MILITARY SPECIFICATION

HEADSET-MICROPHONE KIT, MK-2193/AIC

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

1. SCOPE

1.1 Scope. This specification covers Headset-Microphone Kit MK-2193/AIC for use with advanced communications systems. The kit is designed to fit both the regular and extra large size Helmet, Flying Type SPH-4A.

2. APPLICABLE DOCUMENTS

2.1 Government specifications and standards. Unless otherwise specified, the following specifications and standards, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-P-116	-	Preservation Packaging Methods Of.
MIL-C-572	-	Cords, Yarns, and Monofilaments, Organic Synthetic Fiber.
MIL-I-4997	-	Insulating and Jacketing Compounds for Use in Cords, Cordages and Cables.
MIL-E-5400	-	Electronic Equipment, Airborne, General Specification for.
MIL-P-11268	-	Parts, Materials and Processes Used in Electronic Equipment.
MIL-M-13231	-	Marking of Electronic Items.
MIL-F-14072	-	Finishes for Ground Electronic Equipment.
MIL-C-27072	-	Cable, Special Purpose, Electrical, Multiconductor.
MIL-C-27500	-	Cable, Electrical; Shielded and Unshielded, Aerospace.
MIL-C-45662	-	Calibration System Requirements.
MIL-M-58109	-	Microphone, Linear

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Avionics Research & Development Activity, ATTN: SAVAA-M, Fort Monmouth, New Jersey 07703 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5965

STANDARDS

FEDERAL

FED-STD-228 - Cable and Wire, Insulated; Method of Testing.
FED-STD-595 - Colors.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-147 - Palletized Unit Loads.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
MIL-STD-454 - Standard General Requirements for Electronic Equipments
MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of.
MIL-STD-781 - Reliability Design Qualification and Production Acceptance Test: Exponential Distribution.
MIL-STD-794 - Part and Equipment, Procedures for Packaging and Packing of,
MIL-STD-810 - Environmental Test Methods for Aerospace and Ground Equipment.
MIL-STD-831 - Test Reports, Preparation of.
MIL-STD-1285 - Marking of Electrical and Electronic Parts.

DRAWINGS

ARMY (FSCM 57045)

DLD6002566 - Headset-Microphone Kit, MK-2193/AIC.

NAVY

DS-AF-0200C (A) - Appendix A, Nuclear Survivability.
SK-N-864 - Simulated Gun Blast Producing Equipment.

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

2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ANSI S3.2 - 1960 (R1971) - Monosyllabic Word Intelligibility
ANSI S3.19 - 1974 - Method for the Measurement of Real Ear Protection of Hearing Protectors and Physical Attenuation of Ear Muffs.

(Application for copies should be addressed to the Acoustical Society of America, Standards Manager, 335 East 45th Street, New York, NY 10017.)

(Technical society and technical association specification and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 General. The requirements of MIL-E-5400 for class 1 equipment apply as requirements of this specification with the exceptions and additions called out herein. When the two specifications conflict, this specification shall govern.

3.1.1 Approval of nonstandard parts and materials. The requirement of MIL-E-5400 for category III equipment shall apply.

3.2 First article. When specified, the contractor shall furnish sample unit(s) for first article inspection and approval (see 4.5 and 6.2).

3.3 Materials. Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the microphones to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product. All materials shall have a minimum shelf life of 2 years.

3.4 Component parts. The MK-2193/AIC shall be supplied with the following components:

1 each	Microphone, Linear M-170/AIC, Boom Assembly (Standard Ball and Socket Type) and Cord Assembly, Electrical per MIL-M-58109(AV)/1.
2 each	Linear earcup transducer assembly including Earphone H-347/AIC (see figure 1).
1 each	Cable Assembly per this specification (see figures 1 and 2).
1 each	Switch, Mic, Boom/Mask (see figure 1).

3.5 Design. The MK-2193/AIC shall be stable in mechanical construction, electrical characteristics, acoustical performance, and shall conform to all the requirements of MIL-P-11268.

3.5.1 Aging. The MK-2193/AIC shall not contain parts fabricated from materials known to change their properties appreciably because of aging.

3.5.2 Nuclear survivability. Nuclear survivability shall be considered in the selection of materials to be utilized in the fabrication of MK-2193/AIC. The units shall be designed toward withstanding the nuclear environment specified in appendix A to DS-AF-0200C(A).

