

INCH-POUND
MIL-DTL-81381/9E
17 February 2017
SUPERSEDING
MIL-W-81381/9D
17 March 1977

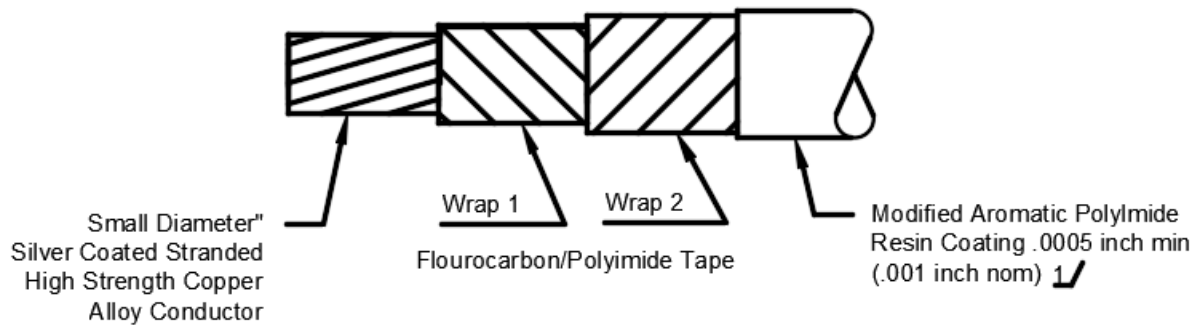
DETAIL SPECIFICATION SHEET

WIRE, ELECTRIC, FLUOROCARBON/POLYIMIDE INSULATED, LIGHT WEIGHT, SILVER COATED HIGH STRENGTH COPPER ALLOY CONDUCTOR, 600 VOLTS, 200 DEGREES C, NOMINAL 5.8 MIL WALL

Inactive for new design after 16 June 1997. For new design, use SAE AS22759/181.

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

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-81381.



NOTES:

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

FIGURE 1 - Wire construction.



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TABLE I. Construction details.

Part or Identification Number (PIN) 1/	Wire Size	Conductor			Finished Wire			Insulation Tapes			
		Stranding (Number of Strands x AWG Gage of Strands)	Diameter (inches)		Resistance at 20° C (68° F) (ohms/1000 ft.) (max)	Diameter (inches) (min – max)	Weight (lbs/1000 ft.) (max)	Wrap 1		Wrap 2	
			min	max				Tape Code 2/	Overlap (%) (min)	Tape Code 2/	Overlap (%) (min)
M81381/9-30-*	30	7 x 38	.011	.012	117.4	.023 - .026	0.6	.1/1.1	50	.1/1.1	50
M81381/9-28-*	28	7 x 36	.014	.015	74.4	.026 - .029	0.9				
M81381/9-26-*	26	19 x 38	.018	.020	44.6	.031 - .034	1.3				
M81381/9-24-*	24	19 x 36	.023	.024	23.4	.034 - .037	1.9				
M81381/9-22-*	22	19 x 34	.029	.031	17.5	.041 - .044	2.9				
M81381/9-20-*	20	19 x 32	.037	.039	10.7	.049 - .052	4.4				

- 1/ PIN: The asterisks in the PIN column of Tables I and II shall be replaced by color code designators in accordance with MIL-STD-681, except that opaque dark yellow as defined in MIL-DTL-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 – M81381/9-20-N, same with orange stripe – M81381/9-20-N3. A non-white insulation may be used with striping or banding (certain color combinations with low color contrast can make identification difficult or increase the chance of misidentification).
- 2/ Tape Code: .1/1.1 0.1mil FEP (Fluorinated Ethylene Propylene) fluorocarbon resin/1 mil polyimide film/0.1 mil FEP fluorocarbon resin.

TABLE II. Performance details.

Part or Identification Number (PIN)	Durability Test Load for		Abrasion Resistance				Bend Testing					
	Color Marking (grams)	Insulation Coating (lbs)	Weight Support Bracket	Weight (lbs)	Tension Load (lbs)	Resistance (inches of tape) (min)	Mandrel diameter (inches) (±3%)				Test Load (lbs) (±3%)	
							Life Cycle (Oven & bend tests) 1/	Cold Bend Test	Wrap Test	Wrinkle Test	Life Cycle (Oven & bend tests) 1/	Cold Bend Test
M81381/9-30-*	50	.25	A	.125	1.0	21	.250	.125	.125	.125	.50	
M81381/9-28-*	50	.25	A	.125	1.0	21	.250	.125	.125	.125	.50	
M81381/9-26-*	75	.50	A	.125	1.0	24	.250	.125	.125	.125	.50	
M81381/9-24-*	75	.75	A	.125	1.0	24	.250	.125	.125	.125	.50	
M81381/9-22-*	100	1.00	A	.125	1.0	24	.250	.125	.156	.156	.50	
M81381/9-20-*	100	1.00	A	.125	1.0	24	.250	.125	.188	.188	.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-DTL-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 AWG 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-DTL-81381

Insulation resistance: 2500 megohm-1000 ft. (min)

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Lamination sealing: Oven temperature $230 \pm 2^\circ \text{C}$ ($446 \pm 3.6^\circ \text{F}$)
Life cycle: Oven temperature $230 \pm 2^\circ \text{C}$ ($446 \pm 3.6^\circ \text{F}$) for 500 hours
Minimum wall thickness: 5.0 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 inches (max) at $230 \pm 2^\circ \text{C}$ ($446 \pm 3.6^\circ \text{F}$)
Surface resistance: 5 megohms-inches (min), initial and final readings
Thermal shock: Oven temperature, $200 \pm 2^\circ \text{C}$ ($392 \pm 3.6^\circ \text{F}$), Change in measurement: 0.031 inches (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 coat intact.) This test shall be included in the MIL-DTL-81381 quality conformance inspection as Group II characteristic, one specimen to be tested from each sample unit.

Intended use note: The wire of this specification sheet is intended for hookup applications in electronic chassis. It is also intended for use in bundles under a protective jacket for interconnecting applications (e.g. airframes).

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

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.

Referenced document. In addition to the basic specification MIL-DTL-81381, this document references:
MIL-STD-681
AS22759/181

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - AS
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

Review activities:
Army – AR, AT, AV, MI
Navy – EC, MC, OS, SH

(Project 6145-2016-050)

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