

INCH-POUND

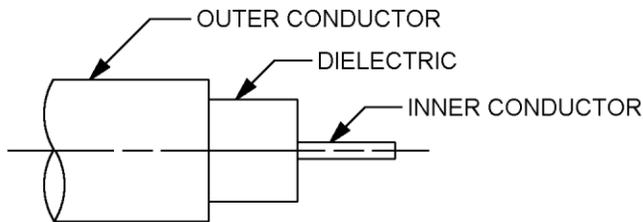
MIL-DTL-17/130F  
w/AMENDMENT 2  
04 May 2011  
SUPERSEDING  
MIL-DTL-17/130F  
w/AMENDMENT 1  
21 May 2009

DETAIL SPECIFICATION SHEET

CABLES, RADIO FREQUENCY, COAXIAL, 0.141 INCH (3.58 mm)  
DIAMETER, SEMIRIGID, 50 OHMS

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-17.



Inches	mm
.0003	0.008
.0005	0.013
.0007	0.018
.001	0.03
.002	0.05
.0362	0.919
.0367	0.932
.1175	2.984
.141	3.58

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Metric conversions are for table I.

FIGURE 1. Configuration.

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TABLE I. Description.

Part or Identifying Number (PIN)	Inner Conductor	Dielectric Core	Outer Conductor <u>1/</u>	
M17/130-RG402	Solid, silver-coated copper-clad steel, diameter, .0362 ±.0007 inch.	Type F-1 diameter, .1175 ±.0010 inch.	Copper tubing diameter, .141 ±.001 inch. <u>2/</u>	
M17/130-00001			Copper tubing diameter, .141+.002, -.001 inch tin plated in accordance with ASTM B545, .0003 inch, minimum thick. <u>2/ 3/</u>	
M17/130-00002			.0362 ±.0007 inch diameter. <u>4/</u>	Seamless copper tubing, diameter .141 ±.001 inch. <u>2/</u>
M17/130-00003			.0362 ± .0007 inch diameter. <u>4/</u>	Copper tubing diameter, <u>2/ 3/</u> .141 +.002 inch, -.001 inch, tin-plated in accordance with ASTM B545, .0003 inch, minimum thick.
M17/130-00004 <u>5/ 6/</u>	Solid, silver-coated copper-clad steel diameter .0362 ± .0007 inch.	Type F-1 diameter, .1175 ± .0010 inch.	Copper tubing diameter, .141 ± .001 inch.	
M17/130-00005 <u>5/ 6/</u>			Copper tubing diameter, <u>3/</u> .141 +.002 inch, -.001 inch, tin-plated in accordance with ASTM B545, .0003 inch, minimum thick	
M17/130-00006 <u>5/ 6/</u>			.0362 ± .0007 inch diameter. <u>4/</u>	Copper tubing diameter, .141 ± .001 inch.
M17/130-00007 <u>5/ 6/</u>			.0362 ± .0007 inch, diameter. <u>4/</u>	Copper tubing diameter, <u>3/</u> .141 +.002 inch, -.001 inch, tin-plated in accordance with ASTM B545, .0003 inch, minimum thick
M17/130-00008	Solid, silver-coated copper-clad steel diameter .0362 ± .0007 inch.	Type F-1 diameter, .1175 ± .0010 inch.	Aluminum tubing, diameter .141 ±.001 inch. <u>7/</u>	
M17/130-00009			Aluminum tubing, diameter .141 +.002 inch, -.001 inch tin plated in accordance with ASTM B545, .0003 inch, minimum thick. <u>7/</u>	
M17/130-00010			.0362 ±.0007 inch diameter. <u>4/</u>	Aluminum tubing, diameter .141 ±.001 inch. <u>7/</u>
M17/130-00011			Aluminum tubing, diameter .141 +.002 inch, -.001 inch, tin plated in accordance with ASTM B545, .0003 inch, minimum thick. <u>7/</u>	

See notes at end of table.

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TABLE I. Description – Continued.