3.6 Construction. The MK-2193/AIC shall be assembled as configured in figure 1.

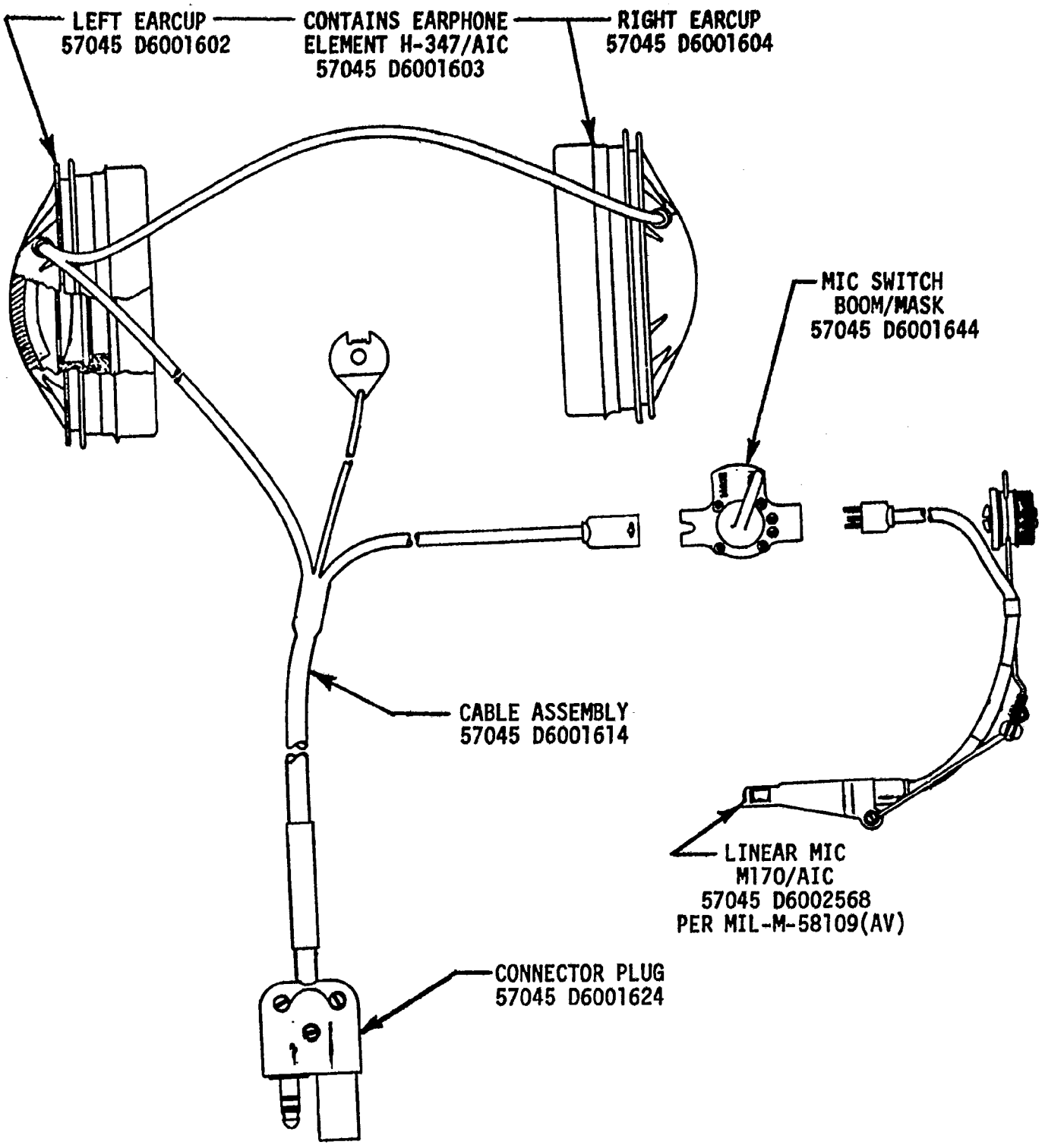

FIGURE 1. Headset-microphone kit assembly

3.6.1 Reduction on material. Natural rubber or natural cement shall not be used in the MK-2193/AIC. Rubber substitutes and plastic materials shall not be used as wedges and fillers.

3.6.2 Earphone diaphram material. The earphone diaphram material shall be plastic (Mylar Type A) or equivalent material giving demonstrated similar results.

3.6.3 Earphone voice coil material. The earphone voice coil shall be constructed of copper wire. The terminals shall be made of brass.

3.6.4 Earphone cushion and filler material. The cushion material shall be a non-hardening type with a slow "memory" which takes a temporary "set". The cushion cover shall be polyurethane.

3.6.5 Earcup material. The earcup shall be constructed of ABS (Acrylonitrile - Butadiene-Styrene).

3.6.6 Cement. To insure uniform adhesion and strength characteristics, any cement used shall be properly and uniformly controlled and cured throughout production.

3.6.7 Cable assembly.

3.6.7.1 Conductors. The nominal area of each of the four conductors shall be AWG 24. Each conductor shall consist of bunch-stranded AWG No. 40 (0.003145 inch diameter) tinned cadmium-bronze wire in accordance with MIL-C-27500. The strands shall be twisted to have a right hand lay of approximately one-half inch. The individual strands, before bunching and plating, shall have a minimum tensile strength of 90,000 pounds per inch squared (lb/in^2) and have a conductivity grade of at least 80 percent. The two conductors of each pair shall be twisted together to have a length of lay of 3/8 inch $\pm$ 1/4 inch each. See figure 1 and figure 2 for schematic representations.

3.6.7.2 Insulation. The insulation shall consist of extruded teflon not less than 0.006 inch thick. The insulation shall withstand a potential of 1000 volts of a commerical line frequency when applied in accordance with method 6211 of FED-STD-228.

3.6.7.3 Shield. A shield of closely woven braid of nickel chrome alloy strands shall be applied to provide coverage of not less than 90 percent. (See MIL-C-27072 shield requirement.) The strands shall conform to the requirements for conductors (see 3.6.7.1). The metallic coating of the shield shall be similar to the metallic coating of the conductors of the wire to which the shield is applied. The braided shield shall not increase the maximum diameters of the type specified by more than 0.030 inch. The shield shall provide both electrostatic and electromagnetic protection for the internal conductors. At the point where the four (4) conductor cable separates for the earphones and microphone, the shield going toward earphones shall terminate. See figure 2 for schematic of cabling for the MK-2193/AIC.

