INCH-POUND
MIL-C-17G
AMENDMENT 3
8 January 1996
SUPERSEDING
AMENDMENT 2
9 January 1995

MILITARY SPECIFICATION

CABLES, RADIO FREQUENCY, FLEXIBLE AND SEMIRIGID,
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-C-17G, dated 9 March 1990, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 2

* 2.1.1 Specifications, standards and handbooks; Delete reference to "TT-P-320" in its entirety.

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* 3.5.7b, Delete this requirement. Existing stock (covered with aluminum paint) may be used until stock is purged.

PAGE 13

3.8, line 2: Delete "manufacturer's code symbol and name" and substitute "manufacturer's code symbol or name, and date code (date code to be marked on cable reel as a minimum).

3.8b, item (2), add new sentence at end of entry: "If additional marking is possible, the remainder of the required military marking shall be applied."

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Delete section 4.1 Through 4.7.2.1.3 and substitute the following:

"4. QUALITY ASSURANCE PROVISIONS

"4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

"4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

"4.1.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with MIL-STD-45662.

"4.1.3 Reliability assurance program. A reliability assurance program shall be established and maintained. Process control records shall cover the implementation of devices such as control charts (e.g., X bar and R charts) or other means of indication of the degree of control achieved in the production process. Records shall also indicate the action taken when each out-of-control condition is observed, and the disposition of non-conforming products processed during the period of out-of-control operation. Records associated with non-conforming products shall be kept for a minimum of 3 years. Evidence of such compliance shall be verified by the qualifying activity of this specification as a prerequisite for qualification and continued qualification."

"4.2 Classification of inspections. The inspections specified herein are classified as follows:

a. Materials inspection (see 4.4).

b. Final inspection (see 4.5).

c. Qualification inspection (see 4.6).

d. Quality conformance inspection (see 4.7).

"4.3 Inspection conditions. Unless otherwise specified herein, all test inspection conditions shall be performed in accordance with the test conditions specified in the General Requirements of MIL-STD-202, as follows:

a. Temperature: 25°C ±10°C.

b. Relative humidity: 60 percent ±15 percent.

c. Atmospheric pressure: 725 mm ±75 mm of mercury.

"4.4 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials listed in table II, used in fabricating the cables, are in accordance with the applicable referenced specifications or requirements prior to such fabrication."

"TABLE II. Materials inspection.

Material	Requirement paragraph	Applicable documents
Ethylene tetrafluoroethylene (ETFE)	3.5.6k	ASTM D-3159
Ethylene chlorotrifluoroethylene (E-CTFE)	3.5.6l	ASTM D-3275
Fiberglass	3.5.6d	MIL-Y-1140
Fluorinated ethylene propylene (FEP)	3.5.2.1t	L-P-389
Paint, aluminum	3.5.7b	TT-P-320
Polyethylene (PE)	3.5.2.1a	L-P-390
Polytetrafluoroethylene (PTFE)	3.5.6f	ASTM D-1457
Polyolefin, cross-linked	3.5.6o	
Rubber, butyl, insulating synthetic	3.5.2.1s	ASTM D-1352
Rubber, insulating synthetic	3.5.2.1x	ASTM D-470
Rubber, polychloroprene	3.5.6a, c, e, i	MIL-I-3930
Rubber, synthetic, semiconductor	3.5.2.1r	FED-STD-601
Tape, polyethylene-terephthalate	3.5.5c	MIL-I-631
Tubing, aluminum, seamless	3.5.3.2b	WW-T-700
Tubing, copper, seamless	3.5.3.2a	WW-T-799
Wire, aluminum-alloy (alclad 5056)	3.5.7a	ASTM B-211
Wire, aluminum, copper-clad	3.5.1.1g	ASTM B-566
Wire, copper, bare	3.5.1.1a	ASTM B-3
Wire, copper, beryllium (alloy 172)	3.5.1.1h	ASTM B-197
Wire, copper, silver-coated	3.5.1.1c, j	ASTM B-298
Wire, copper, tin-coated	3.5.1.1b	ASTM B-33
Wire, high resistance	3.5.1.1k	QQ-R-175
Wire, steel, copper-clad	3.5.1.1d	ASTM B-452
Wire, steel, copper-clad, silver-coated	3.5.1.1f	ASTM B-501
Wire, steel, galvanized	3.5.3.1.1	ASTM A-411
Rubber, polyurethane	3.5.6m	MIL-I-3930
Stranded inner conductors	3.5.1.2	ASTM B-8
Copper conductors for use in hook-up wire for electronic equipment	3.5.1.2	ASTM B-286

"

"TABLE III. Final inspection.

