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.

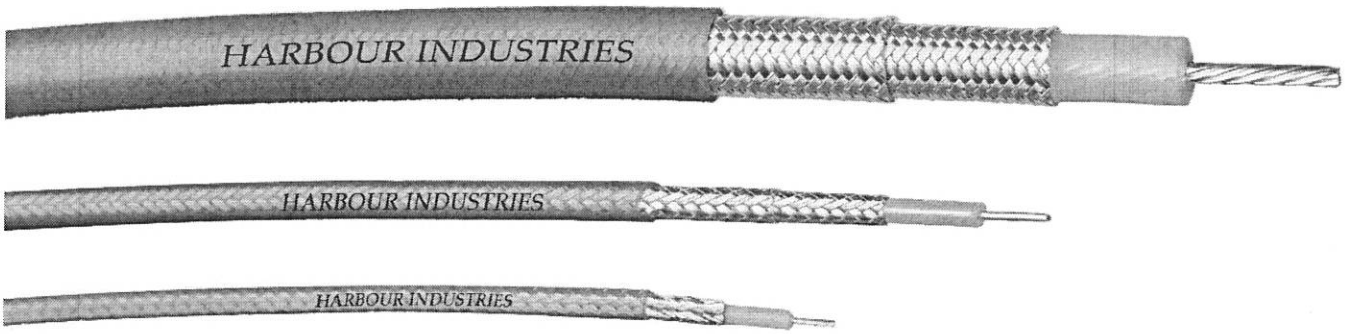
Constructions with PTFE Tape Wrapped Jackets

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

MIL-DTL-17 Coaxial Cables

- including M17/176-00002 Twinaxial Data Bus Cable



				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-17/113D
19 June 2015
SUPERSEDING
MIL-C-17/113C
7 Nov 1978

MILITARY SPECIFICATION SHEET

CABLE, RADIO FREQUENCY, FLEXIBLE, COAXIAL, 50 OHMS, M17/113-RG316

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.

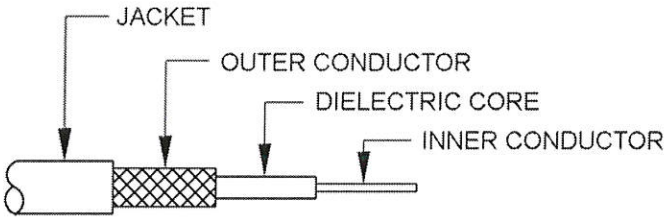


FIGURE 1. Configuration.

TABLE I. Description.

Components	Construction details
Inner conductor	Seven strands of silver-coated, annealed-copper-covered, steel wire, each strand, .0067 inch diameter. Overall diameter: 0.0201 inch ± 0.0010.
Dielectric core	Type F-1: Solid, extruded PTFE. Diameter: 0.060 inch ± 0.003.
Outer conductor	Single braid of AWG No. 38 silver-coated copper wire. Diameter: 0.081 inch maximum. Coverage: 95.2% nominal Carriers: 16 Ends: 5 Picks/inch: 12.0 ± 10%
Jacket	Type IX: FEP. Diameter: 0.098 inch ± 0.004.

ENGINEERING INFORMATION:

Continuous working voltage: 900 V rms, maximum.
Operating frequency: 3 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 at 20°C: 8.41 ohms per 100 feet.
Elongation: 10 percent, minimum.
Tensile strength: 50 $klb_f/inch^2$, minimum.