3.6.7.4 Color code. The insulation for the four conductors shall consist of one conductor color coded red and one green for microphone high and low respectively and one color coded white and one black for headset high and low, respectively.

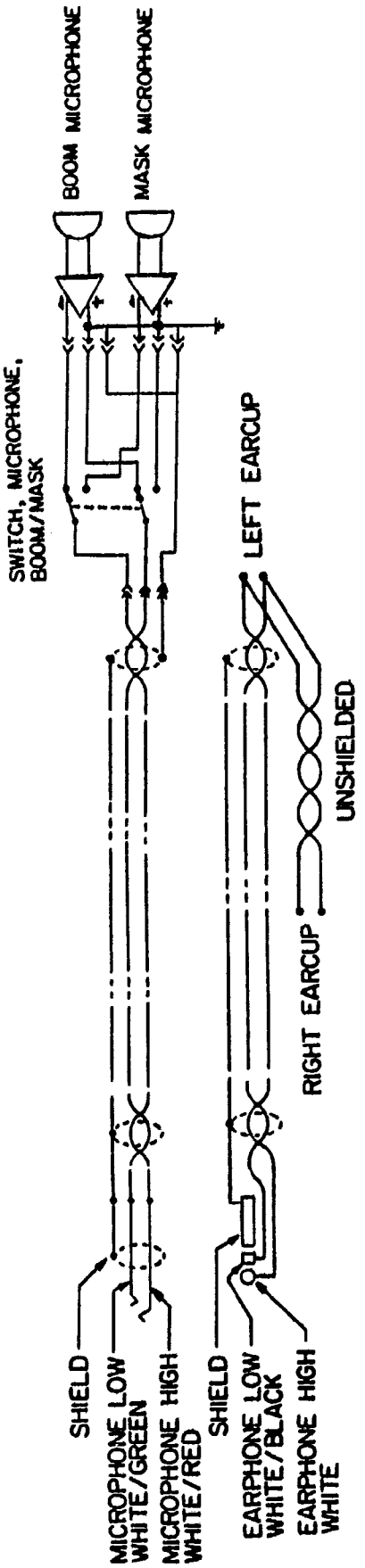

FIGURE 2. Headset-microphone kit assembly schematic

3.6.7.5 Staycord. Staycord shall consist of a fiber conforming to MIL-C-572, type PAA. The cord shall have a minimum breaking strength of 20 pounds for cords of 2, 3, and 4 conductors. The filaments of the staycord shall be bonded together with a fungus-inert adhesive in order to facilitate knotting during termination of the finished cord.

3.6.7.6 Jacket. The cable assembly shall be covered with a woven nylon jacket in accordance with MIL-C-27500.

3.7 Performance.

3.7.1 Electrical performance of earcup transducer assembly.

3.7.1.1 Impedance (see 4.7.2.1). The impedance of the assembly at 1 KHz shall be 19 ohms +10 percent.

3.7.1.2 Insulation resistance (see 4.7.2.2). The insulation resistance of the assembly between the terminals and the metal cover shall not be less than 10 megohms.

3.7.1.3 Dielectric withstanding voltage (see 4.7.2.3). The assembly shall withstand, without flashover or breakdown, the application of a 100 volt alternating potential of commerical line frequency when tested as specified herein.

3.7.2 Acoustical performance of earcup transducer assembly.

3.7.2.1 Frequency response (see 4.7.3.1). The frequency response of the earphone, when installed in its earcup and with earphone cushion in place shall be 85 dB SPL with an input signal of 1 mW at 1 KHz and within + 5 dB between 300-6000 Hz. NOTE: Real head frequency response on a typical person shall not vary from the limits described herein.

3.7.2.2 Psychoacoustic (see 4.7.3.2). The MK-2193/AIC shall enable the listeners to achieve a score of 75 percent or better.

3.7.2.3 Harmonic distortion (see 4.7.3.3). Harmonic distortion measurements shall be made on the earphone at 85, 95 and 105 dB SPL. At no level shall 5 percent harmonic distortion be exceeded.

3.7.2.4 Attenuation capability of earcup/transducer assembly.

3.7.2.4.1 Real head attenuation (see 4.7.3.4.1). The average attenuation values for the earcup transducer assembly shall be equal to or greater than the values shown in the "real head" column of table 3.

3.7.2.4.2 Flat plate coupler attenuation (see 4.7.3.4.2). The average attenuation values for the earcup transducer assembly shall be equal to or greater than the values shown in the "flat plate coupler" column of table 3.

3.7.2.5 Linearity (see 4.7.3.5). The response output of the assembly shall be a linear function of input, as the input voltage is varied for acoustic outputs of 85, 95 and 105 dB SPL at 1 KHz.