PIN	Inner conductor	Dielectric core	Outer conductor <u>1/</u>
M17/130-00012	Solid, silver-coated copper-clad steel diameter .0362 ± .0007 inch.	Type F-1 diameter, .1175 ± .0010 inch.	Copper tubing, diameter .141 +.002, -.001 inch, silver plated in accordance with ASTM B700, type 2, grade A or grade D, 300μ inches minimum. <u>3/</u>
M17/130-00013	.0362 ±.0007 inch diameter. <u>4/</u>		Copper tubing, diameter .141 +.002, -.001 inch, silver plated in accordance with ASTM B700, type 2, grade A or grade D, 300μ inches minimum. <u>3/</u>
M17/130-00014	Solid, silver-coated copper-clad steel diameter .0362 ± .0007 inch.		Copper tubing, diameter .141 +.002, -.001 inch. 90/10 tin plated in accordance with SAE-AMS-P-81728, .0003 inch, thick minimum.
M17/130-00015	Solid silver coated copper wire, diameter .0362 ±.0007 inch.		

1/ Welded outer conductor in accordance with ASTM B447 and MIL-DTL-17 is optional.

2/ Hard outer conductor required (outer conductor after sinking on the dielectric): tensile strength 33,000 psi, minimum, 30 percent elongation, maximum, measured over two inches.

3/ The outer diameter dimension is after plating.

4/ Nickel-coated, copper-clad steel wire, conforming to ASTM B559, class N 40 HS two percent, with uniform and continuous silver coating, 40 microinches minimum thick. Wire shall be drawn to final size after plating.

5/ Tensile strength (outer conductor prior to sinking on the dielectric): 35,000 inch<sup>2</sup>-pounds maximum, 40 percent elongation minimum measured over two inches.

6/ These PIN's are for soft outer conductor cables only.

7/ The tensile strength (outer conductor prior to sinking on the dielectric) shall be 15,000 psi, maximum, 40 percent elongation minimum measured over 2 inches.

ENGINEERING INFORMATION:

Continuous working voltage: 1,900 V rms, maximum.

Operating frequency: 20 GHz, maximum.

Velocity of propagation: 69.5 percent, nominal.

Power rating: See figures 2 and 3.

Operating temperature range: -40°C to + 125°C.

Inner conductor properties:

DC resistance (maximum at 20°C): 2.06 ohms per 100 feet.

Elongation: 10 percent, minimum for class 40 A wire.  
1.0 percent minimum for class 40 HS wire.

Tensile strength: 40,000 inch<sup>2</sup>-pounds minimum for class 40 A wire.  
90,000 inch<sup>2</sup>-pounds minimum for class 40 HS wire.

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Tensile strength (outer-conductor): 35,000 inch<sup>2</sup>-pounds, maximum, 40 percent elongation minimum measured over two inches (not applicable to M17/130-RG402 through -00003) in accordance with ASTM E8/E8M.

Engineering notes: This cable is useful in critical RF performance applications (see connector series SMA in accordance with MIL-PRF-39012). This cable is generally manufactured in 20-foot lengths. Different lengths are available.

REQUIREMENTS:

Dimensions, configuration, and descriptions: See figure 1 and table I.

Environmental and mechanical:

Eccentricity: 6 percent, maximum.

Adhesion of conductors:

Inner conductor to core: 4 pounds minimum; 65 pounds, maximum.

Outer conductor to core: 4 pounds minimum.

