

INCH-POUND

MIL-DTL-10392D  
 11 March 2007  
 SUPERSEDING  
 MIL-C-10392C  
 11 September 1970

## DETAIL SPECIFICATION

Cord, Electrical (Audio, Miniature)

Inactive for new design after 16 June 1997.

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

## 1. SCOPE

1.1 Scope. This specification covers miniature audio cords with stranded wire conductors for use switch microphones, telephone, switchboards, and associated communication equipments. These cords are intended for use at potentials up to 300 volts (rms) at audio frequencies, and at temperatures from -40° to +75° C (see 3.2 for individual types.)

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4 or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## FEDERAL STANDARDS

FED-STD-228 - Cable and Wire, Insulated; Methods of Testing

## DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-C-572 - Cords, Yarns and Monofilaments, Organic Synthetic Fiber.

MIL-C-13777 - Cable, Special Purpose, Electrical.

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center, ATTN: DSCC-VAI, P.O. Box 3990, Columbus, Ohio 43218-3990, or email to [WireCable@dsccl.dla.mil](mailto:WireCable@dsccl.dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contract.

## ASTM INTERNATIONAL

ASTM-B33	-	Standard Specification for Tinned Soft of Annealed Copper Wire for Electrical Purposes
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(Copies of these documents are available online at <http://www.astm.org> or from ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

## NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCSL)

NCSL-Z540.1	-	Calibration Laboratories and Measuring and Test Equipment, General Requirements
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(Copies of this document are available from <http://www.ncsli.org> or from the National Conference of Standards Laboratories (NCSL), 2995 Wilderness Place, Suite 107, Boulder, CO 80381-5404.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Material. The material used in the cords shall be as herein after specified.

3.3 General. The cord types shall be as specified in [table I](#) and shall be constructed as follows:

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TABLE I. Cord types and construction. 1/ 2/

Cord type designation	Total number of conductors	Conductor size no. each	AWG	Conductor circular mils(nominal)	Cord length of lay (inch/mm, maximum)	Cord diameter (inch/mm, maximum)
WD-27A/U	2	2	24	404	0.5 (12.70)	0.146 (3.71)
WT-15A/U	3	3	24	404	0.5 (12.70)	.212 (5.38)
WF-11A/U	4	4	24	404	.875 (22.23)	.212 (5.38)
WM-59A/U	5	5	24	404	1.125 (28.58)	.212 (5.38)
WM-60A/U	6	6	24	404	1.25 (31.75)	.252 (6.40)
WM-69B/U	6	2,4	18,24	1620,404	.875 (22.23)	.262 (6.65)
WM-111A/U	7	2,5	18,24	1620,404	.875 (22.23)	.280 (7.11)
WM-61A/U	7	7	24	404	1.25 (31.75)	.252 (6.40)
WM-62A/U	8	8	24	404	.625 (15.88)	.262 (6.65)
WM-70B/U	8	2,6	18,24	1620,404	.875 (22.23)	.285 (7.24)
WM-63A/U	9	9	24	404	1.75 (44.45)	.280 (7.11)
WM-64A/U	10	10	24	404	2.25 (57.15)	.297 (7.54)

1/ Dimensions are in inches.

2/ Metric equivalents are given for information only.

3.4 Conductor. The conductor shall be constructed as follows: 0.0003 inch (.01 mm), minus 0.0001 inch (.00 mm). Each strand shall be tinned, annealed, cadmium-copper alloy having a 1% nominal content of cadmium.

3.4.1 Conductor construction, 404 circular mils. Conductors having a nominal cross-sectional area of 404 circular mils (24 AWG) shall consist of 41 strands, bunch stranded, with a maximum length of lay of 0.6 inch (15.24 mm).

3.4.2 Conductor construction, 1620 circular mils. Conductors having a nominal cross-sectional area of 1620 circular mils (18 AWG) shall consist of 168 strands, rope lay, consisting of seven bunch-stranded members. Each bunch stranded member shall contain 24 strands, bunch stranded, with a maximum length of lay of 0.6 inch (15.24 mm). Six of these members shall be twisted concentrically around one member, with a maximum length of lay of 0.8 inch (20.32 mm) to form the rope lay conductor.

