

MIL-DTL-17 Coaxial Cables

- including M17/176-00002 Twinaxial Data Bus Cable

Harbour Industries is a QPL approved manufacturer of high temperature, high performance coaxial cables supplied in exact accordance with the MIL-DTL-17 specification. The information referenced has been taken from the MIL-DTL-17 "slant sheets" which define complete physical and electrical characteristics for each MIL-DTL-17 part number including dimensional parameters, dielectric materials, shield constructions, VSWR, and maximum attenuation over various frequency ranges. For complete individual slant sheets, see the Defense Supply Center Columbus (DSCC) link in the Industry Links section of Harbour's website.

The Importance of VSWR Sweep Testing

When selecting a 50 ohm coaxial cable, constructions with VSWR requirements are highly recommended. Manufacturing and sweep testing cables with concern for VSWR ensures a quality cable free of spikes over the frequency range referenced on the slant sheet.

Precision PTFE Dielectrics Used

All of the PTFE dielectric coax cables listed are high temperature, high performance constructions exhibiting high dielectric strength and low capacitance in proportion to the cable's dielectric constant. Harbour manufactures all PTFE dielectric cable constructions with tolerances tighter than the MIL-DTL-17 specification to ensure uniformity of electrical characteristics, especially impedance, attenuation, and VSWR.

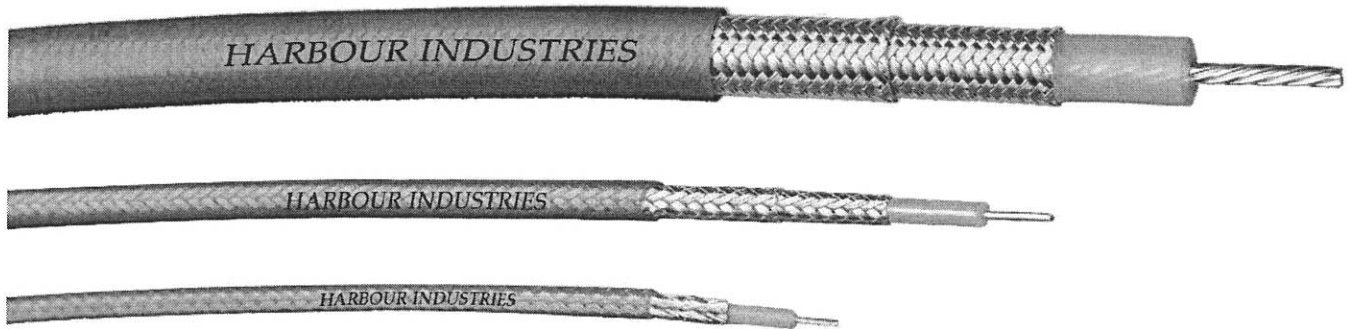
Constructions with PTFE Tape Wrapped Jackets

Harbour manufactures PTFE tape wrapped cables - specifically RG187 A/U, RG188 A/U, RG195 A/U, and RG196 A/U - in accordance with a previous revision of the MIL-DTL-17 specification. These constructions can withstand operating temperatures up to 250 ° versus 200° C for FEP jacketed cables. PTFE tape wrapped cables are generally more flexible than their FEP jacketed counterpart. Alternative 250° constructions are also available with PFA jackets.