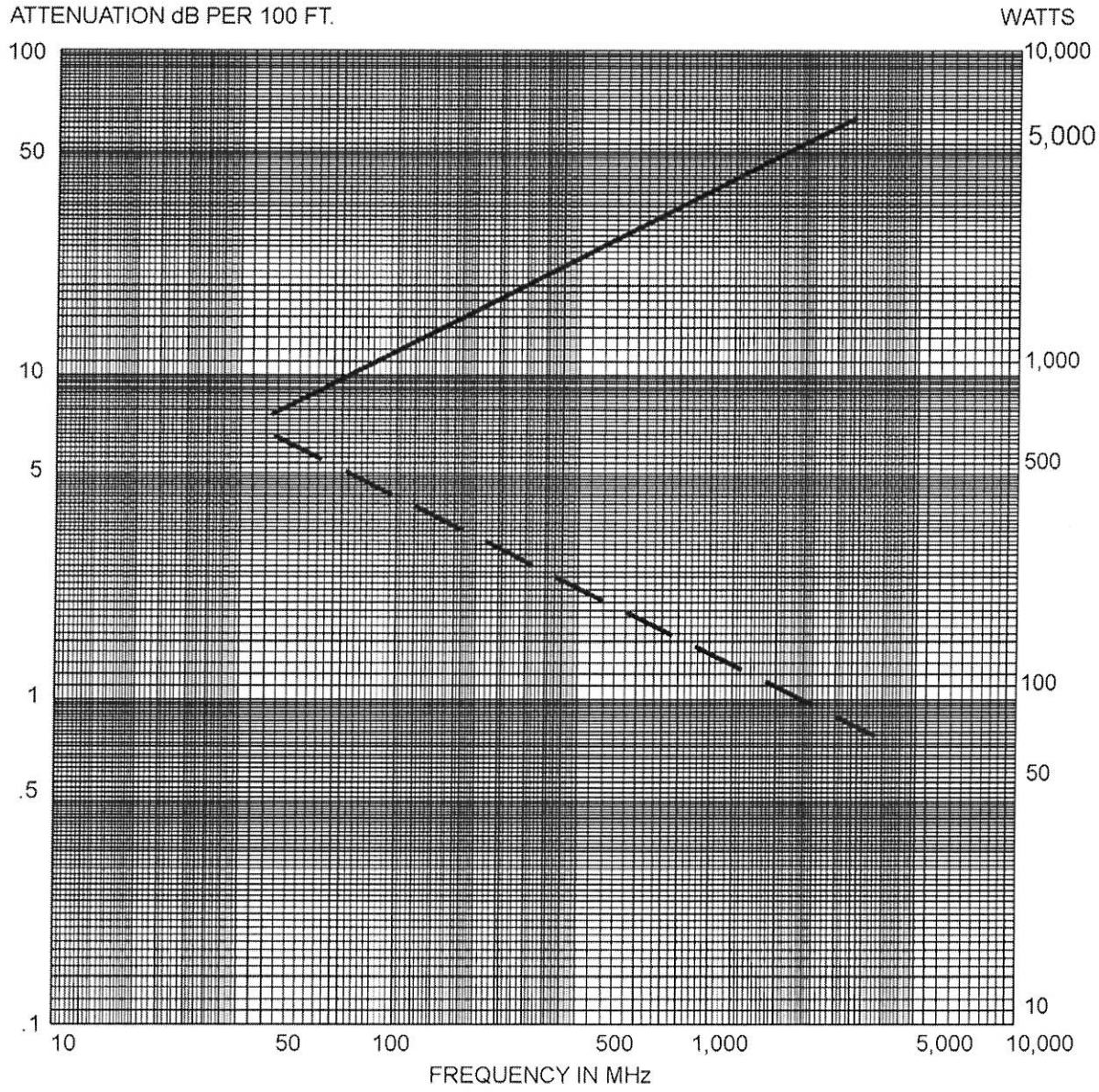
Engineering notes: This cable is useful in general purpose, high temperature applications. (See connector series "SMA", "SMB", and "SMC" per MIL-PRF-39012. NATO preferred type NWR-32).

REQUIREMENTS:

Design and construction:
Dimensions, configuration, and description: See figure 1 and table I.
Weight: 1.22 pounds per 100 feet, maximum.
Environmental and mechanical:
Visual and mechanical examination:
Eccentricity: 10 percent, maximum.
Adhesion of conductors:
Inner conductor to core: 2 pounds, minimum; 8 pounds, maximum.
Stress crack resistance: +230° ± 5°C; mandrel size 7 1/2 times the jacket diameter.
Cold Bend: -55° ± 2°C.
Dimensional stability: +200° ± 5°C.
Inner conductor from core: 0.187 inch, maximum.
Inner conductor from jacket: 0.187 inch, maximum.
Flammability: Applicable.

Electrical:

Capacitance: 32.0 pF per foot, maximum.
Test frequency: 50 MHz to 3 GHz.
Spark test: 2,000 Vrms, +25% -0%.
Voltage withstanding: 2,000 Vrms, minimum.
Corona extinction voltage: 1,200 Vrms, minimum.
Characteristic impedance: 50 ohms ± 2.
Attenuation: See figure 2.
Structural return loss: See figure 3.