Table 3. Attenuation values. (see 3.7.2.4)

Frequency (Hz)	Attenuation (dB SPL)	
	Real head *	Flat plate coupler
100	- 8.2	
125	- 9.0	
160	-12.2	
200	-14.1	-17.5
250	-14.2	-17.1
315	-12.3	-17.5
400	-13.6	-16.4
500	-17.5	-19.9
630	-23.1	-24.5
800	-24.0	-25.7
1000	-26.0	-26.3
1250	-28.4	-31.2
1600	-27.0	-36.3
2000	-28.8	-41.0
2500	-32.0	-43.6
3150	-33.5	-40.8
4000	-38.5	-38.8
5000	-42.9	-40.4
6300	-43.5	
8000	-43.3	
10000	-40.0	

* A +5 variation from these values shall be acceptable provided the values in the "flat plate coupler" column are met or exceeded.

3.7.3 Cable assembly.

3.7.3.1 Temperature range (see 4.7.4.1). The unterminated cable shall be flexible and resilient throughout the temperature range of -55° to +85°C and shall show no evidence of cracking or any other damage as a result of exposure to the temperature range specified herein.

3.7.3.2 Flexing life (see 4.7.4.2). The unterminated cable shall have a mean flex life of 200,000 flexes without showing evidence of:

a. Damage to the outside jacket.
b. Damage to the insulation of the individual conductors.
c. Electrical discontinuty.

3.7.3.3 Cables anchorage (see 4.7.4.3). The cable and its anchorage to the two connector plugs shall withstand a specified pull applied to each connector plug for a period of 30 minutes without damage to the cord or anchorage. The specified weights shall be an 8-pound pull applied to the microphone connector and a 20-pound pull applied to the main cable kit terminating connector.

3.7.3.4 Conductor strain relief and twist relief (see 4.7.4.4). The cables shall be anchored in the two connector plugs so as to provide strain relief for the conductors. Means be provided to prevent twisting or inward movement of the cable in the connector plug.

3.7.3.5 Dielectric strength of cable assembly (see 4.7.4.5). The finished cable assembly shall meet the dielectric strength requirements of MIL-I-4997.

3.7.3.6 Insulation resistance of cable assembly (see 4.7.4.6). The insulation resistance of the finished cord assembly shall be in accordance with MIL-C-27500.

3.7.4 Environmental.

3.7.4.1 Temperature altitude (see 4.7.5.1). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.2 Humidity (see 4.7.5.2). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.3 Immersion (see 4.7.5.3). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.4 Dust (see 4.7.5.4). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.5 Salt fog (see 4.7.5.5). The MK-2193/AIC shall show no corrosion of finishes and metals. Such corrosion shall be defined as any visible degradation of the equipment surfaces that can be attributed to flake, pitted, blistered, or otherwise loosened finish of metal surface.

3.7.4.6 Fungus (see 4.7.5.6). The MK-2193/AIC assembly shall pass, if after 28 days, based on visual examination, it shows no more than only sparse microbial growth with restricted tuberal growth development in an area of 1 to 10 percent or less of the total area and no more than six unrelated minute colonies with mycelical development in areas only in other than critical circuit portions, such as terminal spacing, printed circuit boards, etc., with sparse growth due to random contamination or traces of unmixed material ingredients. The equipment shall fail if it shows more than the growth specified above.

3.7.4.7 Blast (see 4.7.5.7). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.8 Vibration (see 4.7.5.8). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.9 Shock-drop (see 4.7.5.9). The MK-2193/AIC shall meet the requirements of 3.7.1 and 3.7.2.1. There shall be no evidence of breaking, cracking, or other structural damage, and the talk requirements of 3.7.4.12 shall be met.

3.7.4.10 Rain (see 4.7.5.10). The MK-2193/AIC shall meet the requirements of 3.7.2.1.

3.7.4.11 Overload. When tested as specified in 4.7.5.11 the frequency response of the earcup transducer assembly shall be within ±3 dB of the requirements of paragraph 3.7.2.1.

3.7.4.12 Talk out. When tested as specified in 4.7.5.12 the microphone and earphones of the MK-2193/AIC shall be functioning properly when speaking directly into the front of the microphone.

3.7.5 Magnetic.

3.7.5.1 Effect of External Magnetic Field (see 4.7.6.1). The earphone element shall not generate a discernable signal in excess of 95 dbA SPL (relative to 20 micro pascals) when tested to demonstrate compliance with the magnetic susceptibility requirements of MIL-STD-461A, Notice 4 in accordance with test methods RS01 and RS02 of MIL-STD-462, Notice 3.

3.7.5.2 Stray magnetic field of the kit (see 4.7.6.2). The stray magnetic field of the MK-2193/AIC shall cause no more than a 5-degree deflection of a magnetic compass at a distance of 12 inches.

3.7.5.3 Effects of electromagnetic interference (see 4.7.6.3). When tested as specified (see 3.1), the effects of electromagnetic interference on the MK-2193/AIC shall be in accordance with MIL-STD-461 Notice 4(EL), in the following areas of concern:

a. Conducted emissions.
b. Radiated emissions.
c. Radiated susceptibility.

NOTE: Conducted susceptibility test do not apply to 2-wire devices because signal and power are on the same conductors.

3.8 Weight.

3.8.1 The weight of the earphone assembly H-347/AIC, shall not exceed 37 grams.

3.8.2 The weight of the MK-2193/AIC shall not exceed 500 grams.

3.9 Color. the exterior surface of the microphone shall be colored semigloss black (27038), per FED-STD-595. The circumaural earcups and the cables shall be black. Exterior finish shall be in accordance with MIL-F-14072.