M17 Part	Center Conductor	Dielectric Diameter	Shield	Shield Diameter	Jacket	Overall Diameter	Bend Radius	Weight (lbs/mft)	Comments
M17/60-RG142	.037" SCCS	.116"	SPC (2)	.160"	FEP	.195"	1.0"	43.0	
M17/93-RG178	.0120" (7/.004")SCCS	.033"	SPC	.051"	FEP	.071"	0.4"	6.3	
M17/94-RG179	.0120" (7/.004")SCCS	.063"	SPC	.080"	FEP	.100"	0.4"	10.8	
M17/95-RG180	.0120" (7/.004")SCCS	.102"	SPC	.118"	FEP	.141"	0.7"	19.8	
M17/111-RG303	.037" SCCS	.116"	SPC	.136"	FEP	.170"	0.9"	31.0	
M17/112-RG304	.059" SCCS	.185"	SPC (2)	.240"	FEP	.280"	1.4"	94.0	
M17/113-RG316	.0201" (7/.0067")SCCS	.060"	SPC	.075"	FEP	.098"	0.5"	12.2	
M17/127-RG393	.094" (7/.0312") SPC	.285"	SPC (2)	.314"	FEP	.390"	2.0"	165.0	
M17/128-RG400	.0384" (19/.008") SPC	.116"	SPC (2)	.156"	FEP	.195"	1.0"	50.0	
M17/131-RG403	.0120" (7/.004")SCCS	.033"	SPC (2)	.090"	FEP (2)	.116"	0.6"	15.0	Triaxial RG-178
M17/152-00001	.0201" (7/.0067")SCCS	.060"	SPC (2)	.091"	FEP	.114"	0.6"	18.5	Double Shield RG-316
M17/176-00002	.0235" (19/.005")SPA(2)	.042"	SPA	.100"	PFA	.129"	0.6"	18.0	Twinax
RG187 A/U	.0120" (7/.004")SCCS	.063"	SPC	.079"	PTFE	.100"	0.5"	10.0	Tape Wrapped Jacket
RG188 A/U	.0201" (7/.0067")SCCS	.060"	SPC	.080"	PTFE	.100"	0.5"	11.0	Tape Wrapped Jacket
RG195 A/U	.0129" (7/.004")SCCS	.102"	SPC	.117"	PTFE	.141"	0.7"	18.0	Tape Wrapped Jacket
RG196 A/U	.0120" (7/.004")SCCS	.034"	SPC	.050"	PTFE	.067"	0.4"	6.0	Tape Wrapped Jacket

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				Attenuation (dB/100 ft)							
M17 Part	Impedance (ohms)	Capacitance (pF/ft)	Max Voltage	100 MHz Typ/Max	400 MHz Typ/Max	1 GHz Typ/Max	2.4 GHz Typ/Max	5 GHz Typ/Max	10 GHz Typ/Max	Max Frequency (GHz)	
M17/60-RG142	50 +/-2	29.4	1900	3.8 / 4.4	8.1 / 9.3	13.7 / 15.3	23.3 / 25.0	37.4 / 41.8	60.0 / 70.7	12.4	
M17/93-RG178	50 +/-2	29.4	1000	14.7 / 16.0	30.2 / 33.0	48.9 / 52.0	78.7 / 83.3				
M17/94-RG179	75 +/-3	19.4	1200		15.8 / 21.0						
M17/95-RG180	95 +/-5	17.4	1500	5.7 / 6.6	11.7 / 17.4	19.2 / 23.0					
M17/111-RG303	50 +/-2	29.4	1900	4.0 / 4.4	8.1 / 9.3	13.4 / 15.3					
M17/112-RG304	50 +/-2	29.4	3000	2.4 / 2.7	5.8 / 6.4	10.0 / 11.1	17.6 / 19.6	25.4 / 28.2		8.0	
M17/113-RG316	50 +/-2	29.4	1200	7.8 / 11.0	16.0 / 21.0	26.3 / 38.0	43.0 / 55.4			3.0	
M17/127-RG393	50 +/-2	29.4	1500	2.2 / 2.5	4.6 / 5.0	7.9 / 9.2	13.5 / 14.2	21.9 / 26.8	35.5 / 37.9	11.0	
M17/128-RG400	50 +/-2	29.4	1900	4.1 / 4.5	8.6 / 10.5	14.2 / 18.1	23.6 / 30.2	37.0 / 52.1	57.8 / 78.0	12.4	
M17/131-RG403	50 +/-2	29.4	1000		33.3 / 37.0						
M17/152-00001	50 +/-2	29.4	1200	7.6 / 11.0	16.0 / 21.0	26.2 / 38.0	41.2 / 55.4	61.3 / 110.0	90.0 / 170.0	12.4	
M17/176-00002	77 +/-7	19.0	1000								
RG187 A/U	75 +/-3	19.4	1200		15.5 / 21.0						
RG188 A/U	50 +/-2	29.4	1200	7.6 / 11.0	16.0 / 21.0	26.2 / 38.0	41.2 / 55.4			3.0	
RG195 A/U	95 +/-5	17.4	1500		11.7 / 17.4						
RG196 A/U	50 +/-2	29.4	1000	13.0 / 16.0	27.2 / 33.0	41.7 / 52.0	64.0 / 80.0			3.0	