3.5 Conductor strands. The strands comprising the stranded conductors shall have a cross-sectional area of 9.61 circular mils (40 AWG). The diameter of the strands shall be 0.0031 inch (.08 mm) +0.0003 inch (.01 mm), -0.0001 inch (.00 mm). Each strand shall be tinned, annealed, cadmium-copper alloy having a 1 percent nominal content of cadmium.

3.5.1 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content used in connector materials shall not exceed 97 percent by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.3).

3.5.2 Conductor strand tensile strength and elongation. The tensile strength and elongation of the coated strands, removed from the insulated conductors prior to cabling, shall be as follows:

Tensile strength: 45,000 psi, max.  
Elongation in 10 inches: 13 percent, maximum.

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3.5.3 Conductor strand resistance. Each conductor strand shall have a direct current resistance of 1,310  $\Omega$  maximum per 1000 feet at a temperature at or corrected to 20° C. If the resistance value is lower or equal to that specified, when the measurement is made at a temperature greater than 20° C, no correction factor will be needed (see 4.5.5).

3.6 Inner separator. An inner separator shall be applied over each conductor. The separator shall consist of a suitable number of ends of yarn conforming to MIL-C-572, type AR, CTA, or VCR, closely wound to cover the conductor. If however, the insulating compound applied in accordance with 3.7 is free stripping, the separator may be omitted.

3.7 Insulation. A styrene butadiene rubber (SBR) insulating compound, type IS or type ISL, shall be applied over the conductor or inner separator, when present, to a minimum thickness of 0.007 inch (.18 mm). Insulated conductors having a nominal area of 404 circular mils (24 AWG) shall have a maximum diameter of 0.059 inch (1.50 mm). Insulated conductors having a nominal area of 1620 circular mils (18 AWG) shall have a maximum diameter of 0.097 inch (2.46 mm).

### 3.8 Color coding.

3.8.1 Cords having all 24 AWG conductors. Cords having all 24 AWG conductors shall use the following colors, in the sequence listed:

1-White	6-Blue
2-Black	7-Brown
3-Red	8-Yellow
4-Green	9-Gray
5-Orange	10-Purple

3.9 Cords WM-69B/U, WM-70B/U, and WM-111A/U. Cords WM-69B/U, WM-70B/U and WM-111A/U shall be color coded as specified on table II.

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TABLE II. Color code of cords WM-69B/U, WM-70B/U and WM-111A/U.

Cord type	Conductor size (AWG)	Color
WM-69B/U	24	White
	24	Red
	24	Green
	24	Blue
	18	Brown
	18	Yellow
WM-70B/U	24	White
	24	Black
	24	Red
	24	Green
	24	Orange
	24	Blue
	18	Brown
	18	Yellow
WM-111A/U	24	White
	24	Black
	24	Red
	24	Green
	24	Blue
	18	Brown
	18	Yellow

3.10 Conductivity of fibers and yarns. The conductivity of the solution prepared from any part of the fibers or yarns used as servings, binders, braid, core, separators, fillers, or stay cords, removed from the cord, shall not exceed 50 micro-ohms per cubic centimeters, when tested as specified in [4.5.11](#).

3.11 Fillers. Filler materials shall be a ply yarn in accordance with [MIL-C-572](#), type P or CTA or polyester fiber, polypropylene yarn, or polypropylene filament.

3.12 Staycords. Staycord material shall be in accordance with [MIL-C-572](#), type P or PAA or polyester fiber or polypropylene fiber.

3.12.1 Staycord for WD-27A/U. Cord WD-27A/U shall contain one staycord. The staycord shall have a minimum breaking strength of 50 pounds.

3.12.2 Staycord for WM-69B/U. Cord WM-69B/U shall contain two staycords. Each staycord shall have a minimum breaking strength of 25 pounds.

3.12.3 Staycords for WT-15A/U, WF-11A/U, WM-59A/U, WM-60A/U, WM-61A/U, WM-62A/U, WM-63A/U, WM-64A/U, WM-70B/U and WM-111A/U. These cords shall each contain one staycord. The staycord shall have a minimum breaking of 60 pounds.

