

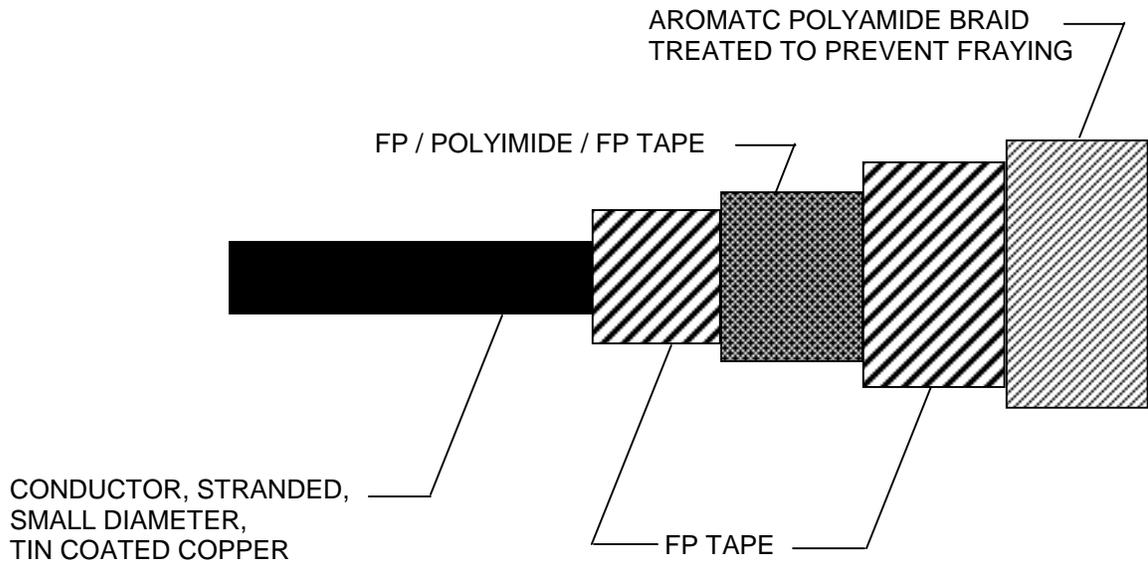
REVISIONS

| LTR | DESCRIPTION | DATE | APPROVED |
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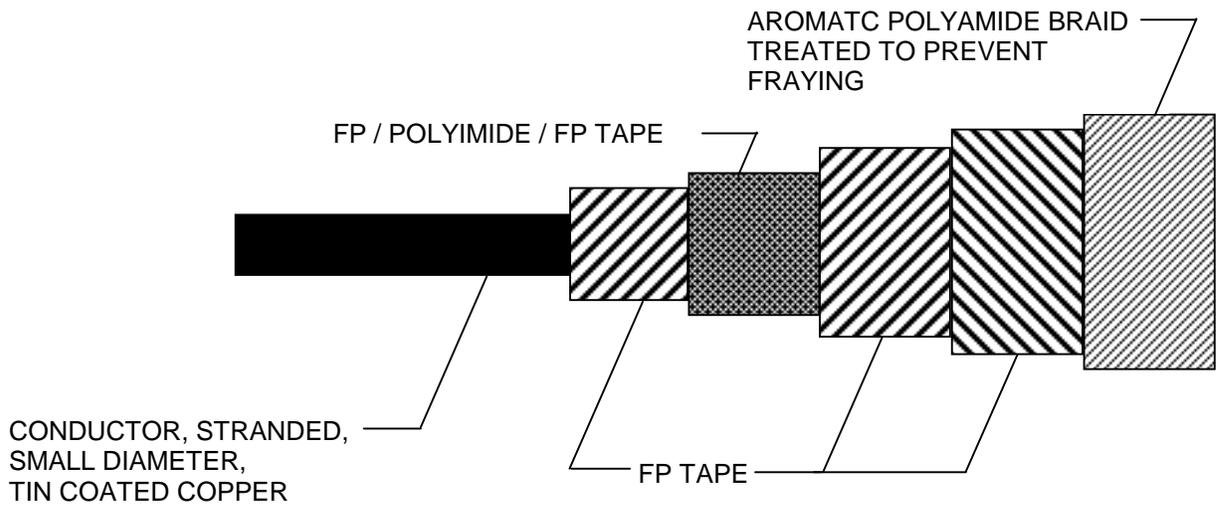
Prepared in accordance with ASME Y14.100