Inspection		Requirement paragraph	Test method paragraph
Semirigid cable 1/	All other cable 2/		
Continuity	Continuity	3.7.1	4.8.2
Voltage withstanding	Spark test	3.7.2	4.8.3
	Voltage withstanding	3.7.3	4.8.4
	Insulation resistance	3.7.4	4.8.5
	Out-of-roundness of jacket measurements	3.6.2	4.8.1.2

1/ Sampling and inspection shall be in accordance with table VIII.
2/ Tests performed on each continuous length of cable."

"4.5 Final inspection. Prior to the delivery of the cable, the tests in table III shall be performed, as applicable.

"4.5.1 Failure.

a. Semirigid cable - One or more failures shall be cause for refusal of lot.
b. All other cable - One or more failures shall be cause for refusal of lot, except a spark test failure may be repaired or the cable length cut out.

"4.6 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production. Group qualification shall be as specified in the appendix to this specification.

"4.6.1 Sample. The sample of each cable type submitted for qualification inspection shall be of sufficient length to perform all the applicable tests in table IV.

"4.6.2 Inspection routine. The samples shall be subjected to the inspections specified in table IV. The entire sample shall be subjected to the inspections of group I. The specimen length shall be cut from each sample as required, and subjected to inspections of group II.

"4.6.3 Failure. One or more failures shall be cause for refusal to grant qualification approval."

"TABLE IV. Qualification inspection.

Inspection	Number of specimens to be tested	Requirement paragraph	Test method paragraph
Group I			
In-process inspection	Entire sample		4.5
Continuity	Entire sample	3.7.1	4.8.2
Spark test	Entire sample	3.7.2	4.8.3
Voltage withstanding	Entire sample	3.7.3	4.8.4
Insulation resistance 1/	Entire sample	3.7.4	4.8.5
Visual and mechanical inspection	Entire sample	3.6	4.8.1
Physical dimensions	Entire sample	3.6	4.8.1
Marking	Entire sample	3.8	4.8.1
Workmanship	Entire sample	3.10	4.8.1
Group II			4.8.6
Corona extinction voltage 2/	1	3.7.5	4.8.7
Characteristic impedance	1	3.7.6	4.8.8
RF transmission loss (attenuation) 2/	2	3.7.7	4.8.9
Standing wave ratio (return loss) 2/	2	3.7.8	4.8.10
Capacitance 2/	1	3.7.9	4.8.11
Capacitance stability 2/	1	3.7.10	4.8.12
Capacitance unbalance 3/	1	3.7.11	4.8.13
Transmission unbalance 3/	1	3.7.12	4.8.14
Mechanically induced noise voltage 4/	1	3.7.13	4.8.15
Time delay 2/	2	3.7.14	4.8.16
Aging stability 5/	4	3.7.15	4.8.17
Stress-crack resistance 2/	4	3.7.16	4.8.18
Outer conductor integrity 6/	4	3.7.17	4.8.19
Cold bend 9/	3	3.7.18	4.8.20
Dimensional stability 7/	1	3.7.19	4.8.21
Contamination 8/	1	3.7.20	4.8.22
Bendability 6/	2	3.7.21	4.8.23
Flammability 2/	1	3.7.22	4.8.25
Flame propagation 10/	1	3.7.23	4.8.26
Acid gas generation 10/	1	3.7.24	4.8.27
Halogen content 10/	1	3.7.25	4.8.28
Immersion 10/	1	3.7.26	4.8.29
Smoke index 10/	1	3.7.27	4.8.30
Toxicity index 10/	1	3.7.28	4.8.31
Durometer 10/	1	3.7.29	4.8.32
Weathering 10/	1	3.7.30	4.8.33
Abrasion resistance 10/	5	3.7.31	4.8.34
Tear strength 10/	6	3.7.32	4.8.35
Heat distortion 10/	1	3.7.33	4.8.36
Physicals (aged) 10/	1	3.7.34	4.8.37
Tensile strength and elongation 10/	1	3.7.35	4.8.24
Weight	1	3.9	

1/ Not applicable to solid types A and F dielectric cores.

2/ When specified.

3/ Applicable to two-conductor cables.

4/ Applicable to low noise cables.

5/ Not applicable to semirigid or cables with type IX jackets.

6/ Applicable to semirigid cables.

7/ Not applicable to time delay or braided inner conductor cables.

8/ Applicable to type IIa jackets.

9/ Not applicable to semirigid cables.

10/ Applicable to type XIV, polyolefin jacketed cables only."