3.10 Identification of product. The identification marking shall include the following information only:

a. Microphone
MICROPHONE, LINEAR M-170/AIC
MANUFACTURER'S NAME OR FSCM
*

b. Earphone
EARPHONE H-347/AIC
MANUFACTURER'S NAME OR FSCM
*

* Data to be inserted by the contractor per MIL-STD-1285. Marking shall be done in accordance with MIL-STD-1285. If MIL-STD-1285 does not cover a particular situation then MIL-M-13231 shall apply.

3.11 Reliability. θ = 6,000 hrs with a duty cycle of 1 min. on to 12 seconds off. Test conditions for temperature, vibration, and moisture shall be as required by paragraph 50.5 Appendix B to MIL-STD-781.

3.11.1 Reliability qualification test conditions. The reliability qualification test conditions shall be in accordance with Appendix B, paragraph 50.5 of MIL-STD-781. A failure is defined as the inability of the equipment to perform its required function. This includes catastrophic failures as well as any event which causes any departure from performance as required by this specification. Proper instrumentation shall be provided to insure immediate recognition of failure. A failure of only one of the earphone elements is not considered a degradation or catastrophic failure.

3.12 Workmanship. THE MK-2193/AIC shall be manufactured and assembled in accordance with Requirement 9 of MIL-STD-454.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 inspection set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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 shall be in accordance with MIL-C-45662.

4.3 Classification of inspection. The inspections specified herein shall be classified as follows:

a. First article inspection (see 4.5).
b. Quality conformance inspection (see 4.6).

4.4 Test conditions. Unless otherwise specified, the MK-2193/AIC shall be tested under the following conditions:

Temperature: Room ambient, (plus 15°C to plus 35°C).
Pressure: Normal atmosphere.
Humidity: Prevailing ambient up to 90 percent relative humidity.

4.4.1 Plotting of frequency response characteristic. The frequency response characteristics shall be plotted on a graphic level recorder (B&K Type 2305 or equivalent) using semi-logarithmic coordinate paper with the response in dB on the linear ordinate scale and the frequency in hertz (Hz) on the logarithmic abscissa scale. The length of a 100-to-1 frequency interval on the abscissa scale shall equal the length of 50 dB on the ordinate scale, (graphic level recorder paper B&K Type QP1124 or equivalent).

4.5 First article inspection. First article inspection shall be performed by the contractor after award of contract and prior to production, at a location acceptable to the Government. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production. First article approval is valid only on the contract under which it is granted, unless extended by the Government to other contracts.

4.5.1 Sample size. Twenty MK-2193/AIC shall be subjected to first article inspection. Also 10 additional unterminated cables shall be provided for cable flex testing.

4.5.1.1 Test sample for the procuring activity. When first article inspection are conducted at a location other than the laboratory of the procuring activity, an additional quantity of 3 untested samples shall be furnished to the procuring activity for such additional tests or examinations as may be desired.

4.5.2 Data to accompany test samples. Test samples quantities specified in 4.5.1 and 4.5.1.1 shall be accompanied by the following data:

a. A compilation of the extent of compliance with each requirement in section 3. This shall be done paragraph by paragraph with no omission.

b. A compilation of the contractors intentions with regard to any variation or deviation which may appear in the compilation of 4.5.2.a.

4.5.3 Test programs and report. When first article tests are to be conducted at a location other than the laboratory of the procuring activity, the contractor shall furnish the following:

a. Test programs for approval.
b. Test report.

4.5.3.1 Test program. Prior to any formal first article testing, the contractor shall submit a Proposed First Article Test Program for approval consisting of the following terms:

a. A list of all tests to be performed.

b. Complete procedures for each test to be performed including block or schematic diagrams.
c. A list of test equipment to be used identified by manufacturer and model number in case of standard test equipment or described by parameters and characteristics in the case of non-standard test equipment.
d. Copies of all data record forms to be used in recording and reporting test data.

4.5.3.2 Test report. Upon completion of preproduction testing in accordance with an approved test program, the procuring activity shall be provided with 3 copies of a test report in accordance with MIL-STD-831.

4.5.4 Inspection routine. The sample shall be subjected to the inspections specified in table I, in the order shown. All sample units shall be subjected to the inspections of group I. The sample shall then be divided equally into two groups and subjected to the inspections for their particular group.

4.5.5 Failures. More than one failure in group I and any failure in group II or III shall be cause for refusal to grant first article approval.

TABLE I. First article inspection.

