

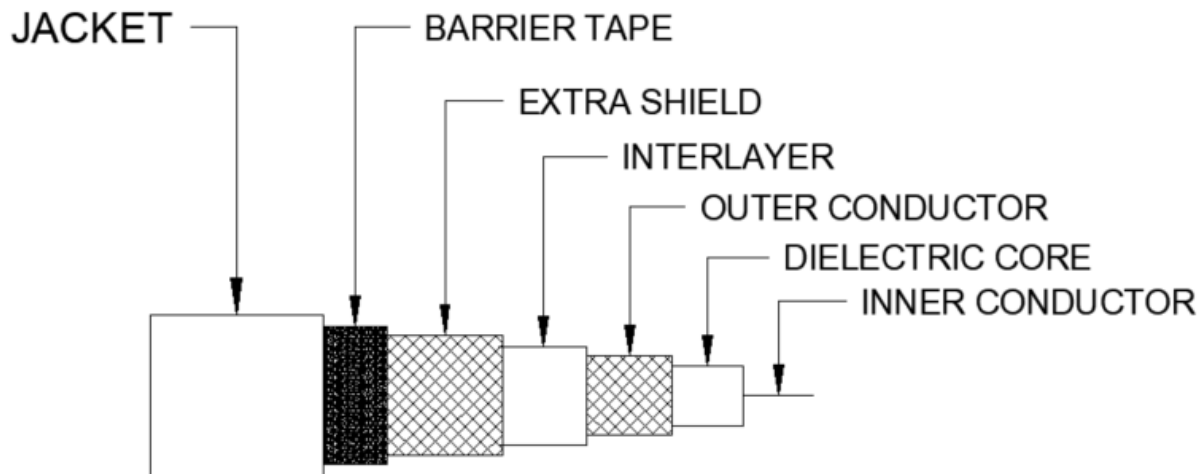
MIL-DTL-17/135E
w/AMENDMENT 1
22 June 2019
SUPERSEDING
MIL-DTL-17/135E
22 April 2014

DETAIL SPECIFICATION SHEET

CABLE, RADIO FREQUENCY, TRIAXIAL, .500 INCH, 50 OHM,
WATER BLOCKED, NON-WATER BLOCKED
AND CROSSLINKED, LOW SMOKE

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.



NOTE: Cable should be constructed of non-toxic material.

FIGURE 1. General configuration.

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TABLE I. Description.

Component	Construction
Inner conductor (M17/135-00001 and -00002)	Seven strands of silver-coated copper wire each strand .0296 inch diameter. Diameter: .089 inch $\pm$ 0.001
Inner conductor(M17/135-00003 thru -00006)	Solid silver-coated copper wire diameter. Diameter: .081 inch $\pm$ 0.001
Dielectric core	Type A-1: Solid polyethylene Diameter: .285 inch $\pm$ 0.010
Inner shield	Single braid of AWG No. 33 silver-coated copper wire Diameter: .340 inch maximum Coverage: 90%, minimum Carriers: 24 Ends: 7 Picks/inch: 8 Separator tape optional
Interlayer (M17/135-00001 thru M17/135-00004)	Type A-1: Solid polyethylene Diameter: .365 inch $\pm$.010
Interlayer (M17/135-00005 and M17/135-00006)	Cross-linked polyolefin Diameter: .365 inch $\pm$.010
Outer shield	Single braid of AWG No. 33 silver-coated copper wire Diameter: .414 inch, maximum Coverage: 85%, minimum Carriers: 24 Ends: 8 Picks/inch: 5.11 Separator tape optional
Jacket M17/135-00005 1/ and M17/135-00006	Cross-linked polyolefin Diameter: .500 inch $\pm$.010, maximum
Jacket M17/135-00001 1/ and M17/135-00002	Type XIII: Polyurthane Diameter: .500 inch $\pm$.010, maximum
Jacket M17/135-00003 1/ and M17/135-00004	Type IIIa: Polyethylene Diameter: .500 inch $\pm$.010

1/ Free strippable blocking compound needed where necessary to meet hydrostatic test. The inner shield may be partially imbedded in the dielectric. Applicable to water blocked cables only.

ENGINEERING INFORMATION

Continuous working voltage: 3,700 V rms, maximum.

Operating frequency: 3 GHz, maximum.

