MIL-C-10065B
7 September 1966

SUPERSEDING
MIL-C-10065A
23 July 1951

MILITARY SPECIFICATION

CABLES, SPECIAL PURPOSE, ELECTRICAL

(MULTIPAIR, AUDIO FREQUENCY)

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

1. SCOPE

1.1 Scope. This specification covers multipair, styrene butadiene rubber (SBR) insulated and jacketed, flexible audio frequency cables.

1.2 Classification. Cables shall be of the types specified in table I.

TABLE I. Types of cable.

Type	Number of pairs	Number of singles	Wire size, AWG
Special Purpose Cable WM-65/U- - -	10	--	18
Telephone Cable WM-78/U- - - - - -	8	--	20
Telephone Cable WM-79/U- - - - - -	13	--	20
Telephone Cable WM-80/U- - - - - -	9	--	20
Special Purpose Cable WM-72/U - -	10	--	22
Telephone Cable WM-66/U- - - - - -	7	1	24

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATION

MILITARY

MIL-P-116 - Preservation, Methods of.
MIL-C-3885 - Cable Assemblies and Cord Assemblies, Electrical (For Use in Electronic, Communication, and Associated Electrical Equipment.)
MIL-I-3930 - Insulation and Jacketing Compounds, Electrical (For Cables, Cords, and Wires).
MIL-C-12000 - Cable, Cord, and Wire, Electric, Packaging and Packing of.
MIL-C-45662 - Calibration System Requirements.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-130 - Identification Marking of US Military Property.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issue in effect on date of invitation for bids or request for proposal shall apply.

DEPARTMENT OF DEFENSE

H4-1 - Federal Supply Code for Manufacturers (Part I).

(Application for copies should be addressed to Defense Supply Agency, Defense Logistics Services Center, Battle Creek, Michigan 49017)

AMERICAN SOCIETY FOR TESTING MATERIALS.

B-33 - Tinned Soft or Annealed Copper Wire for Electrical Purposes.

(Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103)

3. REQUIREMENTS

3.1 Material. The materials used for the cables shall be as specified herein. The best material for tropic and arctic use commercially available for the purpose shall be used when a definite material is not designated.

3.1.1 Conductor strands. Each strand of the conductors shall be tinned, soft, or annealed copper wire and shall conform to ASTM B-33 prior to stranding into conductors.

3.1.2 Insulation. A SBR insulating compound conforming to type IS of MIL-I-3930 shall be applied over each conductor or inner separator, when present, to a minimum thickness as shown in table II.

TABLE II. Insulation thickness.

Conductor		Insulation thickness (min.)
Wire size	Diameter	
AWG	Inches	Inches
18	0.040	0.012
20	.032	.012
22	.0253	.010
24	.0201	.010

3.1.3 Jacket. A SBR jacket conforming to type JS of MIL-I-3930 shall be applied over the outer separator to a minimum thickness and maximum outside diameter of cable as shown in table III.

TABLE III. Jacket thickness and cable diameter.

Cable nomenclature	Jacket thickness (min.)	Cable diameter (max.)
	Inches	Inches
WM-65/U- - - - - -	0.060	0.800
WM-79/U- - - - - -	.050	.710
WM-80/U- - - - - -	.050	.660
WM-78/U- - - - - -	.050	.640
WM-72/U- - - - - -	.030	.455
WM-66/U- - - - - -	.030	.375

3.2 Design and construction.

3.2.1 Conductors. The conductors shall be bunch stranded and shall be composed of the number and size of strands as shown in table IV.

TABLE IV. Construction requirements of stranded conductors.

Conductors			Strands			
Wire size	Diameter	Nominal area	Number	Wire size	Diameter	Nominal area
AWG	Inches	Cir. mils		AWG	Inches	Cir. mils
18	0.040	1,620	41	34	0.0063	39.8
20	.032	1,020	26	34	.0063	39.8
22	.0253	642	16	34	.0063	39.8
24	.0201	404	10	34	.0063	39.8

3.2.2 Inner separator. A fine cotton or rayon separator shall be applied over each conductor. The separator shall consist of a suitable number of ends of yarn closely wound to cover the conductor. If a free stripping insulating compound is applied, the separator may be omitted.

3.2.3 Singles. A single shall be one insulated conductor.

3.2.4 Pairs. Two insulated conductors shall be twisted together with a right hand lay to form a pair. The length of lay shall not exceed the values shown in table V.

TABLE V. Length of lay of twisted insulated conductors.

Conductors	
Wire sizes	Length of lay (max.)
AWG	Inches
18	1.50
20	1.50
22	1.00
24	1.00

3.2.5 Color Code of singles. Singles shall be colored black. Unless otherwise specified one conductor of a pair shall be colored black and the other shall be colored white. The coloring shall be accomplished by the use of colored insulating compounds.

3.2.6 Color Code of pairs. Cable pairs shall be color coded in accordance with table VI, and in the sequence specified for the required number of pairs.

TABLE VI. Color coding.

Order	Color	Paired with
1	Black	White
2	Red	White
3	Green	White
4	Orange	White
5	Blue	White
6	Yellow	White
7	Red	Black
8	Green	Black
9	Orange	Black
10	Blue	Black
11	Yellow	Black
12	Green	Red
13	Orange	Red

3.2.7 Cabling. The paired conductors shall be twisted together with a right hand lay such that the ratio of lay to pitch diameter of each layer of pairs shall not exceed 10:1. The single, if required, shall be twisted together with the pairs or placed in the center of the cable. Soft cotton or dry jute may be used as a core for the cable conductors, or to fill the interstices between the cabled pairs.