Inspection	Requirement paragraph	Method paragraph
Visual and mechanical examination- - - - - -	3.4,3.5,3.6,3.8, 3.9,3.10 and 3.12	4.7.1
Impedance- - - - - - - - - - - - - - - - - -	3.7.1.1	4.7.2.1
Insulation resistance- - - - - - - - - - - -	3.7.1.2	4.7.2.2
Dielectric withstanding voltage- - - - - - -	3.7.1.3	4.7.2.3
Frequency response - - - - - - - - - - - - -	3.7.2.1	4.7.3.1
Effect of external magnetic field- - - - - -	3.7.5.1	4.7.6.1
Stray magnetic field of the microphone - - -	3.7.5.2	4.7.6.2
Talk out - - - - - - - - - - - - - - - - - -	3.7.4.12	4.7.5.12
Group II		
Psychoacoustic - - - - - - - - - - - - - - -	3.7.2.2	4.7.3.2
Harmonic distortion- - - - - - - - - - - - -	3.7.2.3	4.7.3.3
Attenuation capability of earcup/transducer assembly - - - - - - - - - - - - - - - - - -	3.7.2.4	4.7.3.4
Real ear attenuation - - - - - - - - - - - -	3.7.2.4.1	4.7.3.4.1
Flat plate coupler attenuation - - - - - - -	3.7.2.4.2	4.7.3.4.2
Linearity- - - - - - - - - - - - - - - - - -	3.7.2.5	4.7.3.5
Cable assembly		
Temperature range- - - - - - - - - - - - - -	3.7.3.1	4.7.4.1
Flexing life - -(unterminated cable) - - -	3.7.3.2	4.7.4.2
Cable anchorage- - - - - - - - - - - - - - -	3.7.3.3	4.7.4.3
Conductor strain relief and twist relief -	3.7.3.4	4.7.4.4
Dielectric withstanding voltage of cable assembly - - - - - - - - - - - - - - - - - -	3.7.3.5	4.7.4.5

TABLE I. First article inspection - Continued.

Inspection	Requirement paragraph	Method paragraph
Group III Environmental		
Subgroup A (2 samples)		
Insulation resistance of cable assembly	3.7.3.6	4.7.4.6
Effects of electromagnetic interference (EMI)	3.7.5.3	4.7.6.3
Temperature altitude	3.7.4.1	4.7.5.1
Humidity	3.7.4.2	4.7.5.2
Blast	3.7.4.7	4.7.5.7
Subgroup B (2 samples)		
Rain	3.7.4.10	4.7.5.10
Salt fog	3.7.4.5	4.7.5.5
Subgroup C (2 samples)		
Immersion	3.7.4.3	4.7.5.3
Dust	3.7.4.4	4.7.5.4
Vibration	3.7.4.8	4.7.5.8
Shock drop	3.7.4.9	4.7.5.9
Subgroup D (2 samples)		
Fungus	3.7.4.6	4.7.5.6
Subgroup E (2 samples)		
Reliability	3.11	4.7.5.13

4.6 Quality conformance inspection.

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections. Except as specified in 4.6.1.4.4, delivery of products which have passed groups A and B inspections shall not be delayed pending the results of group C inspection.

4.6.1.1 Inspection lot. An inspection lot shall consist of all units of the same type, produced under essentially the same conditions, and offered for inspection at one time.

4.6.1.2 Group A inspection. Group A inspection shall consist of the examination and test specified in table II, in the order shown.

4.6.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table II. Major and minor defects shall be as defined in MIL-STD-105. (Classification of major and minor defects for visual and mechanical examination is shown in table V.)

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination-	3.4,3.5,3.6,3.8, 3.9,3.10 and 3.12	4.7.1	1.0	4.0
Impedance- - - - - - - - - - - - - -	3.7.1.1	4.7.2.1	1.0	4.0
Frequency response - - - - - - - -	3.7.2.1	4.7.3.1	1.0	4.0
Talk out - - - - - - - - - - - - - -	3.7.4.12	4.7.5.12	1.0	4.0

4.6.1.2.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3 Group B inspection. Group B inspection shall consist of the test specified in table III and shall be made on sample units which have been subjected to and have passed group B inspection.

4.6.1.3.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-4. The AQL shall be 6.5 percent defective.

TABLE III. Group B inspection.

Inspection	Requirement paragraph	Method paragraph
Linearity- - - - - - - - - - - - - - - - - -	3.7.2.5	4.7.3.5
Temperature range- - - - - - - - - - - - - -	3.7.3.1	4.7.4.1
Flexing life - -(unterminated cable) - - - -	3.7.3.2	4.7.4.2
Conductor strain relief and twist relief - -	3.7.3.4	4.7.4.4

4.6.1.3.2 Rejected lots. If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3.3 Disposition of sample units. Sample units which have passed the group B inspection may be delivered on the contract or purchase order if the lot is accepted and the sample units are still within specified electrical tolerances, and provided the cable assemblies of the tested units are replaced prior to delivery.

4.6.1.4 Group C inspection. Group C inspection shall consist of the tests specified in table IV, in the order shown. Group C inspection shall be made on sample units selected from inspection lots which have passed groups A and B inspections.

4.6.1.4.1 Sampling plan.

4.6.1.4.1.1 Ten samples of the complete kit shall be selected at random, 5 samples for each subgroup 1 and subgroup 2 in table IV. The samples shall be selected at the start of the contract from the first quality conformance inspection lot. These samples shall constitute the group C requirement for the first 1,000 units produced.

4.6.1.4.1.2 Thereafter, 3 samples of the complete kit shall be selected at random for subgroup 1 in table IV. These samples shall be selected once each year, or every 1,000 units, whichever occurs first.

TABLE IV. Group C inspection.