Velocity of propagation: 65.9 percent, nominal.

Power rating: See figure 2.

Operating temperature range: -40°C to +70°C (M17/135-00001 thru M17/135-00004)
-30°C to +85°C (M17/135-00005 and M17/135-00006)

Inner conductor properties:

DC resistance (maximum at 20°C): 1.62 ohms per 100 feet. (0.173 ohm per 100 feet for M17/135-00001 and M17/135-00002.)

Elongation: 25 percent, minimum. (30 percent minimum for M17/135-00001 and M17/135-00002)

Tensile strength: Not applicable.

Engineering note: This cable useful for non-hosing low temperature applications.

REQUIREMENTS (See table II)

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

Environmental and mechanical:

Visual and mechanical examination: Applicable.

Diameter: Applicable.

Out-of-roundness: Not applicable.

Eccentricity: 10 percent, maximum.

Adhesion of conductors:

M17/135-00001, M17/135-00003, and M17/135-00005: 7 pounds minimum, 65 pounds maximum.

M17/135-00002, M17/135-00004, and M17/135-00006: 7 pounds minimum, 50 pounds maximum

Electrical and mechanical:

Continuity: Applicable.

Spark test: 8,000 V rms, +10%, -0%.

Voltage withstanding: 10,000 V rms, minimum applied between the inner conductor and outer conductor with the outer conductor grounded; 500 V dc minimum applied between the outer conductor and the extra shield with the extra shield grounded.

Insulation resistance: Not applicable.

Corona extinction voltage: 5,000 V rms, minimum.

Characteristic impedance: 50 ohms $\pm$ 2.

RF transmission loss (attenuation): See figure 2.

Standing wave ratio (return loss): See figure 3.

Capacitance: 32 pF per foot, maximum.

Capacitance stability: Not applicable.

Capacitance unbalance: Not applicable.

Transmission unbalance: Not applicable.

Inductance: Not applicable.

Mechanically induced noise voltage: Not applicable.

Time delay: Not applicable.

Aging stability:

+90°C $\pm$ 2°C (M17/135-00003 and M17/135-00004)

+98°C $\pm$ 2°C (M17/135-00001, M17/135-00002, M17/135-00005 and M17/135-00006)

Stress crack resistance: Not applicable.

Outer conductor integrity: Not applicable.

Cold bend: -55°C $\pm$ 2°C (M17/135-00001 thru M17/135-00004)

-30°C $\pm$ 2°C (M17/135-00005 and M17/135-00006)

Dimensional stability: +85°C $\pm$ 2°C.

Inner conductor from core: .125 inch, maximum.

Inner conductor from jacket: .250 inch, maximum.

Contamination: Not applicable.

Bendability: Not applicable.

Flammability: Not applicable.

Flame propagation: Applicable to M17/135-00005 and M17/135-00006.

Acid gas generation: 2.0 percent, maximum.

Halogen content: 0.2 percent, maximum. Applicable to M17/135-00005 and M17/135-00006.

Immersion test: Applicable to M17/135-00005 and M17/135-00006.

Tensile strength, percent of unaged minimum: 50. Applicable to M17/135-00005 and M17/135-00006.

Elongation, percent of unaged minimum: 50. Applicable to M17/135-00005 and M17/135-00006.

Smoke index: 25 maximum. Applicable to M17/135-00005 and M17/135-00006.

Toxicity index: 5 maximum. Applicable to M17/135-00005 and M17/135-00006.

Durometer hardness: (type A) 80 minimum. Applicable to M17/135-00005 and M17/135-00006.

Weathering: Applicable to M17/135-00005 and M17/135-00006.

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Abrasion resistance: 75 cycles minimum (jacket only). Applicable to M17/135-00005 and M17/135-00006.

Tear strength: 35 pounds per inch minimum. Applicable to M17/135-00005 and M17/135-00006.

Heat distortion: 30 percent maximum distortion. Applicable to M17/135-00005 and M17/135-00006.

Physical tests on unaged jacket:

Tensile strength: 1,300 psi, minimum. Applicable to M17/135-00005 and M17/135-00006.

Elongation: 160 percent, minimum. Applicable to M17/135-00005 and M17/135-00006.

Physical tests on aged jacket: Applicable to M17/135-00005 and M17/135-00006.

Air oven:

Tensile strength, percent minimum: 60.