"4.6.4 Retention of qualification. To retain qualification, the contractor shall forward a report at 12-month intervals to the qualifying activity. The qualifying activity shall established the initial reporting date. The report shall consist of:

a. A summary of the results of the tests performed for inspection of product for delivery (groups A and B), indicating as a minimum the number of lots that have passed and the number that have failed.

b. A summary of the results of tests performed for qualification verification inspection group C, including the number and mode of failures. The summary shall include results of all qualification verification inspection tests performed and completed during the 12-month period. If the summary of the test results indicates nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 12-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the 12-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during three consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit representative cables of each type to testing in accordance with the qualification inspection requirements.

"4.7 Quality conformance inspection.

"4.7.1 Inspection of product for delivery. Inspection and final inspection in accordance with table III of product for delivery shall consist of groups A and B inspections.

"4.7.1.1 Unit of product. A unit of product shall be 5,000 feet of cable of the same type designation. If a production run is less than 5,000 feet, then the quantity produced shall be one unit of product.

"4.7.1.1.1 Inspection lot. The inspection lot shall consist of the number of units of product, offered for inspection at one time. All of the units of product in the inspection lot submitted shall have been produced during the same production period with the same materials and processes.

"4.7.1.1.2 Sample unit. A sample unit shall be a unit of product selected at random from the inspection lot without regard to quality.

"4.7.1.1.3 Sample unit size. Unless otherwise specified, the sample unit size shall consist of that number of sample units required by the inspection lot size, as determined by table VIII.

"4.7.1.1.4 Specimen. A specimen shall be an individual length of cable cut from the sample unit.

"4.7.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table V.

"4.7.1.2.1 Sampling plan. Table V, tests shall be performed on a production lot basis. Samples shall be selected in accordance with table VIII. If one or more defects are found, the lot shall be screened for that particular defect(s) and defects removed. A new sample of product shall be selected in accordance with table VIII and all group A tests for previously found defects shall again be performed. If any defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

"4.7.1.2.1.1 Visual inspection (group A). Each cable shall be visually examined for completeness, workmanship and identification requirements."

"TABLE V. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual and mechanical inspection	3.6	4.8.1
Physical dimensions	3.6	4.8.1
Marking	3.8	4.8.1
Workmanship	3.10	4.8.1
Characteristic impedance	3.7.6	4.8.7
RF transmission loss (attenuation)	3.7.7	4.8.8
Standing wave ratio (return loss)	3.7.8	4.8.9
1/	3.6.4	4.8.1.4
Adhesion of conductors	3.6.3	4.8.1.3
Eccentricity of inner conductor		

1/ As applicable."

"4.7.1.3 Group B inspection. Group B inspection shall consist of the inspections specified in table VI.

"4.7.1.3.1 Sampling plan. The sampling plan shall be in accordance with table VIII. If one or more defects are found, the lot shall be screened for that particular defect(s) and defects removed. A new sample of product shall be selected in accordance with table VIII and all group B tests for previously found defects shall again performed. If any defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification."

"TABLE VI. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph
Corona extinction voltage 1/	3.7.5	4.8.6
Capacitance	3.7.9	4.8.10
Capacitance unbalance 1/	3.7.11	4.8.12
Transmission unbalance 1/	3.7.12	4.8.13
Mechanically induced noise voltage	3.7.13	4.8.14
1/	3.7.14	4.8.15
Time delay 1/	3.7.18	4.8.19
Cold bend 2/	3.9	4.8.24
Weight	3.7.32	4.8.34
Tear strength		

1/ As applicable.

2/ Not applicable to semirigid cables."

"4.7.2 Group C inspection. Group C inspection shall consist of the inspections specified in table VII. group C inspection shall be made on sample units selected from inspection lots which have passed the groups A and B inspection.

"4.7.2.1 Sampling plan. Sample units shall be selected from those types covered by a single specification sheet in accordance with table VIII, 3 months after the date of notification of qualification, except when the total production in a 3-month period is less than two units of product (10,000 feet) inspection need not be made until either production is at least 2 units of product or a total of 6 months has elapsed since the inspection was performed in which case only one sample unit shall be tested."

"TABLE VII. Group C inspection.

Inspection	Requirement paragraph	Test method paragraph
Capacitance stability	3.7.10	4.8.11
Aging stability 1/	3.7.15	4.8.16
Stress-crack resistance	3.7.16	4.8.17
Outer conductor integrity	3.7.17	4.8.18
Dimensional stability	3.7.19	4.8.20
Contamination 2/	3.7.20	4.8.21
Bendability 1/	3.7.21	4.8.22
Flammability 1/	3.7.22	4.8.23
Heat distortion 1/	3.7.33	4.8.35
Tensile strength and elongation 1/	3.7.35	4.8.37
Physicals (aged) 1/	3.7.34	4.8.36

1/ When specified.

