MILITARY SPECIFICATION SHEET

WIRE, ELECTRIC, FLUOROCARBON/POLYIMIDE INSULATED, MEDIUM WEIGHT, SILVER 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.

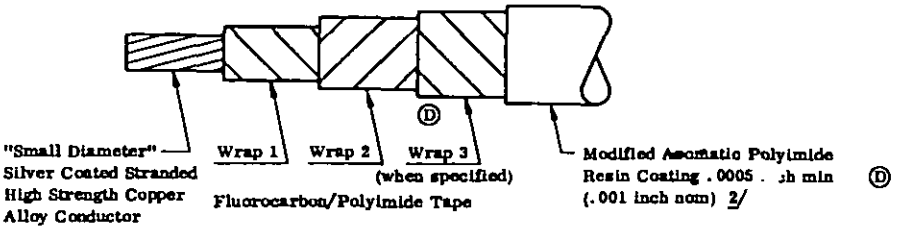

TABLE I. Construction details.

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/
Ⓓ M81381/13-28-*	28	7 x 36	.014	.015	74.4	.031-.035	1.0	1.2	.1/1/.1	.1/1/.1	.1/1/.1
M81381/13-26-*	26	19 x 38	.018	.020	44.8	.036-.040	1.4	1.5	0/2/.5	.1/1/.1	No Third Wrap
M81381/13-24-*	24	19 x 36	.023	.024	28.4	.041-.045	2.0	2.2			
M81381/13-22-*	22	19 x 34	.029	.031	17.5	.047-.051	3.0	3.1			
M81381/13-20-*	20	19 x 32	.037	.039	10.7	.055-.059	4.6	4.8			

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 - M81381/13-20-N; same with orange stripe - M81381/13-20-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 (D)	Life Cycle (Oven & bend tests) 1/	Cold Bend Test
(D) M81381/13-28-*	50	.25	A	.75	1.0	9	.250		.125	.125	.25	
M81381/13-26-*	75	.50	A	1.0	1.0	10	.250		.125	.125	.50	
M81381/13-24-*	75	.75	A	1.0	1.0	12	.250		.125	.156	.50	
M81381/13-22-*	100	1.00	A	1.0	1.0	14	.250		.125	.188	.75	
M81381/13-20-*	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 ±2°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
(D) 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)
(D) 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.

Custodians:
Navy - AS
Army - EL
Air Force - 11

User activities:
Navy - MC, OS
Army - AT, AV, MU

Review activities:
Navy - EC, SH
Army - MI
Air Force - 99
DSA - IS
NSA

Preparing activity:
Navy - AS
(Project No. 6145-0705-7)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

MIL-W-81381/13D Wire, Electric, Fluorocarbon/Polyimide Insulated,...etc.

NAME OF ORGANIZATION AND ADDRESS	CONTRACT NUMBER
	MATERIAL PROCURED UNDER A ☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?

   ☐ YES ☐ NO *(If "Yes", in what way?)*

4. REMARKS

SUBMITTED BY *(Printed or typed name and address - Optional)*	TELEPHONE NO.
	DATE

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