Elongation, percent minimum: 60.

Hot oil immersion: Applicable to M17/135-00005 and M17/135-00006.

Tensile strength, percent minimum: 50.

Elongation, percent minimum: 50.

Tensile strength and elongation: 1,300 psi, 160 percent, minimum. Applicable to M17/135-00005 and M17/135-00006.

Weight: 16 pounds per 100 feet, max (M17/135-00001 and -00002).
18.5 pounds per 100 feet, max (M17/135-00003 thru -00006).

Marking: Applicable.

Workmanship: Applicable.

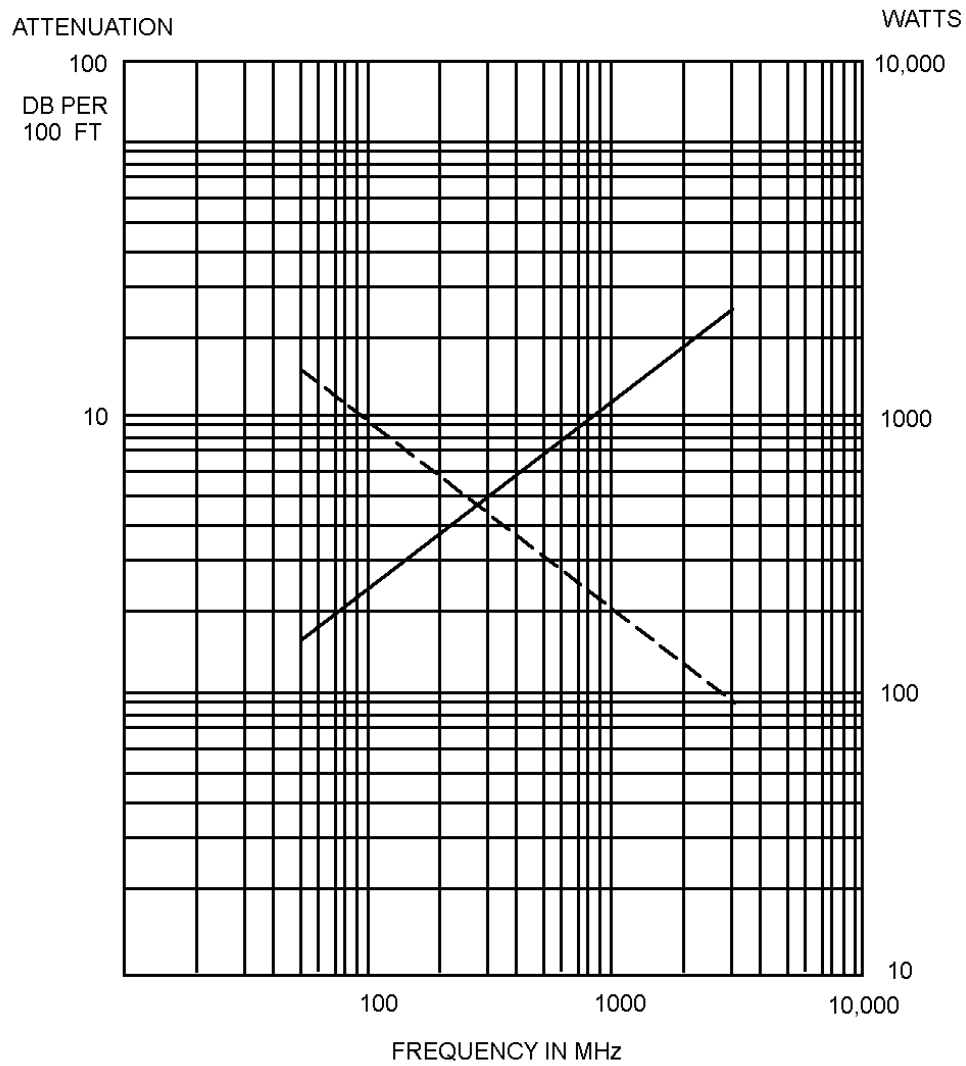
Watertightness (not applicable to M17/135-00002, M17/135-00004, and M17/135-00006): One end of a five foot length of completed cable shall be placed in a terminal fitting which will allow water pressure to be applied directly to the exposed cross-sectional area of the end of the cable. Exposure of the sides of the cable to water shall be kept to a minimum, and the fitting shall not exert radial compression against the cable. Unless otherwise approved by the qualifying activity, the sealer used for the packing gland in the terminal fitting shall be a metal alloy having a maximum melting point of 88°C. The specimen shall be subjected to a water pressure of 25 lb_f/in² for a period of 6 hours. Any evidence of water leakage shall be cause for rejection.