3.13 Cabling. Cabling of the cords shall be as indicated below. The length of lay of the insulated conductors shall be as specified in [table I](#). The staycord or staycords shall be at or near the center of the core, and shall not be twisted together with the insulated conductors. Fillers shall be used in the interstices between the conductors to form an essentially round core prior to jacketing.

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3.13.1 Cord WM-69B/U. The insulated conductors of cord WM-69B/U shall be twisted around two parallel staycords in the configuration specified on [figure 1](#).

3.13.2 Cord WM-70B/U. The insulated conductors of cord WM-70B/U shall be twisted around a central staycord in the configuration specified on [figure 1](#).

3.13.3 Cord WM-111A/U. The insulated conductors of cord WM-111A/U shall be twisted with fillers around a central staycord in the configuration specified on [figure 1](#).

3.14 Outer separator. A separator shall be applied over the cabled conductors. The separator shall consist of a suitable number of ends of yarn or polyester tape closely wound to cover the cabled conductors.

3.15 Jacket. A smooth, dense, SBR jacket, type JS or type JS-L, shall be applied over the outer separator. The minimum jacket thickness shall be 0.015 inch (.38 mm) for cord WD-27A/U and 0.020 inch (.51 mm) for the remaining cords. The outside diameters of the cords shall be as specified in [table 1](#), with a tolerance of  $\pm 0.010$  inch (.25 mm).

3.16 Cord tensile strength. When tested as specified in [4.5.6](#), cord WD-27A/U shall have a breaking strength of not less than 50 pounds; the remaining cords shall have a breaking strength of not less than 60 pounds. Continuity of all conductors shall be maintained to at least the minimum breaking strength specified herein.

3.17 Identification marking. Cords shall be identified by inked markings. Inked markings shall be clear and legible, shall be resistant to moisture and oil, and shall not readily abrade when the cord is stepped or tramped upon or dragged on the ground when subjected to the cold bend test. The inked marking shall consist of the type designation followed by the number of this specification and year of manufacture. Digits indicating footage may be used at the option of the manufacturer. The marking shall be repeated along the cord at intervals not more than one foot apart.

### 3.18 Electrical requirements.

3.18.1 Dielectric withstanding voltage. The insulated conductors shall withstand without breakdown an applied voltage of 500 volts (rms) when tested as specified in [4.5.7](#).

3.18.2 Insulation resistance. Immediately after the insulated conductors have withstood the dielectric withstanding voltage test, the insulation resistance shall be measured as specified in [4.5.8](#). The insulation resistance of the insulated conductors shall not be less than 600 megohms-1000 ft.

3.18.3 Conductor resistance. Each conductor in the finished cord shall be continuous and shall have a direct-current (dc) resistance at or corrected to 20° C, as specified on [table III](#). If the resistance value is lower of equal to that specified when the measurement is made at a temperature greater than 20° C, no correction factor is needed (see [4.5.9](#)).

TABLE III. Conductor resistance.