Inspection	Requirement paragraph	Method paragraph
Subgroup 1 (5 sample units)		
Psychoacoustic	3.7.2.2	4.7.3.2
Harmonic distortion	3.7.2.3	4.7.3.3
Humidity	3.7.4.2	4.7.5.2
Dust	3.7.4.4	4.7.5.4
Vibration	3.7.4.8	4.7.5.8
Subgroup 2 (5 sample units)		
Sub-Subgroup A (2 samples)		
Temperature-altitude	3.7.4.1	4.7.5.1
Blast	3.7.4.7	4.7.5.7
Subgroup B (2 samples)		
Rain	3.7.4.10	4.7.5.10
Salt fog	3.7.4.5	4.7.5.5
Overload	3.7.4.11	4.7.5.11
Sub-Subgroup C (1 sample)		
Shock-drop	3.7.4.9	4.7.5.9
Immersion	3.7.4.3	4.7.5.3
Fungus	3.7.4.6	4.7.5.6

4.6.1.4.2 Failures. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed.

4.6.1.4.3 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or purchase order.

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

4.6.1.4.5 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all defects likely to be found and the method of correcting them.

4.6.2 Inspection of packaging. The sampling and inspection of the preservation and interior pack marking shall be in accordance with the group A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129.

4.7 Methods of examination and test.

4.7.1 Visual and mechanical examination. The MK-2193/AIC shall be examined to verify that the materials, design, construction, physical dimensions, marking and workmanship are in accordance with the applicable requirements (see 3.4, 3.5, 3.6, 3.8, 3.9, 3.10, and 3.12). Unless otherwise specified (see 6.2), the defects shall be classified as specified in table V. Particular attention shall be paid to the following:

a. Soldering operations.
b. Cable shielding.
c. Weight.
d. Uniformity and strength of cementing.
e. Security and cleanliness of microphone and earphone terminal connections to cable terminals.
f. Construction of cable assembly.
g. Cleanliness of vent holes throughout the microphone and earphone structure.
h. Workmanship regarding the fit and sealing of the microphone and earphone cases.
i. Set screws holding the cables to the microphone and earphones.

TABLE V. Classification of defects for visual and mechanical examination.

Defect type	Classification	
	Major	Minor
Dimensions	Dimensions not as specified	
Materials and finish	Materials not as specified. Wrong or incomplete finish. Large amounts of flaking, peeling or chipping of finish.	Scratches, cuts, abrasions, etc., causing exposure of base metal, or relatively small amounts of flaking peeling, or chipping.
Parts	Missing parts. Inoperative, improperly assembled, or defective parts which could cause the unit to fail in service. Wrong parts.	Defective parts which would reduce efficency of use, but not cause failure in service. Cracks or chipped surfaces having no effects on the functioning assembly maintenance, or life of the unit.
Marking	Marking missing, illegible, or incorrect.	Markings dirty or smudged, but legible.
Foreign objects	Any metallic foreign object, not firmly attached 1/, which could cause a short circuit, or acoustical malfunctioning of the unit. Any nonmetallic foreign object such as insulation, dirt, or phenolic chips which could cause acoustical malfunctioning of the unit.	Any metallic or nonmetallic foreign object which affects appearance but which could not cause acoustical malfunctioning of the unit.
Soldering	Improper wrap - Less than 1/2 turn. Unsoldered joint - Solder not applied where intended. Insufficient solder - Minimum dimension of solder bridge less than twice the diameter of the wire or less then 3/32 inch, whichever is greater. Entire area of contact between wire and terminal not jointed by soler bridge. Cold solder joint - Chalky appearance, lacks metallic luster, presents rough "pile-up" appearance; movement of wire or solder upon pick application. Rosin joint - Presence of excess rosin; relative movement of wire or solder upon pick application. Insulation in terminal hole - Solder over insulation; no appearance of visible wire contour.	Improper wrap - 1/2 turn or more, but less than one turn. Excess solder - Build-up of solder on joint greater than necessary for good soldering, usually resulting in obliteration of wire contour. Cold solder joint - Chalky appearance lacks metallic luster, presents rough "pile-up" appearance; no relative action between wire and solder upon pick application.
Wiring	Wiring not in accordance with schematic diagram. Broken strands - More than 20 percent; except in a 7-strand conductor, more than 2 broken strands. Insulation burned, abrased, pinched, or deteriorated between two or more conductors, resulting in a potential short circuit. Taut wire - Wire exhibits no slack and subsequent breaking may occur due to stress on terminal or part. Insulation frayed to the extent that a potential short circuit exists.	Broken strands - 20 percent or less. In a 7-strand conductor, 2 broken strands. Insulation burned, abrased, pinched or deteriorated, with exposure of bare wire, but short circuit not possible. Taut wire - Slight stress on conductor, but no possibility of subsequent breakage.

1/ Foreign objects that cannot be dislodged by the moderate application of pressure with a pick or spudger shall be considered to be firmly attached.

4.7.2 Electrical performance of the earcup transducer assembly.

4.7.2.1 Impedance (see 3.7.1.1). The impedance of the assembly shall be measured with 0.14 volt, 1 KHz signal applied to the earphone terminals. The impedance shall be determined either by measuring the voltage across and the current through the earphone or with an impedance bridge.

4.7.2.2 Insulation resistance (see 3.7.1.2). The assembly shall be tested in accordance with method 302, test condition B, of MIL-STD-202. There shall be no evidence of arcing or insulation breakdown during the test.

4.7.2.3 Dielectric withstanding voltage (see 3.7.1.3). The assembly shall be tested in accordance with method 301 of MIL-STD-202. The following details shall apply:

a. Test voltage: 100 volts.
b. Nature of potential: 60 Hz ac.
c. Points of application: Between one terminal and the external surface of the earphone case.
d. Measurements after test: Impedance at 1,000 Hz.