Selected item drawing

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| REV STATUS | REV | | | | | | | | | | | | | | | | | | |
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| PMIC | PREPARED BY William Carpenter | | | | | | DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO 43216-5000 | | | | | | | | | | | | |
| Original date of drawing 12 July 2004 | CHECKED BY Lee Surowiec | | | | | | TITLE WIRE, ELECTRICAL, COMPOSITE, POLYAMIDE BRAID, POLYTETRAFLUOROETHYLENE/POLYIMIDE INSULATED, NORMAL WEIGHT, TIN COATED, COPPER CONDUCTOR, 150°C, 600 VOLT | | | | | | | | | | | | |
| | APPROVED BY Richard L. Taylor | | | | | | | | | | | | | | | | | | |
| | SIZE A | CAGE CODE 037Z3 | | | | | DWG. NO. | | | 04039 | | | | | | | | | |
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8 AWG through 6 AWG



4 AWG through 4/0 AWG

FP – Fluorocarbon Polymer, modified Polytetrafluoroethylene (PTFE)

FIGURE 1. General configuration.

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1 SCOPE

1.1 Scope. This drawing covers the performance characteristics for a composite wire using a seamless polytetrafluoroethylene/polyimide tape wrap insulation system, with a normal weight stranded conductor. The polyimide tape shall be hydrolysis resistant.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as specified as follows:

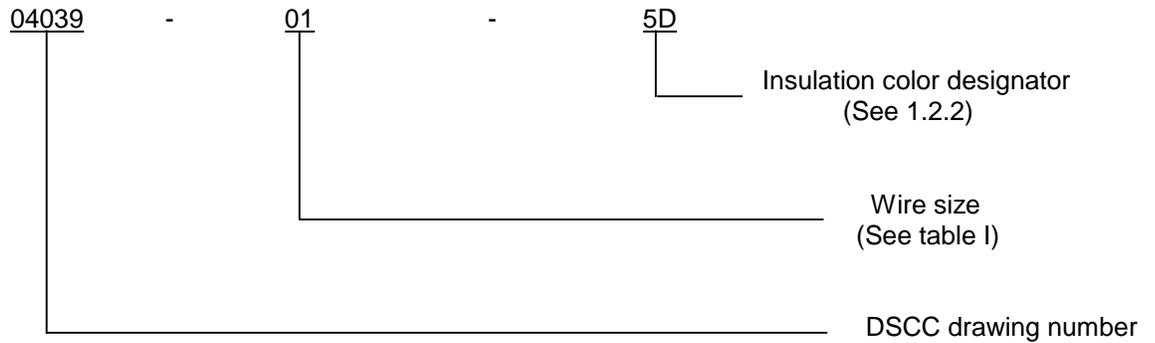


TABLE I. Details of construction.

| PIN | Wire size (AWG) | Conductor | | | Finished wire | | | |
|------------|-----------------|--|-------------------|------|---------------------------------------|-------------------|------|-------------------------|
| | | Stranding (number of strands X gauge (AWG) of strands) | Diameter (inches) | | Resistance At 20°C ohms/1000ft. (max) | Diameter (inches) | | Weight lb/1000ft. (max) |
| | | | Min | Max | | Min | Max | |
| 04039-8-* | 8 | 133 X 29 | .158 | .169 | .701 | .196 | .216 | 61.6 |
| 04039-6-* | 6 | 133 X 27 | .198 | .212 | .445 | .235 | .255 | 93.7 |
| 04039-4-* | 4 | 133 X 25 | .250 | .268 | .292 | .292 | .312 | 148 |
| 04039-2-* | 2 | 665 X 30 | .320 | .340 | .183 | .360 | .380 | 227 |
| 04039-1-* | 1 | 817 X 30 | .366 | .380 | .149 | .400 | .420 | 295 |
| 04039-01-* | 0 | 1045 X 30 | .395 | .425 | .116 | .442 | .462 | 351 |
| 04039-02-* | 00 | 1330 X 30 | .440 | .475 | .091 | .498 | .528 | 438 |
| 04039-03-* | 000 | 1665 X 30 | .500 | .540 | .071 | .554 | .584 | 554 |
| 04039-04-* | 0000 | 2109 X 30 | .565 | .605 | .056 | .615 | .655 | 689 |