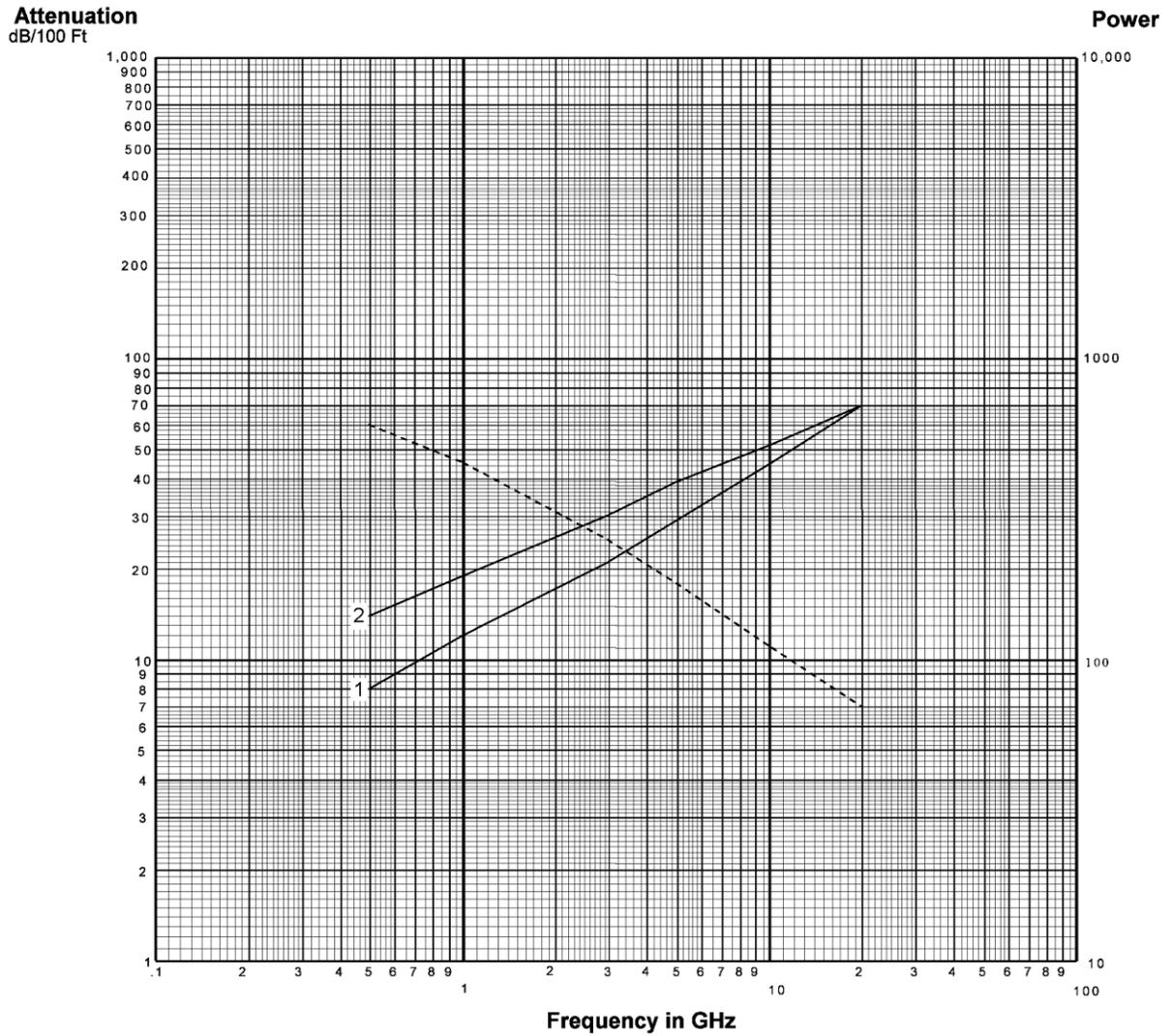
Aging stability: Not applicable.

Stress crack resistance: Not applicable.

Cold bend: Not applicable.

Outer conductor integrity: Four specimens, approximately 2 feet long, shall be cut from the sample unit. The specimens shall be suspended in a heat chamber without touching one another or the walls of the chamber and conditioned for 1 hour 30 minutes minimum at the specified maximum operating temperature  $\pm 5^{\circ}\text{C}$ . Heated air shall be circulated so as to maintain a uniform test temperature. After the conditioning period, the specimens shall be removed from the heat chamber and conditioned at room ambient temperature for 4 hours minimum. The specimen shall then have one end immersed into molten solder to a depth of 0.5 inch minimum for 15 seconds minimum. The molten solder temperature shall be  $+230^{\circ}\text{C}$  minimum. After the conditioning period, the specimens shall be removed from the molten solder and conditioned at room ambient temperature for 1 hour minimum. Examine the specimens for cracks, flaws, or other damage in the outer conductor material.