Hydrostatic (open end) (not applicable to M17/135-00002, M17/135-00004, and M17/135-00006): A 5-foot specimen of completed cable shall be fitted into a gland similar to USL 44500B-12. The cable shall be capable of withstanding 1,000 lb_f/in² applied to the gland end of the specimen for a period of 2 hours. Any evidence of water leakage shall be cause for rejection.

Part or Identifying Number (PIN): See table III.

Supersession data: See table III.

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NOTE:

1. Maximum power (at 25°C seal level)
2. Maximum attenuation _____
3. Test requirements shall be noted as line indicated on graph.

Frequency MHz	Attenuation dB	Watts dB
50	1.7	1400
100	2.6	850
400	6.4	350
1000	11.4	190
3000	23	90

FIGURE 2. Power rating and attenuation.

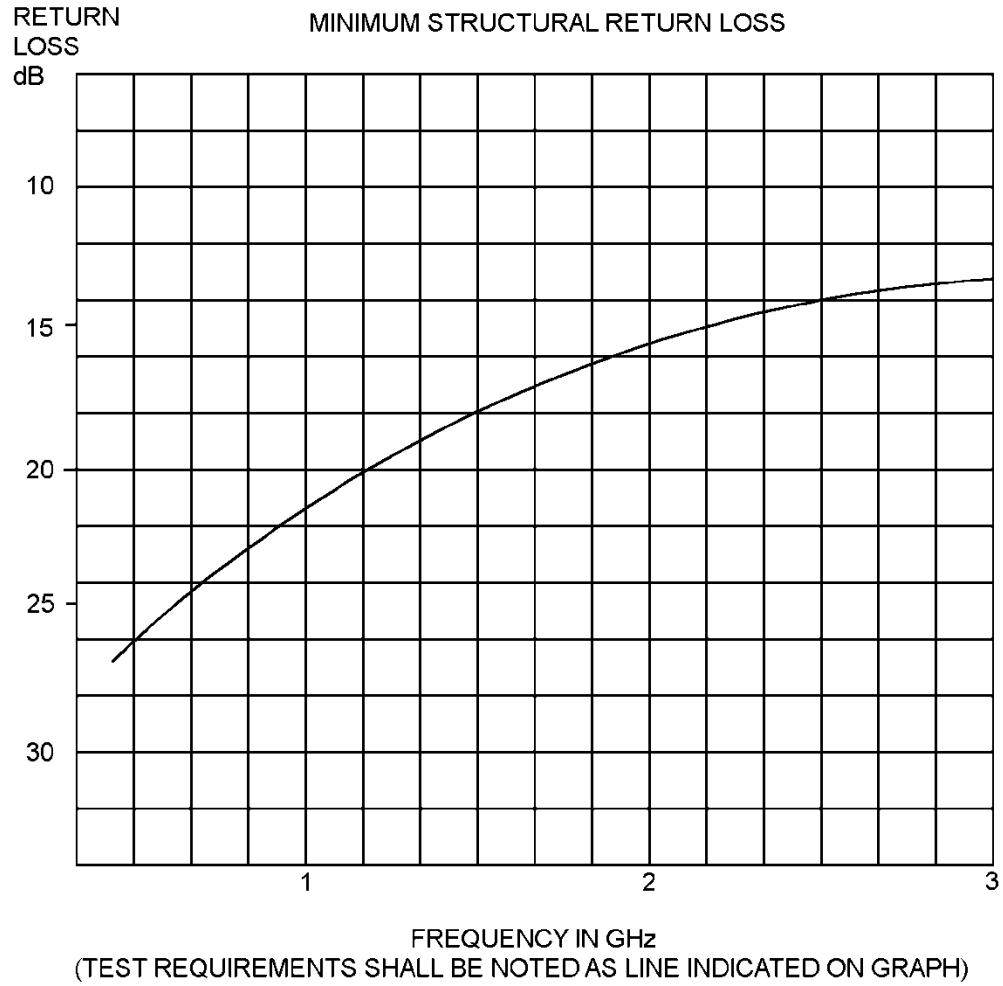


FIGURE 3. Structural return loss.