° UL approvals for many of the MIL-DTL-17 cables listed are available upon request.

° Maximum frequencies are those referenced on individual slant sheets of the MIL-DTL-17 specification. No values are given above 400MHz for unswept constructions because MIL-DTL-17 specification recommends these cables should not be used above this frequency.

° The MIL-DTL-17 specification references maximum attenuation values as shown in the above chart, however typical values are substantially lower. For the more popular constructions, the following K factors may be used to calculate typical attenuation at any specific frequency.

	M17/60-RG142	M17/93-RG178	M17/94-RG179	M17/113-RG316	M17/128-RG400	M17/127-RG393
K1	.355	1.420	.766	.750	.390	.200
K2	0.00245	0.0034	0.00119	0.0026	0.00188	0.00155

INCH-POUND

MIL-DTL-17/128B
w/AMENDMENT 2
25 February 2005
SUPERSEDING
MIL-C-17/128B
AMENDMENT 1
18 July 1985

DETAIL SPECIFICATION SHEET

CABLE, RADIO FREQUENCY, FLEXIBLE, COAXIAL,
50 OHMS, M17/128-RG400

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

The complete requirements for acquiring the product described herein shall consist of this specification sheet and MIL-C-17.

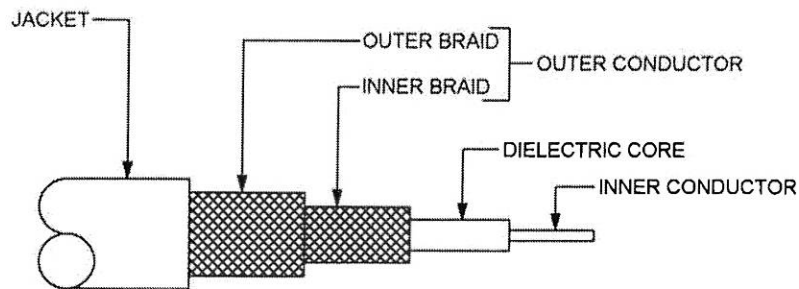


FIGURE 1. Configuration.

TABLE I. Description.

Components	Construction details
Inner conductor	Nineteen strands of silver-coated copper wire at .008 inch each. Overall diameter: .0384 inch \pm .0010.
Dielectric core	Type F-1: Solid extruded PTFE. Diameter: .116 inch \pm .005.
Outer conductor	Double braid of AWG size 36 silver-coated copper wire. Diameter: .171 inch maximum.
Inner braid	Coverage: 94.8% nominal Carriers: 16 Ends: 7 Picks/inch: 11.5 \pm 10%
Outer braid	Coverage: 93.6% nominal Carriers: 16 Ends: 7 Picks/inch: 14.5 \pm 10%
Jacket	Type IX: Diameter: .195 inch \pm .005.

MIL-DTL-17/128B
w/AMENDMENT 2

ENGINEERING INFORMATION

Continuous working voltage: 1,400 V rms, maximum.

Operating frequency: 12.4 GHz, maximum.

Velocity of propagation: 69.5 percent, nominal.