Conductor size (AWG)	DC resistance (ohms,max./1000 ft.)
24	39.0
18	9.7

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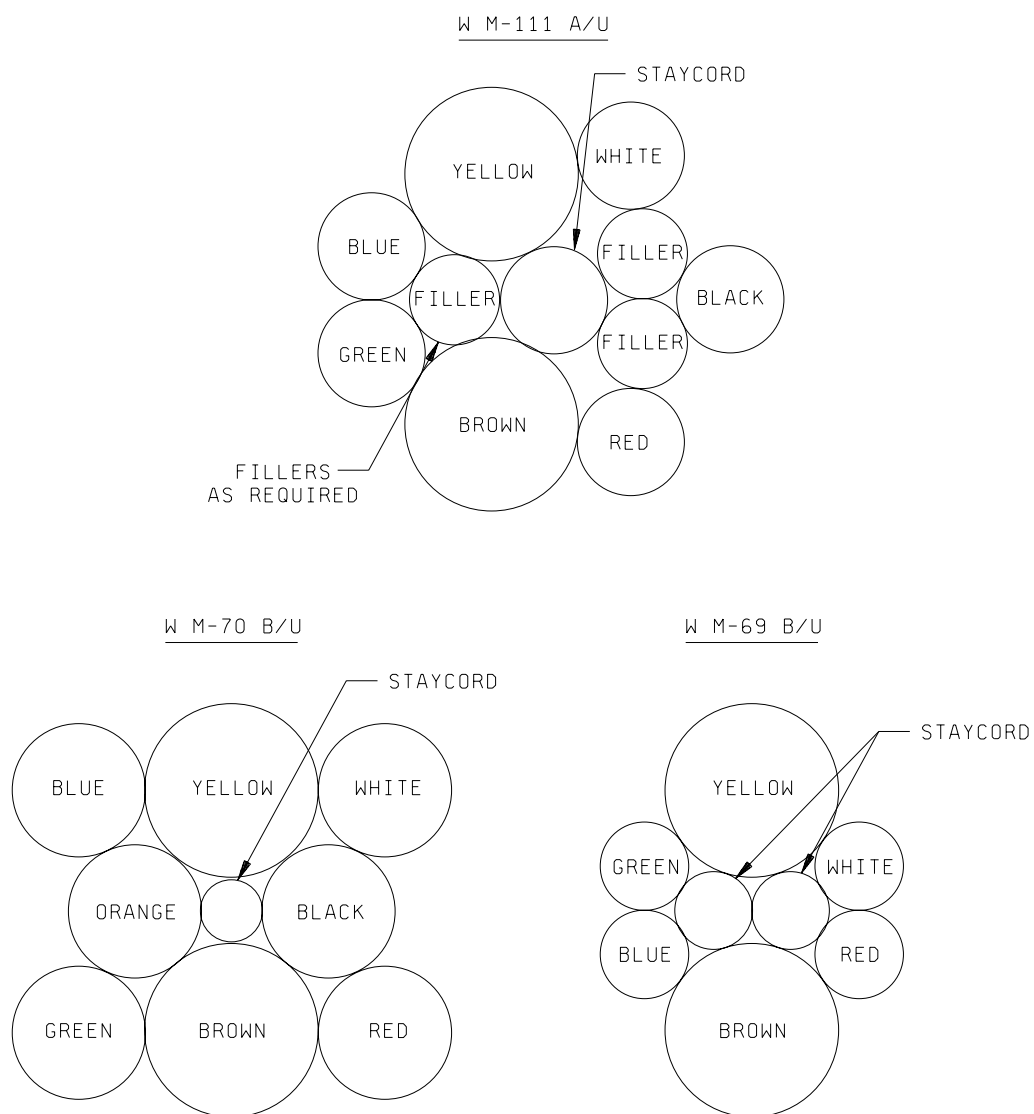


FIGURE 1. Cabling diagrams.

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3.19 Flexing life requirements. When tested as specified in 4.5.2, the finished cords, except WD-27A/U, shall be capable of being flexed without loss of continuity of any of the conductors for not less than 30,000 cycles. Cord WD-27A/U shall be capable of being flexed without loss of continuity of any of the conductors for not less than 15,000 cycles.

3.20 Operating range. The cords shall be flexible and resilient throughout the temperature range of -40° C to +75° C.

3.20.1 Cold bend. Neither the jacket nor the insulation shall show evidence of cracks, flaws or other damage when tested at -55° C in accordance with 4.5.10.

3.21 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life-cycle costs.

3.22 Workmanship. Cords shall be constructed and finished in a thoroughly workmanlike manner in accordance with accepted high grade production techniques. The cords shall be a uniform and consistent product and shall be free from any defects which will adversely affect the serviceability of the product, such as lumps, kinks, splints, abrasions, scrapes, corroded surfaces, skin impurities and faulty extruded surfaces.

#### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.3).

b. Conformance inspection (see 4.4).

4.2. 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 (i.e., non-Government standard [NGS] or federal or military standard) shall be in accordance with NCSL-Z540.1 or equivalent.

4.3 Qualification inspection. Qualification inspection shall consist of material inspection and tests having certification supported by verifying documentation that the materials and tests listed in table IV, used in fabricating the designated cord type (see 3.2), are in accordance with the applicable referenced specification or requirements prior to such fabrication.



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TABLE IV. Qualification inspection.

