-WELDING

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This document covers extra flexible, single-conductor, electrical, arc-welding, leads with heavy-duty jacket suitable for use up to 600 volts.

1.2 Classification. Leads will be of the following sizes and grades, as specified (see 6.2):

Size 2 - No. 2 American Wire Gage (AWG)
Size 1/0 - No. 1/0 AWG
Size 2/0 - No. 2/0 AWG

Grade A - Moderate-low temperature (oil/solvent resistant)
Grade B - Low temperature (oil/solvent resistant)
Grade C - Low temperature (non-oil/solvent resistant)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

FSC 6150

Federal Specifications

PPP-B-601 - Boxes, Wood, Cleated-Plywood
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner
PPP-B-636 - Boxes, Shipping, Fiberboard
PPP-B-640 - Boxes, Fiberboard, Corrugated, Flexible

Federal Standard

FED-STD-123 - Marking for Shipment

Military Specifications

MIL-P-116 - Preservation, Methods of
MIL-I-3930/18 - Insulating and Jacketing Compounds, Electrical (for Cables, Cords, and Wires), Jacketing Compound, Type JN-Moderate-Low Temperature, Chloroprene Rubber (CR)
MIL-I-3930/19 - Insulating and Jacketing Compounds, Electrical (for Cables, Cords, and Wires), Jacketing Compound, Type JN-L-Low Temperature, Chloroprene Rubber (CR)
MIL-I-3930/20 - Insulating and Jacketing Compounds, Electrical (for Cables, Cords, and Wires), Jacketing Compound, Type JH-Low Temperature, Heat and Weather Resistant, Ethylene-Propylene (EPM) or Ethylene-Propylene-Diene Rubber (EPDM)
MIL-T-7928 - Terminals, Lug: Splices, Conductor: Crimp Style, Copper, General Specification for

Military Standards

MIL-STD-105 - Sampling Procedures and Tables for Inspection by by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-147 - Palletized Unit Loads
MS20659 - Terminal, Lug, Crimp Style, Copper, Uninsulated, Ring Tongue, Type I, Class I

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

American Society for Testing and Materials (ASTM):

ASTM D 3951 - Commercial Packaging, Standard Practice for

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

Underwriters Laboratories Inc. (UL):

UL 44 - Wires and Cables, Rubber-Insulated

(Application for copies should be addressed to the Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.)

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.

3. REQUIREMENTS

3.1 Description. Leads shall consist of a length of rope-lay, bunch-stranded, copper wire covered with a separator and abrasion-resistant jacket and terminated at each end with a lug terminal.

3.2 Standard commercial product. The leads shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the leads being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.3 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.2.1 and 6.3).

3.4 Materials. Materials shall be as specified herein and in applicable specifications and standards, and other referenced documents. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Materials shall be free of defects which adversely affect performance or serviceability of the finished product.

3.5 Construction. The leads shall conform to UL 44, as applicable, for 600 volt rated portable arc-welding cables. Cable for leads shall have been manufactured not more than six months prior to the date of acceptance of the leads. Unless otherwise specified (see 6.2), the lead shall be 50 feet in length and terminated at each end with a one-hole, crimp-type, copper lug terminal.

3.6 Conductor. The conductor shall be rope-lay, bunch-stranded, bare No. 34 AWG copper wire. The separator shall be either laminated metallic foil, heavy paper, textile serving polyester tape, varnished cambric or other suitable material.

3.7 Jacket. Unless otherwise specified (see 6.2), the jacket shall be made of one of the following compounds: heavy-duty chloroprene rubber (CR) (neoprene), heavy-duty vulcanized acrylonitrile-butadiene/polyvinyl-chloride compound (NBR/PVC), chlorinated polyethylene (CPE), heavy-duty vulcanized chlorosulfonated-polyethylene compound (hypalon) or ethylene-propylene-diene (EPDM) rubber. EPDM shall not be used for oil-resistant and solvent-resistant jacket requirements (see 6.2).