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Maximum attenuation ————— (Test requirements shall be as noted as line indicates on graph)

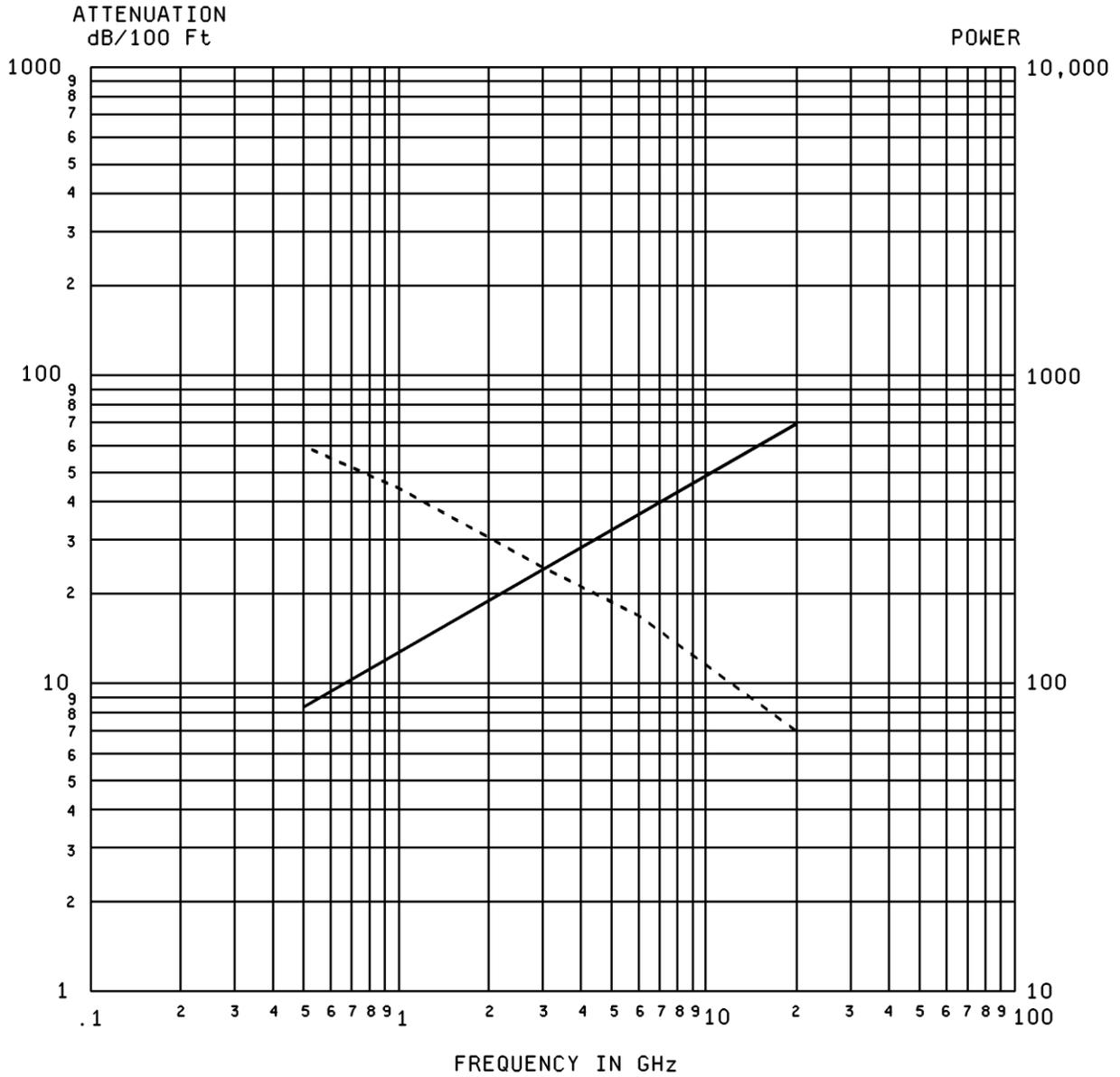
Maximum power -----  
At 25°C at sea level.