Material	Requirements paragraph	Applicable specification
Separators, fillers and staycords	<a href="#">3.6</a> , <a href="#">3.11</a> , <a href="#">3.12</a>	<a href="#">MIL-C-572</a>
Insulation	<a href="#">3.7</a>	n/a
Jacket	<a href="#">3.15</a>	n/a

4.4 Conformance inspection.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspection.

4.4.1.1 Unit of product. Unless otherwise specified, the unit of product for purpose of sampling shall be each continuous length of finished cord contained on a reel, spool or coil.

4.4.1.2 Inspection lot. An inspection lot shall consist of all cords of the same type (see [3.2](#)) produced under essentially the same conditions and submitted for inspection at one time.

4.4.1.3 Sampling. A random sample shall be selected from each inspection lot in table V.

TABLE V. Inspection sample.

Inspection lot size <sup>1/</sup>	Sample size
1	1
2 to 8	2
9 to 90	3
91 to 150	12
151 to 280	19
281 to 500	21
501 to 1,200	27
1,201 to 3200	36
3,210 to 10,000	38
10,001 to 35,000	46

NOTE: <sup>1/</sup> Lot size is based on the number of units of product.

4.4.1.4 Sample unit. A sample unit is defined as a unit of product selected to be part of a sample.

4.4.1.5 Test specimen. A test specimen may be the entire sample unit (length of finished cord) or any portion of the sample unit which is to be tested.

4.4.2 Group A inspection. Group A inspection shall include the examinations and tests in [table VI](#).

4.4.2.1 Subgroup I. Subgroup I tests may be performed in any order.

4.4.2.2 Subgroup II. For subgroup II, the sample shall be 100 percent of the cord in the inspection lot and every length of cord shall be subjected to the tests. Subgroup II tests shall be performed in the order specified in [table VI](#). The entire lot shall be rejected if more than 3 defects per 100 feet in a lot are found.

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TABLE VI. Group A inspection.

Examination or test	Requirement paragraph	Test method paragraph
Subgroup I		
Visual and mechanical		
Material and construction	3.2 through 3.17	4.5.1
Workmanship	3.22	4.5.1
Subgroup II		
Electrical		
Dielectric withstanding voltage	3.18.1	4.5.7
Insulation resistance	3.18.2	4.5.8
Conductor resistance	3.18.3	4.5.9

4.4.2.3 Rejected lots. Failure of a lot to pass any test or inspection constitutes failure of the lot and the lot shall be rejected. If an inspection lot is rejected, the contractor may rework the lot to correct the defects, or screen out the defective units and resubmit the lot for re-inspection. Such lots shall be segregated from new lots and shall be identified as re-inspected lots.

4.4.3 Group B inspection. Group B inspection shall be performed on inspection lots that have passed group A inspection and on specimens selected from units of product that have been subjected to and met the group A inspection. Group B inspection shall include the applicable inspections specified in table VII.

4.4.3.1 Order of inspection within group B. Group B inspection shall be performed in any order which is satisfactory to the government.

4.4.3.2 Disposition of samples. Samples subjected to group B tests shall not be included as part of the delivered product.

TABLE VII. Group B inspection.

Examination or test	Requirement paragraph	Test method paragraph
Subgroup I	n/a	n/a
Conductor strands	n/a	n/a
Tin coating	3.5.1	4.5.3
Tensile strength and elongation	3.5.2	4.5.4
Conductor strand resistance	3.5.3	4.5.5
Subgroup II	n/a	n/a
Cord	n/a	n/a
Conductivity of fibers and yarns	3.10	4.5.11
Tensile strength	3.16	4.5.6
Flexing life	3.19	4.5.2
Subgroup III	n/a	n/a
Insulation and jacket	n/a	n/a
Cold bend	3.20.1	4.5.10

#### 4.5 Test methods.

4.5.1 Visual and mechanical inspection. The finished cords shall be given a visual and mechanical inspection for conformance with the requirements of 3.2 to 3.17 inclusive.