3.7.1 Grade A leads. When specified (see 6.2), the jacket used for grade A leads shall conform to MIL-I-3930/18, type JN-moderate-low temperature chloroprene jacketing compounds.

3.7.2 Grade B leads. When specified (see 6.2), the jacket used for grade B leads shall conform to MIL-I-3930/19, type JN-L-low temperature chloroprene rubber jacketing compounds.

3.7.3 Grade C leads. When specified (see 6.2), the jacket used for grade C leads shall conform to MIL-I-3930/20, type JH-low temperature, heat resistant, ethylene-propylene rubber (EPM) or EDPM.

3.8 Terminal lugs. Unless otherwise specified (see 6.2), the supplier's standard straight, crimp type, uninsulated, copper lug terminal with one 3/8-inch (nominal) stud hole shall be affixed to each end of the lead. When specified (see 6.2), terminal lugs shall conform to MIL-T-7928 for uninsulated, one stud hole, crimp type, copper lugs. Terminal configuration shall be ring type in accordance with MS20659 with a stud hole size of 3/8 inch (nominal). Terminal dash numbers shall be 114, 118, and 120 for size 2, 1/0, and 2/0 respectively.

3.9 Mechanical strength. Terminals shall be securely affixed to the ends of the leads with a suitable crimping tool. Lug joints of complete leads shall withstand, without breaking, or separating from the cable, or becoming distorted, a pull of not less than 550 pounds, 700 pounds, and 750 pounds for sizes 2, 1/0, and 2/0, respectively, for one minute, when tested as specified in 4.6.2.

3.10 Voltage drop. When tested as specified in 4.6.3, the millivolt drop through the crimped joint shall not exceed eight millivolts.

3.11 Identification marking. The lead shall be provided with a durable marking on the jacket throughout its entire length, at intervals not exceeding 2 feet, by which it may be identified as the product of a particular manufacturer. It shall include the size number AWG, grade of jacket, and the date of manufacture of the cable. The marking shall consist of lettering, not code. The manufacturer's code and part number may also be shown.

3.12 Workmanship. The quality of workmanship employed shall be the quality necessary to produce leads that conform with the requirements of this specification and are so fabricated as to insure proper functioning of the lead or not produce any defects that would affect safety of personnel, serviceability, or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

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

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one lead of each size and grade when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.4 and the tests of 4.5. The first article may be either a first production lead or a standard production lead from the supplier's current inventory provided the lead meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining leads to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one lead of each size and grade. All leads offered for delivery at one time shall be considered a lot for the purpose of inspection.

4.3.1 Sampling for examination. Examination shall be based on inspection level II and an Acceptable Quality Level (AQL) of 4.0 percent defective.

4.3.2 Sampling for tests. Tests shall be based on inspection level S-4 and an AQL of 6.5 percent defective.

4.4 Examination. Each lead shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.5 Tests. The first article sample, when a first article sample is required, and each sample selected in accordance with 4.3.2 shall be tested in accordance with UL 44 and MIL-I-3930, as applicable. Tests shall include, but shall not necessarily be limited to, verification of the properties and characteristics as specified when tested as specified in 4.5.1, 4.5.2, and 4.5.3. Failure to pass any phase of the tests shall be cause for rejection.

4.5.1 Physical and aging tests. Physical and aging tests shall be conducted on the selected samples of each grade of jackets to determine conformance to 3.7.

4.5.2 Tensile strength. The tensile strength and security of terminal lugs shall be determined by means of a suitable testing machine or a free-hanging weight. Lug terminals and conductor shall not break or separate when the specified force (see 3.8) is applied.

4.5.3 Millivolt drop test. The millivolt drop shall be measured when the cable is loaded to the following current values:

AWG size	Current (amperes)
2	200

AWG size	Current (amperes)
1/0	300
2/0	375

Millivolt drop measurements shall be made by puncturing the insulation of the conductor 1/16-inch back of cable receiving end of the lug and at the intersection of barrel and tongue of the lug for the test points. The millivolt drop between the test points shall not exceed eight millivolts.

