MILITARY SPECIFICATION SHEET

# WIRE, ELECTRIC, FLUOROCARBON/POLYIMIDE INSULATED, MEDIUM WEIGHT, NICKEL COATED HIGH STRENGTH COPPER ALLOY CONDUCTOR, 600 VOLTS, 200°C, NOMINAL 8.2 OR 8.4 MIL WALL

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

The complete requirements for procuring the wire described herein shall consist of this document and the issue in effect of Specification MIL-W-81381.

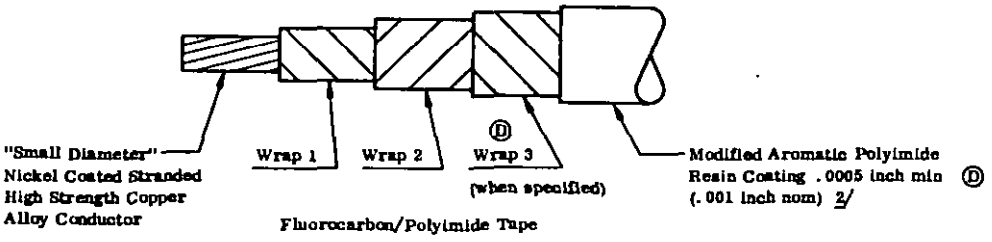


TABLE I. Construction details.

| Part Number 1/ | Wire Size | Conductor: Stranding (Number of Strands X AWG gage of strands) | Conductor: Diameter (inches) (min) | Conductor: Diameter (inches) (max) | Finished Wire: Resistance at 20°C (68°F) (ohms/1000 ft) (max) | Finished Wire: Diameter (inches) (min-max) | Finished Wire: Weight (lbs/1000 ft) (nom) 2/ | Finished Wire: Weight (lbs/1000 ft) (max) | Insulation Tapes (Overlap all tapes 50% min): Wrap 1 Tape Code 3/ | Insulation Tapes: Wrap 2 Tape Code 3/ | Insulation Tapes: Wrap 3 Tape Code 3/ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ⓓ M81381/14-28-* | 28 | 7 x 36 | .014 | .016 | 79.0 | .031-.035 | 1.0 | 1.2 | .1/1/.1 | .1/1/.1 | .1/1/.1 |
| M81381/14-26-* | 26 | 19 x 38 | .018 | .020 | 49.4 | .036-.040 | 1.4 | 1.6 | 0/2/.5 | .1/1/.1 | No Third Wrap |
| M81381/14-24-* | 24 | 19 x 36 | .023 | .025 | 30.1 | .041-.045 | 2.0 | 2.3 | | | |
| M81381/14-22-* | 22 | 19 x 34 | .029 | .031 | 18.6 | .047-.051 | 3.0 | 3.3 | | | |
| M81381/14-20-* | 20 | 19 x 32 | .037 | .040 | 11.4 | .055-.060 | 4.6 | 5.0 | | | |

1/ Part Number: The asterisks in the part number column, Tables I and II, shall be replaced by color code designators in accordance with MIL-STD-681, except that opaque dark yellow as specified in MIL-W-81381 shall be designated by the letter "N" and unpigmented polyimide resin coating shall be designated by the letter "C". Examples: Size 20, opaque dark yellow - M81381/14-20-N; same with orange stripe - M81381/14-20-N3.

2/ Nominal values are for information only. Nominal values are not requirements.

3/ Tape Codes: .1/1/.1 0.1 mil FEP fluorocarbon resin/1 mil polyimide film/0.1 mil FEP fluorocarbon resin
0/2/.5 2 mil polyimide film/0.5 mil FEP fluorocarbon resin

FEP = Fluorinated Ethylene Propylene

Ⓓ denotes changes.



FSC 6145

TABLE II. Performance details.

| Part Number | Durability Test Load for | | Abrasion Resistance | | | | Bend Testing | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Mandrel diameter (inches) (±3%) | | | | Test Load (lbs) (±3%) | |
| | Color Markings (grams) | Insulation Coatings (lbs) | Weight Support Bracket | Weight (lbs) | Tension Load (lbs) | Resistance (inches of tape) (min) | Life Cycle (Oven & bend tests) 1/ | Cold Bend Test | Wrap test | Wrinkle Test Ⓓ | Life Cycle (Oven & bend tests) 1/ | Cold Bend Test |
| Ⓓ M81381/14-28-* | 50 | .25 | A | .75 | 1.0 | 9 | .250 | | .125 | .125 | .25 | |
| M81381/14-26-* | 75 | .50 | A | 1.0 | 1.0 | 10 | .250 | | .125 | .125 | .50 | |
| M81381/14-24-* | 75 | .75 | A | 1.0 | 1.0 | 12 | .250 | | .125 | .156 | .50 | |
| M81381/14-22-* | 100 | 1.00 | A | 1.0 | 1.0 | 14 | .250 | | .125 | .188 | .75 | |
| M81381/14-20-* | 100 | 1.00 | A | 1.0 | 1.0 | 16 | .250 | | .125 | .250 | .75 | |

1/ Also for bend tests after immersion

## WIRE RATINGS AND ADDITIONAL REQUIREMENTS

TEMPERATURE RATING: 200°C (392°F) max conductor temperature
VOLTAGE RATING: 600 volts (rms) at sea level
BLOCKING: Oven temperature, 200°C (392 ±3.6°F)
*COLOR: As specified in contract or order in accordance with MIL-W-81381*
FLAMMABILITY: 3 sec (max) after-flame
3.0 inches (max) flame travel
No flaming of tissue paper
HUMIDITY RESISTANCE: 5 megohms-1000 ft, min insulation resistance after humidity exposure
IDENTIFICATION OF PRODUCT: Required for sizes 22 and larger
IDENTIFICATION, STRIPING, OR BANDING DURABILITY: 125 cycles (250 strokes); see Table II for test load.
IMPULSE DIELECTRIC TEST: 100% test; impulse voltage as specified in MIL-W-81381
INSULATION RESISTANCE: 2500 megohms-1000 ft (min)
LAMINATION SEALING: Oven temperature, 230 ±2°C (446 ±3.6°F)
LIFE CYCLE: Oven temperature, 230 ±2°C (446 ±3.6°F) for 500 hours
MINIMUM WALL THICKNESS: 8.0 mils
POLYIMIDE CURE TEST: Applicable
*PROPELLANT RESISTANCE: Test not required*
Ⓓ RESIN COATING DURABILITY: 250 cycles (500 strokes); see Table II for test load.
SHRINKAGE: 0.031 inch (max) at 230 ±2°C (446 ±3.6°F)
SURFACE RESISTANCE: 5 megohms-inches (min), initial and final readings
THERMAL SHOCK: Oven temperature, 200 ±2°C (392 ±3.6°F) Change in measurement, 0.031 inch (max)
WET DIELECTRIC TEST: 2500 volts (rms)
Ⓓ WRINKLE TEST: No wrinkles shall be visible in the insulation at 3X magnification (3 diameters) after bending the wire one full turn around the mandrel specified in Table II. (The wire may be examined on the mandrel or after removal of the mandrel leaving the coil intact.) This test shall be included in the MIL-W-81381 quality conformance inspection as a Group II characteristic, one specimen to be tested from each sample unit.

Caution: This wire should not be subjected to physical contact with missile propellants.

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Army - EL
Air Force - 11

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Army - AT, AV, MU

Review activities:
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Army - MI
Air Force - 99
DSA - IS
NSA

Preparing activity:
Navy - AS
(Project No. 6145-0705-8)

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