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4.5.2 Flexing life test. The finished cords shall be tested for compliance with 3.19. The cord flexing machine shall contain a rotating actuating arm whose normal zero position is vertical. The arm shall rotate about a horizontal axis, the outer end traversing a circular arc in a vertical plane. The arm shall rotate 90° from the zero position to a position 90° from the zero position in the opposite direction, and then reverse its direction and rotate back to zero position, thus completing a cycle. The arm shall be rotated at approximately 900 cycles per hour. Two adjustable 0.5 inch (12.70 mm) diameter mandrels shall be mounted in the machine with their axis perpendicular to the plane of rotation of the actuating arm. The plane through the axis of the two mandrels shall be horizontal and shall pass through the axis of rotation of the actuating arm. The mandrels shall be placed so that the axis of rotation lies midway between the mandrels. A length of cord shall be inserted between the mandrels which shall be so spaced that there is a slight clearance between the cord and the mandrels. The upper end of the cord shall be attached to the rotating end of the actuating arm. The lower end of the cord shall be attached to a weight: One pound for WD-27A/U, two pounds for WT-15A/U, WF-11A/U, WM-59A/U, and a three pound weight for WM-60A/U, WM-61A/U, WM-62A/U, WM-63A/U, WM-64A/U, WM-69B/U, WM-111A/U and WM-70B/U. There shall be at least five inches of cord from the plane through the axis of the mandrels to the point at which the weight is attached to the cord. The weight shall be lightly snubbed to prevent rotation. The cord shall have all of its conductors connected in series through a relay which will cause the machine to cease operation if any of the conductors momentarily lose continuity. A bending machine such as specified in MIL-C-13777 is a suitable cord flexing machine for use as indicated. Any other approved machine which will give equivalent mechanical motion to the cord may be used.

4.5.3 Tin-coating. The tin-coating on the conductor strands and the continuity, adherence and finish shall pass the applicable tests specified in ASTM-B33 (see 3.5.1).

4.5.4 Conductor strand tensile strength and elongation. This test shall be made in accordance with FED-STD-228, method 3211 (see 3.5.2).

4.5.5 Conductor strand resistance. The conductor strand, prior to stranding into a conductor, shall be measured for dc resistance in accordance with FED-STD-228, method 6021 (see 3.5.3).

4.5.6 Cord tensile strength. The tensile strength shall be made on a tensile testing machine, power driven, and preferably of the pendulum type. The test shall be made at the rate of 12 inches (304.80 mm) per minute. The conductors of the cord may be connected in series to an indicating or signaling device or automatic stop or both. The arrangement shall be such that an indication will be given when there is a disruption of electrical continuity due to the breaking of the conductors of the cord under tensile test (see 3.16).

4.5.7 Dielectric withstanding voltage. Cords shall be tested in accordance with FED-STD-228, method 6111 except that:

- a. The test shall be performed on sample units of finished cords only.
- b. The immersion period shall be not less than 6 hours.
- c. An alternating potential, as specified in 3.18.1, shall be applied between two terminals, one being each conductor in turn, and the other being all the remaining conductors tied together in electrical contact with the water.

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4.5.7.1 Alternate test procedure. The following alternate test procedure may be used in place of the test procedure as specified.

a. Arrange the conductors in a rectangle containing rows and columns as specified. The last column will contain unused spaces as specified.

Number of conductors	Number of rows	Number of columns	Number of unused spaces
3	2	2	1
4	2	2	0
5	2	3	1
6	2	3	0
7	3	3	2
8	3	3	1
9	3	3	0
10	3	4	2

b. Connect all the conductors in a column together. Do this for each column.

c. Apply the specified test voltage, for the specified time, between each column of the rectangle in turn, and the remaining columns connected together and also tied together in electrical contact with the water.

d. Connect all the conductors in a row together. Do this for each row.

e. Apply the specified test voltage, for the specified time, between each row of the rectangle in turn and the remaining rows connected together and also tied together in electrical contact with the water.

4.5.8 Insulation resistance test. This test shall be performed on sample units of the finished cords in accordance with [FED-STD-228](#), method 6031, except that the immersion period shall not be less than 6 hours (see [3.18.2](#)).

4.5.9 Conductor resistance. The direct current resistance of each conductor shall be measured on the sample units of finished cords in accordance with [FED-STD-228](#), method 6021, except that the immersion period shall not be less than 6 hours (see [3.18.3](#)). To ascertain added length of conductor due to pairing and cabling, the measured length of the cords shall be corrected to length of lay by the appropriate pairing and cabling factor computation.