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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

Frequency MHz	MIN. SRL
50	27
1000	21
2000	16
3000	13.8

FIGURE 3. Structural return loss - Continued.

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TABLE II. Qualification and Group A, B, and C Table.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Qual- # of Specimens	Conf - # of Specimens	Conformance inspection
I	In-process inspection:		4.5	Entire sample		
	Continuity	3.7.1	4.8.2	Entire sample		
	Spark test	3.7.2	4.8.3	Entire sample		
	Voltage withstanding	3.7.3	4.8.4	Entire sample		
	Insulation resistance	N/A				
	Visual and mechanical inspection	3.6	4.8.1	Entire sample	Per Table VIII	A
	Diameter measurements.	3.6.1	4.8.1.1	Entire sample	Per Table VIII	A
	Out-of-roundness	N/A				
	Eccentricity of inner conductor	3.6.3	4.8.1.3	2	Per Table VIII	A
	Adhesion of conductors	3.6.4	4.8.1.4	4	Per Table VIII	A
	Marking	3.8	4.8.1	Entire sample	Per Table VIII	A
	Workmanship	3.10	4.8.1	Entire sample	Per Table VIII	A
II	Corona extinction voltage	3.7.5	4.8.6	1	Per Table VIII	B
	Characteristic impedance	3.7.6	4.8.7	1	Per Table VIII	A
	RF transmission loss (attenuation)	3.7.7	4.8.8	2	Per Table VIII	A
	Standing wave ratio (return loss)	3.7.8	4.8.9	2	Per Table VIII	A
	Capacitance	3.7.9	4.8.10	1	Per Table VIII	B
	Capacitance stability	N/A				
	Capacitance unbalance	N/A				
	Transmission unbalance	N/A				
	Inductance	N/A				
	Mechanically induced noise voltage	N/A				

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TABLE II. Qualification and Group A, B, and C Table - Continued.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Qual- # of Specimens	Conf - # of Specimens	Conformance inspection
II	Time delay	N/A				
	Aging stability	3.7.15	4.8.16	4	Per Table VIII	C
	Stress crack resistance	N/A				
	Outer conductor integrity	N/A				
	Cold bend	3.7.18	4.8.19	3	Per Table VIII	B
	Dimensional stability	3.7.19	4.8.20	1	Per Table VIII	C
	Contamination	N/A				
	Bendability	N/A				
	Flammability	N/A				
	Flame propagation	3.7.23	4.8.25	1		
	Acid gas generation	3.7.24	4.8.26	1		
	Halogen content	3.7.25	4.8.27	1		
	Immersion tests	3.7.26	4.8.28	1		
	Smoke index	3.7.27	4.8.29	1		
	Toxicity Index	3.7.28	4.8.30	1		
	Durometer hardness	3.7.29	4.8.31	1		
	Weathering	3.7.30	4.8.32	1		
	Abrasion resistance	3.7.31	4.8.33	5		
	Tear strength	3.7.32	4.8.34	6	Per Table VIII	B
	Heat distortion	3.7.33	4.8.35	1	Per Table VIII	C
	Physicals (aged)	3.7.34	4.8.36	1	Per Table VIII	C
	Tensile strength and elongation	3.7.35	4.8.37	1	Per Table VIII	C
	Weight	3.9	4.8.24	1	Per Table VIII	B
	Watertightness	This Specification Sheet	This Specification Sheet			
	Hydrostatic	This Specification Sheet	This Specification Sheet			

TABLE III. Cross-reference of PIN.

PIN	Superseded PIN type or designation	Type
M17/135—00001 <u>1/</u>	AA-3833	Water blocked
M17/135—00002 <u>1/</u>	TRF-8	Non-water blocked
M17/135—00003	-----	Water blocked
M17/135—00004	-----	Non-water blocked
M17/135—00005	AA-7559	Water blocked
M17/135—00006	AA-7560	Non-water blocked

1/ Inactive for new design.

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. This document references MIL-DTL-17.

CONCLUDING MATERIAL

Custodians:

Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity
DLA - CC

(Project 6145-2019-016)

Review activities:

Army - AR, AT, CR4, MI
Navy - AS, MC, OS, SH
Air Force - 19

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