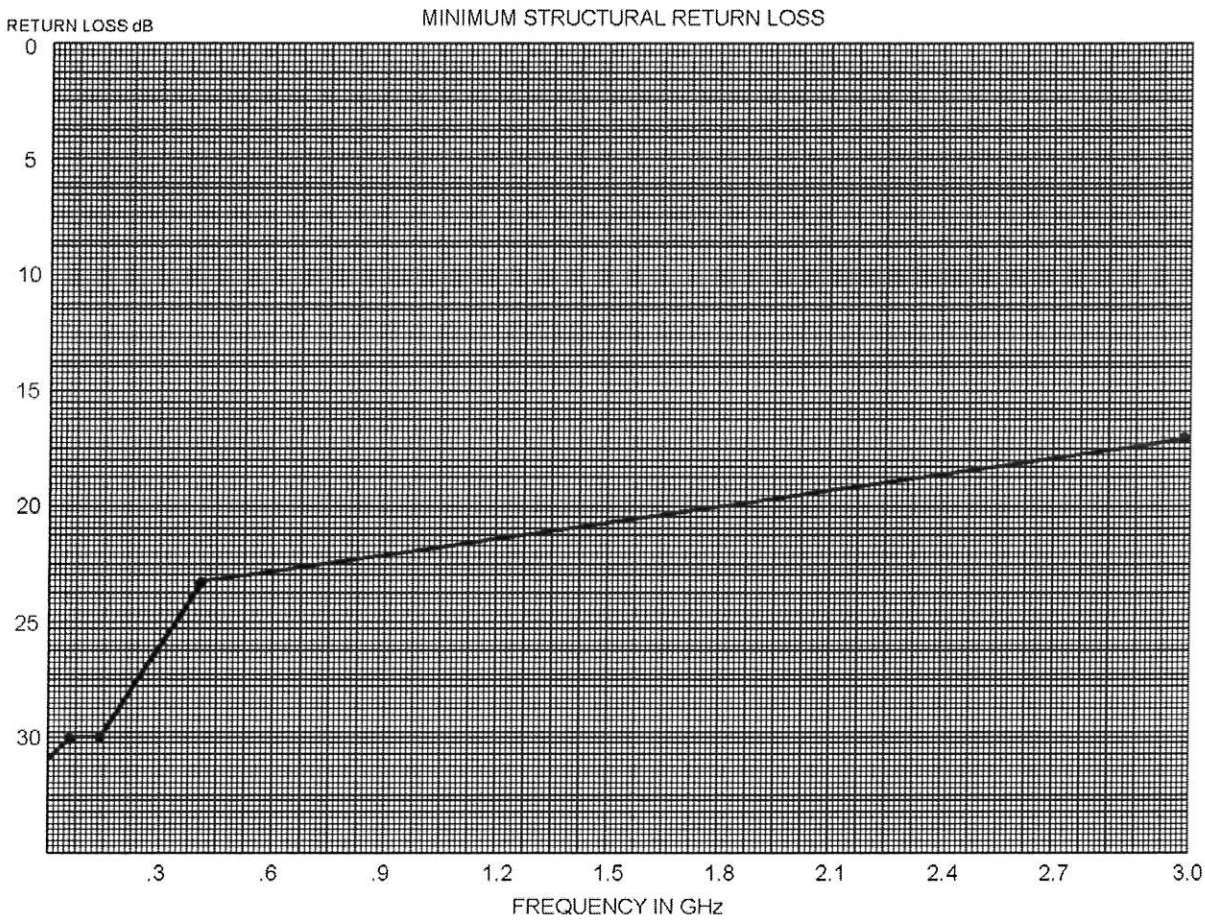


Maximum attenuation ————

Maximum power at 25°C, sea level —— —— ——

Attenuation	
MHz	dB
50	7.5
100	11
400	21
1000	38
3000	58

FIGURE 2. Power rating and attenuation.



SWR	REFLECTION COEFFICIENT	RETURN LOSS dB	SWR	REFLECTION COEFFICIENT	RETURN LOSS dB
17.3910	.8913	1	1.3767	.1585	16
8.7242	.7943	2	1.3290	.1413	17
5.8480	.7079	3	1.2880	.1259	18
4.4194	.6310	4	1.2528	.1122	19
3.5698	.5623	5	1.2222	.1000	20
3.0095	.5012	6	1.1957	.0891	21
2.6146	.4467	7	1.1726	.0794	22
2.3229	.3981	8	1.1524	.0708	23
2.0999	.3548	9	1.1347	.0631	24
1.9250	.3162	10	1.1192	.0562	25
1.7849	.2818	11	1.1055	.0501	26
1.6709	.2512	12	1.0935	.0447	27
1.5769	.2239	13	1.0829	.0398	28
1.4985	.1995	14	1.0736	.0355	29
1.4326	.1778	15	1.0653	.0316	30

MHz	dB
50	30
100	30
400	23
1000	21
3000	17

FIGURE 3. Structural return loss.

Part or Identifying Number (PIN): M17/113-RG316.

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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

MIL-PRF-39012

CONCLUDING MATERIAL

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

Preparing activity:
DLA - CC

(Project 6145-2015-018)

Review activities:
Army – AT, 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.dla.mil.