1. M17/130-RG402, -00001, -00004, -00005 and -00012
2. M17/130-00002, -00003, -00006, -00007, -00010 -00011 and -00013

MHz	Attenuation		Power Watts At 1.5 SWR
	dB 1	dB 2	
500	8	14	600
1000	12	19	450
3000	21	31	250
5000	29	39	180
10000	45	52	120
20000	70	70	70

FIGURE 2. Power rating and attenuation.

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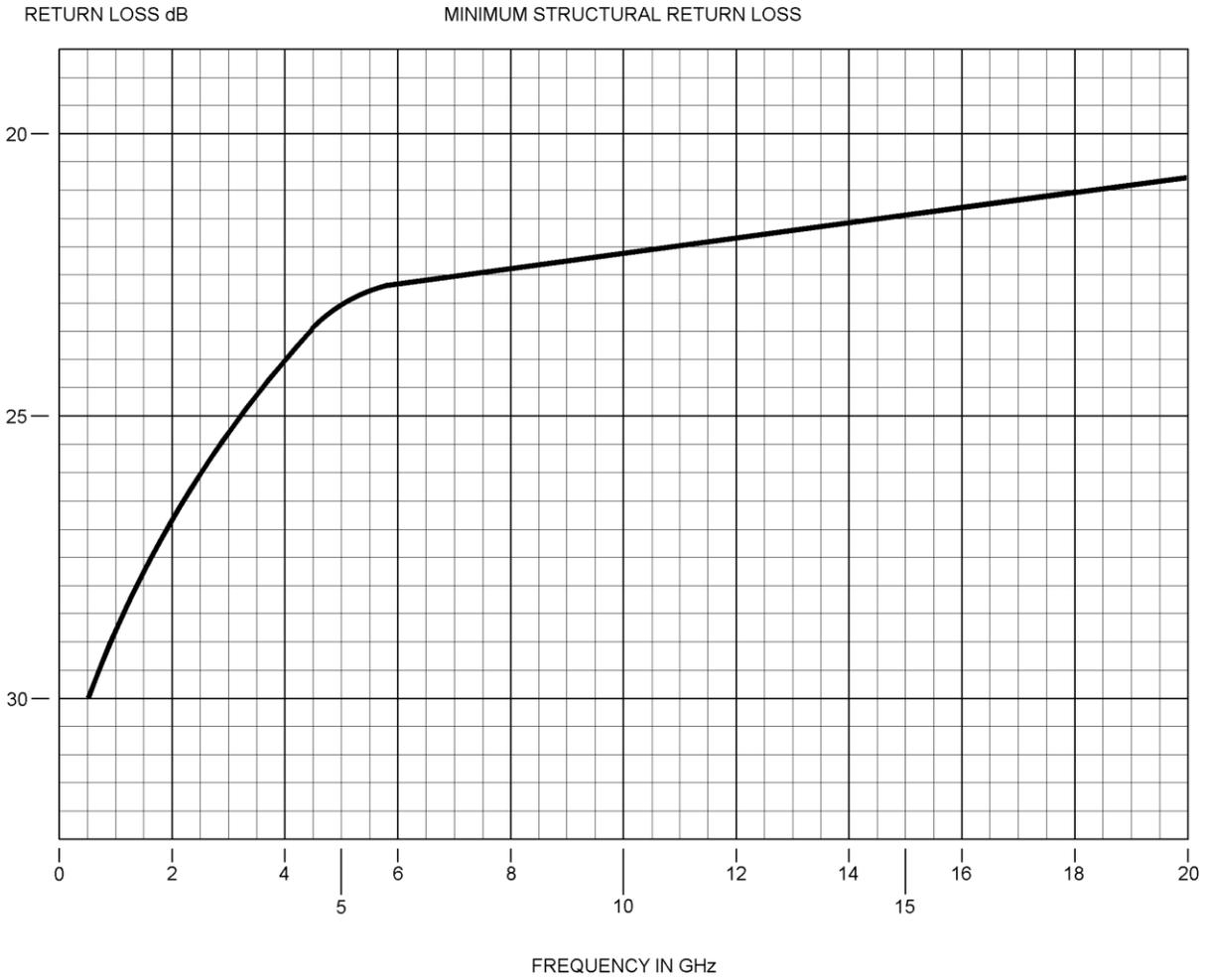
Maximum attenuation —————  
Maximum power - - - - -

Attenuation and power ratings apply to  
M17/130-00008 and -00009.