#### 4.5.10 Cold bend.

4.5.10.1 Specimens. One specimen from each sample unit shall be prepared for test. Each specimen shall be divided into two parts, one for checking the cord as a whole and the other for checking the insulation apart from the cord.

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4.5.10.2 Procedure. The specimens selected for checking the cord as whole shall be attached to the proper size mandrel as specified in 4.5.10.2.1. The specimens shall be suspended vertically with lower ends weighted sufficiently to keep specimens taut and to permit bending them without handling. The mandrel and specimens shall be placed for at least 20 hours in the cold chamber at the specified temperature (see 3.20.1). While at this temperature, the specimens shall be bent for seven close turns around the mandrel at the rate of approximately fifteen turns per minute. After the test has been complete, the jacket on the specimen of cord shall be examined for damage through a magnifying glass of at least three diameter's magnification. The jacket shall be carefully removed and the individual conductor insulation of all specimens shall be examined for damage with the magnifying glass. Only the five inside turns shall be considered for evidence of damage.

4.5.10.2.1 Mandrels for cords. The mandrel for testing the cord shall be selected from the following standard size mandrel diameters.

Mandrel diameters (in/mm)

0.500 (12.70)  
0.680 (17.27)  
0.840 (21.34)  
1.050 (26.67)

NOTE: Dimensions are in inches. Metric equivalents are given for information only.

The size selected shall be the largest size which does not exceed three times the specified nominal diameter of the cord.

4.5.10.2.2 Mandrels for insulation. The mandrel for testing the insulation apart from the cord shall be selected according to the size of the conductor as follows:

<u>Conductor size</u>	<u>Mandrel diameter (in/mm)</u>
24	0.062 (1.57)
18	0.094 (2.39)

NOTE: Dimensions are in inches. Metric equivalents are given for information purposes.

4.5.11 Conductivity of fibers and yarns. The fibers and yarns shall be subjected to the following test: One-half gram of material removed from the finished cord shall be boiled for 10 minutes in 60 to 70 cubic centimeters of distilled water which has a conductivity of not more than 5 micro-ohms per centimeter cube at 20° C. Enough distilled water shall then be added to make a volume of 100 cubic centimeters. The conductivity of this solution shall be measured with alternating current and shall be determined as the average of two specimens removed from each sample unit. If the average thus determined exceeds the requirement specified in 3.9, the sample unit shall be considered defective. A conductivity cell may be used for this test.

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## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order. When packaging of materiel is to be performed by DoD personnel or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The cords covered by this specification are intended for use with microphones, receivers, headsets, handsets, etc., where small diameter and flexibility are advantageous.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type required (see 3.2).
- c. Length of finished cords to be delivered.

6.3 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Subject term (key word) listing.

Polytetrafluoroethylene (PTFE)  
Separator  
Bunch strands

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6.5 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. Table VIII lists the Environmental Protection Agency (EPA) top seventeen hazardous materials targeted for major usage reduction. Use of these materials should be minimized or eliminated unless needed to requirements specified herein (see section 3).

TABLE VIII. EPA top seventeen hazardous materials.

Benzene	Dichloromethane	Tetrachloroethylene
Cadmium and Compounds	Lead and Compounds	Toulene
Carbon Tetrachloride	Mercury and Compounds	1,1,1 Trichoroethane
Chloroform	Methyl Ethyl Ketone	Trichloroethylene
Chromium and Compounds	Methyl Isobutyl Ketone	Xylene
Cyanide and Compounds	Nickel and Compounds	

6.6 Environmental. Environmental pollution prevention measures are contained in the packaging material specifications referenced herein. Refer to material specifications or preparing activity for recommended disposability methods.

6.7 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue 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 for this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

## CONCLUDING MATERIAL

## Custodians:

Army - CR  
Navy - AS  
Air Force – 11  
DLA - CC

## Preparing activity:

DLA - CC

(Project 6145-2007-002)

## Review activities:

Army - AR, AT, AV, CR4, MI  
Navy – EC, MC, OS  
Air Force – 71

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 <http://assist.daps.dla.mil>.