2/ Applicable to type IIa jackets."

"TABLE VIII. Sampling plan for all group inspection.

Units of product from 3-month's production	Sample unit size
2	1
3 to 8 inclusive	2
9 to 30 inclusive	3
31 to 80 inclusive	4
81 to 130 inclusive	5
131 to 180 inclusive	6
181 to 240 inclusive	7
241 to 300 inclusive	8

"

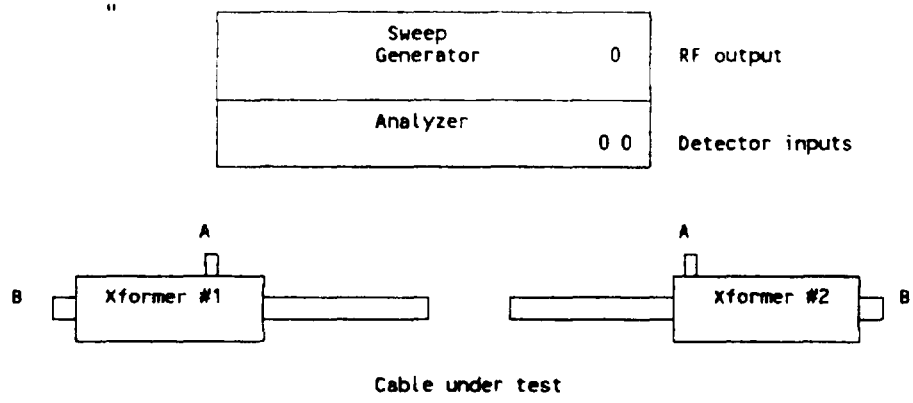
"4.7.2.1.1 Failures. If one or more specimens fail to pass group C inspection, the inspection lot shall be considered to have failed.

"4.7.2.1.2 Disposition of specimens. Specimens that have been tested to group C inspection shall not be delivered on the contract or purchase order.

"4.7.2.1.3 Noncompliance. If a sample fails to pass group C inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which are manufactured under essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken group C inspection shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Groups A and B inspections may be reinstituted; however, final acceptance and shipment shall be withheld until the group C inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity."

FIGURE 8, delete and substitute new figure 8 as printed below:

"



Port A and B are series N connectors, remaining two are twinaxial.

FIGURE 8. Transmission unbalance."

4.8.13.4, delete and substitute the following:

"4.8.13.4 Transmission unbalance test procedure. The following test procedure or one suitable to the Government shall be used for measuring transmission unbalance. In the event of conflict, the following method shall be the referee test.

Equipment used: Sweep generator (set to sweep 100-160 MHz).
Analyzer and printer.
1 or 2 RF detectors.
2 Telplex (Alford) transformers w/calibration device.
1 or 2 50-ohm loads.

Procedure:

1. Detectors shall be calibrated to obtain a zero reference line.
2. Connect the RF output of the generator to port A or B of transformer #1.
3. To the other port place a 50-ohm load.
4. Connect the calibration device between the two transformers.
5. To transformer #2, connect the RF detector from port A of the analyzer to port A of the transformer and a 50-ohm load to port B.
6. If a second RF detector is available, then connect it from port B of the analyzer to port B of the transformer.
7. Obtain a trace on the analyzer from port A. If two detectors are used, then obtain two traces on the analyzer.
8. Calculate the minimum difference between the two traces in dB and using the following formula determine the unbalance. This number should be approximately 50-51 dB which equals less the 1% unbalance.

$$TUB\ \% = \frac{200}{\left(\text{antilog}_{10}\ \frac{\text{dB difference}}{20}\right)}$$

9. Change the detector from port A of the transformer to port B, and the load to port A.
10. When these are printed, the resulting unbalance shall be calculated as in step 7 above.
11. Remove the calibration device and place the cable to be tested between the two ports of the transformer.
12. Repeat steps 5-10, as appropriate.
13. See table X for the minimum unbalance allowable."

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4.8.32, Irradiance entry: Delete ".nm". Also for Arc lamp off entry: Delete "35 ±2°C" and substitute "25°C ±2°C".

The margins of this amendment are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. 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 and relationship to the last previous amendment.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 85

Review activities:
Army - AR, AT, ME, MI
Navy - AS, MC, OS, SH
Air Force - 17, 19, 99
NASA - NA
DLA - IS

Preparing activity:
DLA-ES

(Project 6145-2119)