* The asterisks in the part number column of table I shall be replaced by color code designator (see 1.2.2). Example: 04039-26-5D is dark green.

1.2.2 Color. The color of the finished wire shall be as indicated by the insulation color designator (see 1.2) of the wire part number and the color specified in the contract or order. The color designators shall indicate the color of the braid. The preferred color is shall be dark green with the Munsell color limits of 5Y 3/2 and 5B 2/0.5 color designator 5D. White is an acceptable alternative color, designator 9.

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2. APPLICABLE DOCUMENTS

2.1 Government Documents.

2.1.1 Specifications, standards, and handbook. 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.

SPECIFICATIONS

DEPARTMENT OF DEFENSE

- MIL-W-22759 - Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy
- MIL-DTL-22759/85 - Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volt
- MIL-DTL-22759/88 - Wire, Electrical, Polytetrafluoroethylene/Polyimide Insulated, Normal Weight, Tin Coated, Copper Conductor, 150°C, 600 Volts

STANDARDS

- MIL-STD-104 - Limits For Electrical Insulation Color
- MIL-STD-681 - Identification Coding and Application Of Hookup and Lead Wire
- MIL-STD-2223 - Test Methods for Insulated Electric Wire

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

2.2 Other publications. The following documents form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DOD adopted, shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue which is current on the date of the solicitation.
American Society for Testing and Materials (ASTM)

- ASTM B33 - Standard Specification for Tin Coated Soft or Annealed Copper Wire for Electrical Purposes
- ASTM D4591 - Standard Test Method for Determining Temperatures and Heats of Transitions of Fluoropolymers by Differential Scanning Calorimetry

(Copies of these documents are available from <http://www.astm.org/> or ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959.)

NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCLS)

- NCSL Z540.1 - Laboratories Calibration and Measuring and Test Equipment

(Copies of these documents are available from <http://www.ncsli.org> or to National Conference of Standards Laboratories (NCSL), 2995 Wilderness Place, Suite 107, Boulder, CO 80301-5404.)

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SOCIETY OF AUTOMOTIVE ENGINEERS INC (SAE)

AS 4373 - Test Methods for Insulated Electric Wire

(Copies of these documents are available from <http://www.sae.org/> or SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001).

(Non-Government standards and other publications are normally available from the organizations which prepare or distribute the documents. These documents also may be available in libraries or from other informational services.)

3. REQUIREMENTS

3.1 DSCC requirements. Items described in this drawing shall meet the requirements of MIL-W-22759, MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG) except as specified herein. Any requirements included in this drawing shall be in addition to, or supersede those requirements included in MIL-W-22759, MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG). In case of conflict between the requirements in this drawing, MIL-W-22759, MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG), the requirements of this drawing shall take precedence.

3.2 Design configuration. The design, construction, and physical dimensions shall be as specified in this drawing.

3.2.1 Design documentation. Design documentation shall be retained by the manufacturer and shall be available upon request for review by the contracting activity, DSCC, or contractor.

3.3 Material:

3.3.1 Conductor. Conductors shall be made of soft annealed copper in accordance with ASTM B33 and table I of this drawing. All strands shall be free from lumps, kinks, splits, scarred or corroded surfaces and skin impurities. Strands shall be tin coated in accordance with ASTM B33.