Attenuation		Power
MHz	dB	Watts At 1.5 SWR
500	8.3	600
1000	12.1	450
3000	22.5	250
5000	30.1	180
10000	45.5	120
20000	70.0	70

FIGURE 3. Power and attenuation for aluminum outer conductor cables.

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Structural Return Loss	
MHz	dB
500	30
5000	23
18000	21

FIGURE 4. Minimum structural return loss cable.

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SWR	Reflection coefficient	Return loss dB
17.3910	.8913	1
8.7242	.7943	2
5.8480	.7079	3
4.4194	.6310	4
3.5698	.5623	5
3.0095	.5012	6
2.6146	.4467	7
2.3229	.3981	8
2.0999	.3548	9
1.9250	.3162	10
1.7849	.2818	11
1.6709	.2512	12
1.5679	.2239	13
1.4985	.1995	14
1.4326	.1778	15
1.3767	.1585	16
1.3290	.1413	17
1.2880	.1259	18
1.2528	.1122	19
1.2222	.1000	20
1.1957	.0891	21
1.1726	.0794	22
1.1524	.0708	23
1.1347	.0631	24
1.1192	.0562	25
1.1055	.0501	26
1.0935	.0447	27
1.0829	.0398	28
1.0736	.0355	29
1.0653	.0316	30

FIGURE 4. Minimum structural return loss cable – Continued.

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Dimensional stability:  $+125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

Core to jacket: .015 inch, maximum.

Contamination: Not applicable.

Bendability: Mandrel diameter .50 inch, maximum (except dash numbers -00004 through -00007 mandrel diameter shall be .150 inch maximum). Mandrel diameter .250 inch maximum for -00008 through -00011. (Performance may degrade after being subjected to the mandrel test).

Flammability: Not applicable.

Weight: 34.4 pounds per 1000 feet, maximum (M17/130-RG402, M17/130-00002, -00004, -00006).

35.1 pounds per 1000 feet, maximum (M17/130-00001, M17/130-00003, -00005, -00007).

18.8 pounds per 1000 feet, maximum (M17/130-00008 and -00010).

20.5 pounds per 1000 feet, maximum (M17/130-00009 and -00011).

35.1 pounds per 1000 feet, maximum (M17/130-00012, -00013, -00014 and -00015).

Electrical:

Test frequency: 500 MHz to 20 GHz.

Spark test: Not applicable.

Voltage withstanding: 5,000 V rms, minimum.

Insulation resistance: Not applicable.

Corona extinction voltage: 1,900 V rms, minimum.

Characteristic impedance: 50 ohms  $\pm 1$ .

Attenuation: See figures 2 and 3.

Structural return loss: See figure 4.

Capacitance: 29.9 pF per foot, maximum.

Capacitance stability: Not applicable.

Capacitance unbalance: Not applicable.

Transmission unbalance: Not applicable.

Phase stability: Not applicable.

Mechanically induced noise voltage: Not applicable.

Time delay: Not applicable.

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PIN: See table I.

Supersession data: See table II.

TABLE II. Cross reference of PIN.

PIN	Superseded PIN or type designation
M17/130-RG402	RG-402/U

Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Referenced documents. In addition to MIL-DTL-17, this document references the following:

ASTM B447  
ASTM B545  
ASTM B559  
ASTM B700  
ASTM E8/E8M  
MIL-PRF-39012  
SAE-AMS-P-81728

CONCLUDING MATERIAL

Custodians:  
Army – CR  
Navy – EC  
Air Force – 85  
DLA - CC

Preparing activity:  
DLA - CC  
(Project 6145-2010-039)

Review activities:  
Army – AR, AT, AV, CR4, MI  
Navy – AS, MC, OS, SH  
Air Force – 19, 99

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.daps.dla.mil>.