3.2.8 Outer separator. A close serving, braid, or suitable fabric binder shall be applied over the cable conductors in such a manner as to permit sliding movement when the cable is bent or twisted sharply.

3.2.9 Cables, cords and cable assemblies. All cables, cords and cable assemblies fabricated therefrom, shall be in accordance with MIL-C-3885.

3.3 Performance.

3.3.1 DC resistance. Each conductor in each cable shall be continuous and shall have a dc resistance per 1,000 feet of cable, at or corrected to 25° C (77° F), of not more than the value shown in table VII when tested in accordance with 4.6.2.

TABLE VII. Conductor dc resistance.

Conductors			DC resistance (max.) per 1,000 feet at 25° C (77° F)
Wire size	Diameter	Nominal area	
AWG	Inches	Cir. mils	Ohms
18	0.040	1,620	7.9
20	.032	1.020	12.4
22	.0253	642	20.3
24	.0201	404	32.4

3.4 Marking. Cables shall be marked in accordance with MIL-STD-130, with the type designation, the manufacturer's code symbol and the manufacturer's name. The code symbol shall be in accordance with Handbook H4-1. Cables shall be marked at intervals of not more than 10 feet on the outside of the jacket. Marking shall not permanently dent, deform, or otherwise damage the jacket.

3.5 Workmanship. The cables shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, serviceability, or appearance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.

4.1.1 Supplier. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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.

4.1.2 Test equipment and inspection facilities. Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of the inspection equipment shall comply with the requirements of MIL-C-45662.

4.2 Classification of inspection. The examination and testing of cables shall be classified as follows:

(a) Component-materials inspection (see 4.3).

(b) Quality conformance inspection (see 4.5).

(1) Inspection of finished product (see 4.5.1).

(2) Inspection of preparation for delivery (see 4.6.3).

4.3 Component-materials inspection. Component-materials inspection shall consist of verification that the component materials listed in table VIII used in fabricating the cables, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

TABLE VIII. Component-materials inspection.

Component material	Requirement paragraph	Applicable specification
Conductor strands- - - - -	3.1.1	ASTM B-33
Insulation - - - - - - - - -	3.1.2	MIL-I-3930
Jacket - - - - - - - - - - -	3.1.3	MIL-I-3930

4.4 Inspection conditions. Unless otherwise specified herein all inspections shall be made in accordance with the general requirements of MIL-STD-202.

4.5 Quality conformance inspection.

4.5.1 Inspection of finished product. Inspection of finished product shall be in accordance with 4.6.

4.5.1.1 Definitions.

4.5.1.1.1 Unit of product. The unit of product shall be defined as either a manufactured length or a quantity of 10,000 feet whichever is larger.

4.5.1.1.2 Inspection lot. An inspection lot, as far as practicable, shall consist of all cables, of the same type, produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.1.3 Inspection lot size. The inspection lot size shall be the number of units of product, as determined in 4.5.1.1.1.

4.5.1.1.4 Sample. The sample shall consist of that number of sample units required by the sampling plan for the inspection lot size as determined in 4.5.1.1.3.

4.5.1.1.5 Selection of samples. The number of sample units required for inspection shall be chosen at random by selecting one spool, reel, or coil for each sample unit required, (see 4.5.1.1.4), after which the selected spool, reel, or coil shall be treated as the sample unit for purposes of inspection. Sampling for inspection shall be in accordance with MIL-STD-105, Level II, with an acceptable quality level (AQL) of 4.0 percent defective.

4.6 Methods of examination and test.

4.6.1 Visual and mechanical examination. The cables shall be examined to verify that the material, design, construction, physical dimensions, and workmanship are in accordance with 3.1, 3.2 and 3.5. Inspection shall be in accordance with 4.5.1.1.5.

4.6.2 DC resistance. Each conductor of all cables on orders shall be tested for dc resistance by a suitable bridge. (See 3.3.1.)

4.6.3 Inspection of preparation for delivery. Sample items and packs shall be selected and inspected in accordance with MIL-P-116, table III, including rough handling tests, and the other specifications referenced herein, to verify conformance with the requirements in section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Electrical cable shall be prepared for delivery in accordance with MIL-C-12000, for the specified levels of packaging, packing and marking (see 6.1).

6. NOTES

6.1 Ordering data. Requests, requisitions, schedules and contracts or orders should specify the following:

(a) Title, number, and date of this specification.

(b) The length of cable required to be furnished on each reel.

(c) Whether domestic or overseas packing is required.

(d) Levels of preservation and packaging and packing and applicable marking (see 5.1).

6.1.1 Indirect shipments. The preservation, packaging, packing, and marking requirements specified in section 5 apply only to direct purchases by or direct shipment to the Government and are not intended to apply to contracts or orders between the supplier and prime contractor.

Custodians:
Army - EL
Air Force - 17

Review activities:
Army - EL, MO
Air Force - 17

User activities:
Army - MI, MU
Air Force -

Preparing activity:
Army - EL

(Project 6145-0411)

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)* | CITY AND STATE

CONTRACT NO. | QUANTITY OF ITEMS PROCURED | DOLLAR AMOUNT $

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)* | DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE PLATE NO. 15419