3.3.2 Braid : The braid shall be made of bright aromatic polyamide yarn, 200 Denier, 100 filaments, tightly formed. The braid shall be uniform in appearance and treated with a clear finisher coating. The finisher coating shall be compatible with the temperature rating and performance requirements of the insulated wire.

3.3.3 Insulation: Insulation shall be polytetrafluoroethylene and polytetrafluoroethylene/polyimide tape in accordance with tables II and III.

TABLE II. Wire insulation materials. 1/

| Tape code | Thickness Nominal (inches) | Material |
|-----------|----------------------------|-----------------------------------|
| 1 | .0020 | .0005 FP/.0010 polyimide/.0005 FP |
| 2 | .0010 | FP (Skived) |
| 3 | .0020 | FP (Skived) |
| 4 | .0030 | FP (Unsintered) |

1/ Physical properties of PTFE unsintered tape shall be in accordance with MIL-W-22759.

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TABLE III. Physical properties of FP/Polyimide/FP tapes.

| | |
|---------------------|---|
| Tensile strength | 19,000 lb/in ² (average min) |
| Tensile modulus | 350,000 lb/in ² (average min) |
| Elongation | 40 percent (average min) |
| Dielectric strength | 4,000 volts/mil (average min) |
| .0005 FP Layer | Distinguishable color (next to conductor) |

3.4 Wire construction and physical dimensions. See figure 1 and tables I and IV.

TABLE IV. Tape overlap requirements. 1/

| Wire size | Wrap 1 | | | Wrap 2 | | | Wrap 3 | | | Wrap 4 | | | Nominal Wall Thickness (mils) 2/ |
|-----------|-----------|-----------------|-----|-----------|-----------------|------|-----------|-----------------|------|-----------|-----------------|------|----------------------------------|
| | Tape code | Percent overlap | | Tape code | Percent overlap | | Tape code | Percent overlap | | Tape code | Percent overlap | | |
| | | Min | Max | | Min | Max | | Min | Max | | Min | Max | |
| 8 | 2 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 67.0 | 71.0 | - | - | - | 13.2 |
| 6 | 2 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 67.0 | 71.0 | - | - | - | 13.2 |
| 4 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 2 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 1 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 1/0 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 2/0 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 3/0 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |
| 4/0 | 3 | 20.5 | 35 | 1 | 50.5 | 55.0 | 4 | 50.5 | 54.0 | 4 | 50.5 | 54.0 | 16.2 |

1/ Wrap 1 is innermost tape which is in contact with the conductor.

2/ Nominal wall thickness does not include the polyamide braid thickness.

3.5 Performance testing: Wire supplied to this drawing shall be qualified in accordance with MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG) and shall meet any additional requirements of this drawing.

3.5.1 Solderability (quality conformance test): Not required, this wire is intended for crimp terminations.

3.5.2 Insulation state of sinter (quality conformance test): FP layers shall be evaluated with a Differential Scanning Calorimeter in accordance with ASTM D4591. This is performed on the sintered wire prior to braiding. The FP layers shall meet the following requirements:

- a. First Heat: Less than 25 Joules/gram (j/g).
- b. Second Heat: Maximum 2 j/g change when compared to first heat.
- c. Bonding between FP layers shall be homogenous. No evidence of tape edges or seams shall be present on the outer FP layer when visually examined with the unaided eye. The outer surface will be smooth and free of tape edges at the overlap.

3.5.3 Lamination sealing (quality conformance test). When tested in accordance with AS4373 method 809 at 200°C, there shall be no evidence of tape separation or lifting. There shall be no visible tape ridges that can contribute to tearing of the tape. This test is performed on the sintered wire prior to braiding.

3.5.4 Color: Conformity of color to the limits of MIL-STD-104 shall not be required after oven exposure.

3.6 Ratings:

3.6.1 Temperature rating: 150°C maximum continuous conductor temperature.

3.6.2 Voltage rating: 600 Vrms at sea level.

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3.7 Marking. The finished wire shall be identified by a printed marking applied to the outer surface or the wire. The identification mark shall not be applied by hot stamp marking or other methods which significantly penetrate the insulation. The PIN shall be in accordance with 1.2 herein.