Power rating: See figure 2.

Operating temperature range: -55°C to + 200°C.

Inner conductor properties:

DC resistance (maximum at 20°C): 0.91 ohm per 100 feet.

Elongation: 10 percent, minimum.

Tensile strength: Not applicable.

Engineering notes: This cable is useful in general purpose, high temperature applications (see connector series "TNC", "BNC", and "SMA" in accordance with MIL-PRF-39012).

REQUIREMENTS:

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

Environmental and mechanical:

Adhesion of conductors:

Inner conductor to core: 4 pounds, minimum; 30 pounds, maximum.

Aging stability: Not applicable.

Stress crack resistance: +230° ± 5°C; mandrel size seven times the jacket diameter.

Outer conductor integrity: Not applicable.

Cold bend: -55° C ±2° C.

Dimensional stability: +200°C ± 5°C.

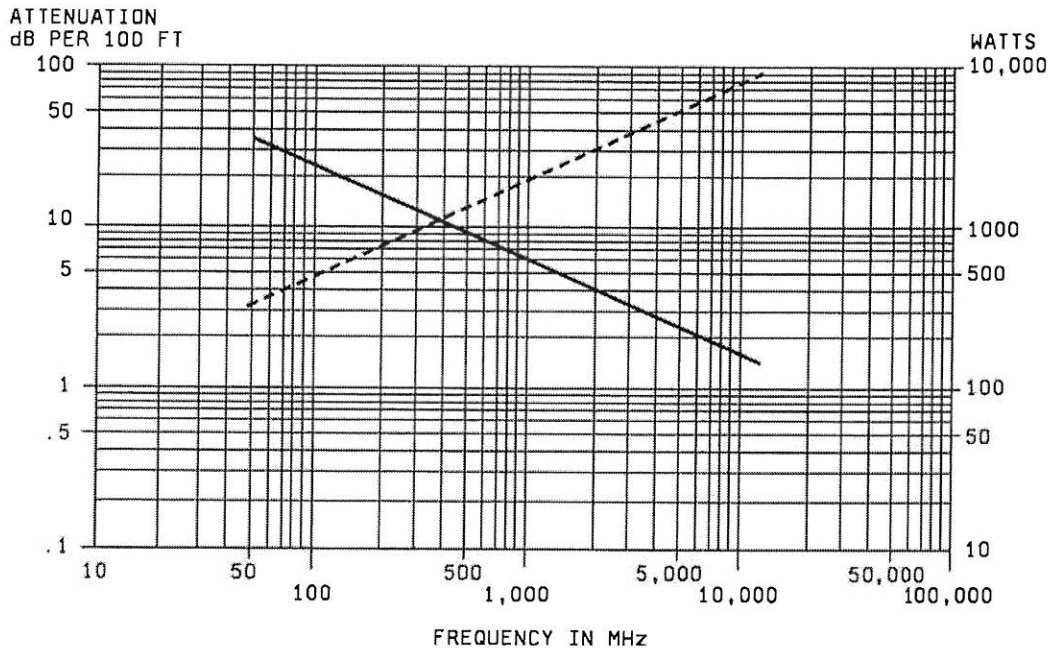
Inner conductor from core: .187 inch, maximum.

Inner conductor from jacket: .312 inch, maximum.

Bendability: Not applicable.

Weight: 5 pounds per 100 feet, maximum.