4.6 Packaging inspection. The preservation, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A, B, or commercial as specified (see 6.2).

5.1.1 Level A. Each lead shall be preserved using method 1C in accordance with MIL-P-116. Each lead shall be coiled to the minimum safe diameter and the coil shall be secured. Each coil shall be placed in a box conforming to PPP-B-636 before being given method 1C 2 preservation.

5.1.2 Level B. Preserve the same as level A, except that method III shall be used for preservation.

5.1.3 Commercial. Material shall be preserved and packaged in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or commercial as specified (see 6.2).

5.2.1 Level A. The leads shall be packed in containers conforming to PPP-B-601, overseas type; PPP-B-621, class 2. The contents shall be cushioned, blocked and braced to prevent movement or damage.

5.2.2 Level B. The leads shall be packed in containers conforming to PPP-B-601, domestic type; PPP-B-621, class 1; PPP-B-636, class weather-resistant, PPP-B-640, class 2. The contents shall be cushioned, blocked and braced to prevent movement or damage.

5.2.3 Commercial. Material shall be packed in accordance with ASTM D 3951.

5.3 Palletization. Material shall be palletized in accordance with MIL-STD-147 when the following criteria are met:

a. Load to consist of four or more unskidded containers; and,
b. Load shall utilize a minimum of 80 percent of the pallet base.

5.4 Marking.

5.4.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.4.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

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 leads covered by this specification are intended for use between an arc-welding power source and electrode holder, secondary leads on generator sets, portable lighting systems, trailing cables, and power outlets up to 600 volts alternating current. EPDM rubber should not be used for a jacket which is required to be oil-resistant or degreaser solvent-resistant.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
c. Size and grade of lead required (see 1.2).
d. When first article is required for inspection and approval (see 3.3, 4.2.1, and 6.3).
e. Length required, if other than specified (see 3.5).
f. When the jacket shall be oil-and solvent-resistant (see 3.7).
g. When the jacket material for Grade A leads should conform to MIL-T-3930/18 (see 3.7.1).
h. When the jacket material for Grade B leads should conform to MIL-T-3930/19 (see 3.7.2).
i. When the jacket material for Grade C leads should conform to MIL-T-3930/20 (see 3.7.3).

j. When terminals are to be other than as specified (see 3.8).
k. When terminals are to conform to MIL-T-7928 (see 3.8).
l. Level of preservation and packing required (see 5.1 and 5.2).

6.2.1 Contract data requirements. When this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of paragraph 52.227-7031 of the Federal Acquisition Regulation (FAR). The data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the Contract Data Requirements Lists (DD Form 1423) incorporated into the contract. When the provisions of FAR 52.227-7031 are not invoked, the data should be delivered in accordance with the contract requirements.

6.3 First article. When a first article is required, it should be tested and approved under the appropriate provisions of paragraph 52.209-3 of the FAR. The first article may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of one lead of each size and grade. The contracting officer should include specific instructions in all procurement instruments, regarding arrangements for examinations, test and approval of the first article.

6.4 PIN. Since this document does not affect the interchangeability characteristics of the items covered, the items should retain their existing part numbers but the part numbers should be designated as PINs. However, when there is no existing part number for an item, the PIN should be developed as follows:

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 F      2744    X     X  (XXXXX)
 *       *      *     *     *
 *       *      *     *     *-----Numbers, letters, or combinations specified
 *       *      *     *              by the acquisition activity
 *       *      *     *-----------Grade letter
 *       *      *-----------------Size number
 *       *------------------------Specification number
 *--------------------------------Prefix to indicate federal specification
```

6.5 Subject term (key word) listing.

Copper
Terminal
Jacket
Conductor

MILITARY INTERESTS:

Custodians:

Army - ME
Navy - YD
Air Force - 99

Review Activities:

Army - CR
Air Force - 80
DLA - GS

PREPARING ACTIVITY:

Navy - YD

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