4. VERIFICATION

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

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.1.1 Equipment calibration. All test equipment and inspection facilities shall be maintained in accordance with NCSL Z540.1 or equivalent.

4.2 Qualification inspection. The product manufactured under this drawing shall be currently listed on the qualified products list QPL-22759 for wire type MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG). The requirements in paragraph 3.5 apply.

4.3 Quality conformance. Quality conformance inspection shall be in accordance with MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG) and 3.5 herein.

4.4 Certification: In order to be certified and listed as an approved source of supply for wire manufactured to this drawing, a manufacturer shall:

- a. Agree to make available to DSCC, upon request, all pertinent test data indicating compliance to the tests outlined in MIL-W-22759, MIL-DTL-22759/85 (2 - 4/0 AWG) or MIL-DTL-22759/88 (8 - 4 AWG) and this drawing.
- b. Provide to DSCC-VAI, or its designated agent, upon request, free of charge and without obligation, current production samples of the types and quantities requested.
- c. Meet one of the following criteria:
 - (1) Currently be listed on QPL-22759 for at least one wire series (not necessarily the one for which this drawing applies).
 - (2) Be in current production of the subject part.

4.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply (see 6.6).

5 PACKAGING.

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6 NOTES

6.1 Intended use. Wires conforming to this drawing are intended for use when military specifications do not exist for wires that will perform the required function. This drawing is intended to prevent the proliferation of unnecessary duplicate specifications, drawings and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-22759, this drawing will be inactivated.

6.2 Ordering data. The acquisition document should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of a copy of the quality conformance inspection data for the lot being supplied, if applicable. This data should be supplied with each shipment.
- c. Requirements for certificate of compliance, if applicable.
- d. Requirements for packaging and packing.
- e. (As needed)

6.3 Replaceability. Wires covered by this drawing will replace the same generic wires covered by a contractor-prepared specification or drawing.

6.4 Comments. Comments on this drawing should be directed to DSCC-VAI, Post Office Box 3990, Columbus, Ohio 43218-3990, or e-mail to RectangularConnector@dla.mil, telephone (614) 692-0566, or facsimile (614) 692-6939.

6.5 Certificate of compliance. The certificate of compliance submitted to DSCC-VAI, prior to listing as an approved source of supply, shall state that the manufacturer's product meets the requirements of this drawing.

6.6 Generic test data. Generic test data may be used to satisfy the requirements of 4.3. Generic test data shall be on date coded wire no more than 1 year old when the wire is made of the same material, of the same design, and is made using the same manufacturing processes. The vendor is required to retain the generic data for a period of not less than 3 years from the date of shipment.

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6.7 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed have agreed to the contents of this drawing and a certificate of compliance has been submitted to DSCC-VAI.

| DSCC drawing PIN | Vendor CAGE Number | Vendor CAGE Number | Vendor similar PIN <u>1/</u> |
|------------------|--------------------|--------------------|------------------------------|
| 04039-8-* | 12814 | 28427 | SMLF8-* |
| 04039-6-* | 12814 | 28427 | SMLF6-* |
| 04039-4-* | 12814 | 28427 | SMLF4-* |
| 04039-2-* | 12814 | 28427 | SMLF2-* |
| 04039-1-* | 12814 | 28427 | SMLF1-* |
| 04039-01-* | 12814 | 28427 | SMLF01-* |
| 04039-02-* | 12814 | 28427 | SMLF02-* |
| 04039-03-* | 12814 | 28427 | SMLF03-* |
| 04039-04-* | 12814 | 28427 | SMLF04-* |

1/ Caution: Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

* Color code designators in accordance with MIL-STD-681 shall replace the asterisks in the part number column of table. Example: 04039-26-93 is white with an orange stripe.

Vendor CAGE
number

12814

28427

Vendor name
and address

Thermax/CDT
235 North Freeport Drive
Nogales, AZ 85621-2428

Thermax/CDT Barcel Division
2851 Alton Parkway
Irvine, CA 92606-5145

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