MIL-DTL-17/128B
w/AMENDMENT 2

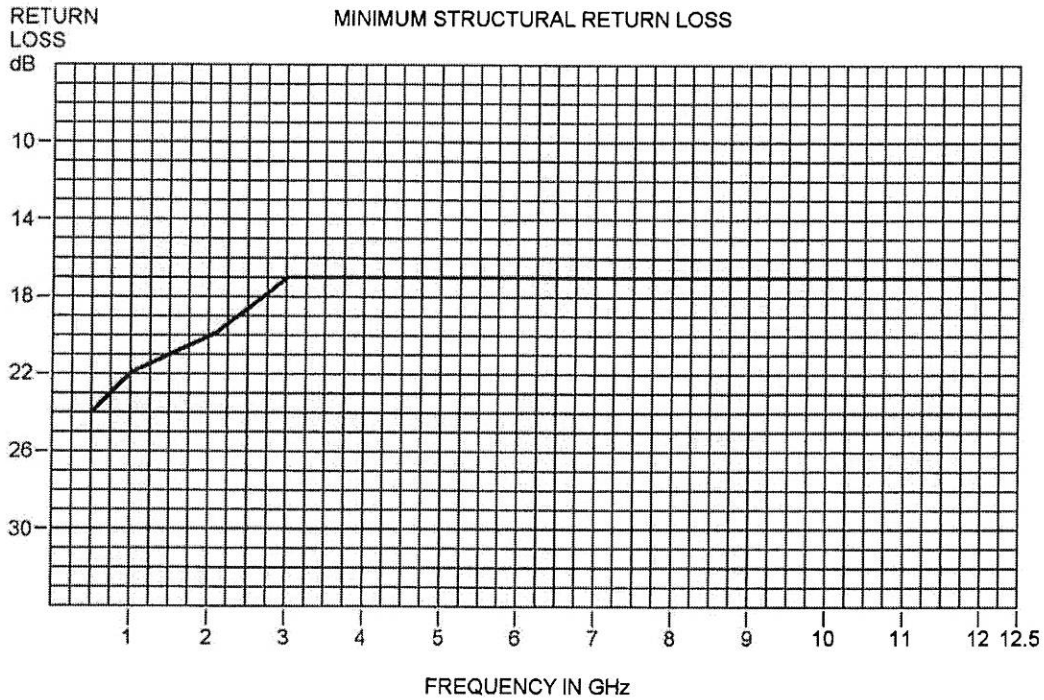


TABULATED VALUES ARE FOR REFERENCE ONLY.
THE VALUES ON THE CHART REPRESENT THE REQUIREMENTS.
MAXIMUM ATTENUATION AT 25° C, SEA LEVEL - - - - -
MAXIMUM POWER AT 25° C, SEA LEVEL - - - - -

Frequency MHz	Attenuation dB
50	3.2
100	4.5
400	10.5
1,000	17
3,000	38
10,000	78
12,400	90

FIGURE 2. Power rating and attenuation.

MIL-DTL-17/128B
w/AMENDMENT 2



TABULATED VALUES ARE FOR REFERENCE ONLY.
THE VALUES ON THE CHART REPRESENT THE REQUIREMENTS.

MHz	dB	SWR	RELECTION COEFFICIENT	RETURN LOSS Db
50	25.5			
400	23.8	1.4985	.1995	14
1000	22	1.4326	.1778	15
2000	20	1.3767	.1585	16
3000	17	1.3290	.1413	17
8000	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

FIGURE 3. Structural return loss.

MIL-DTL-17/128B
w/AMENDMENT 2

Electrical:

- Test frequency: 50 MHz to 12.4 GHz.
- Spark test: 2,000 V rms, +10 percent, -0 percent.
- Voltage withstanding: 3,000 V rms, +10, -0 percent.
- Insulation resistance: Not applicable.
- Corona extinction voltage: 1,900 V rms, minimum.
- Characteristic impedance: 50 ± 2 ohms.
- Attenuation: See figure 2.
- Structural return loss: See figure 3.
- Capacitance: 32 pF per foot, maximum.
- Capacitance unbalance: Not applicable.
- Transmission unbalance: Not applicable.
- Mechanically induced noise voltage: Not applicable.
- Time delay: Not applicable.
- Contamination: Not applicable.

Part or Identifying Number (PIN): M17/128-RG400.

The margins of this specification are marked with a vertical line 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-C-17, this document references the following:

MIL-PRF-39012