4.7.3 Acoustical performance of the earcup transducer assembly.

4.7.3.1 Frequency response (see 3.7.2.1). The frequency response of the earphone in an earcup shall be made starting at 300 Hz and extending through 6000 Hz. The earcup transducer assembly shall be placed on a flat plate coupler of an artificial ear, B&K Type 4153 or demonstrated equivalent, with a 1 Kg force (to simulate closure to the head). A pure tone sine wave from an audio oscillator (B&K 1024 or equal) at 0.28 volts maximum will be used as the input to the device under test. The frequency response of the earcup transducer assembly shall be in accordance with paragraph 3.7.2.1.

4.7.3.2 Psychoacoustic (see 3.7.2.2). The MK-2193/AIC shall be subjected to a series of psychoacoustic tests using the Harvard phonetically balanced words in accordance with ANSI Standard S3.2-1960. The noise environment for the talkers shall be pink noise at 100 dB SPL presented in a diffuse field environment as described in A.S.A. Standard S3.19-1974. The listeners shall be in the same environment wearing SPH-4 Helmets with the MK-2193/AIC installed.

4.7.3.3 Harmonic distortion (see 3.7.2.3). The earcup transducer assembly shall be mounted on the flat plate coupler, and connected to the test circuit described in 4.7.3.1. The output of the oscillator shall be adjusted to 0.28 volts at 300 Hz across the series combination of the 19 ohm resistor and the earphone. The rms harmonic distortion shall be measured with a Hewlett-Packard Model 334-A Distortion Analyzer or equal, connected across the output of the microphone referenced in 4.7.3.1. The distortion measurement shall be repeated at 400 Hz and at sufficient points between 400 Hz and 6000 Hz to determine the frequency where maximum distortion exist. The total harmonic distortion shall comply with 3.7.2.3.

4.7.3.4 Attenuation capability of earcup transducer assembly.

4.7.3.4.1 Real head - Attenuation (see 3.7.2.4.1). The earcup transducer assembly shall be mounted on a human head with a miniature electret microphone placed on the concha of that ear, a B&K 1/2 inch microphone shall be placed next to the assembly to measure the noise outside the earcup. The miniature electret microphone including it's amplifier, shall have a frequency response characteristic equivalent to the 1/2" B&K microphone and be of equal sensitivity. It will measure the noise inside the earcup. The difference of these values shall be measured at ever 1/3 octave frequency between 100 Hz and 10 KHz in a free field 105 dB SPL pink. noise environment. A minimum sample of 10 individuals of varying head sizes shall be tested and a composite average be made. This average will be the real head attenuation of the earcup transducer assembly. Measurements will be recorded using a sweeping 1/3 octave band analyzer or in tabular form. Where ANSI S3.19-1974 conflicts with this specification, this specification shall govern.

4.7.3.4.2 Flat plate coupler attenuation (see 3.7.2.4.2). A B&K Type 4153 artificial ear with flat plate (or equivalent) shall be placed in a free field of 105 dB SPL pink noise measured by the artificial ear's microphone. The 1/3 octave values measured from 200 Hz to 5 KHz shall be recorded. Next, the earcup transducer assembly is placed on the flat plate and a 1 Kg force placed on the outside of the assembly to simulate closure to the head. A new set of 1/3 octave values shall be measured and recorded. The difference between these values shall be the flat plate coupler attenuation of the assembly. Measurements will be recorded using a 1/3 octave band analyzer or in tabular form.

4.7.3.5 Linearity (see 3.7.2.5). The input voltage to the assembly shall be adjusted to produce an output, measured across a 19 ohm resistive load, equal to 85 dB relative to 20 micropascals at any one frequency within each of the following ranges: 400-800 Hz, 801-2,500 Hz, and 2,501-5,000 Hz. The input voltage measured, which produces 85 dB relative to 20 micropascals, at the selected frequency in each of the listed ranges, will be increased by 10 dB and 20 dB and the acoustic output of the assembly shall be checked for a respective increase in output level of 10 dB and 20 dB $\pm$ 1 dB at each of the selected frequencies. Alternatively a series of frequency sweeps may be used.

4.7.4 Cable and connectors.

4.7.4.1 Temperature range (see 3.7.3.1). The unterminated cable shall be placed within a test chamber wherein a temperature of plus 85°C (plus 185°F) is maintained for a period of 4 hours. The cable shall be wrapped around a mandrel while at this temperature without damage to the cable jacket or conductor insulation. The diameter of the mandrel shall be the same as the nominal cable diameter. The cable shall be attached to the mandrel and suspended vertically with the lower and weighted sufficiently to keep the specimen taut and to permit wrapping without handling. The cable shall be inspected for damage or deformation and then subjected to a test chamber wherein the temperature of -55°C (-67°F) is maintained. After 20 hours of storage at -55°C, the cable shall be wrapped about the mandrel while at this temperature in the same manner as it was at the positive extreme temperature. the cable shall be examined for cracks or other damage to the jacket or conductor insulation.

4.7.4.2 Flexing life (see 3.7.3.2). Five samples of unterminated cable, each approximately 1-1/2 feet long, shall be subjected to the following test. Other flexing test methods which will subject the cable to flexing cycles equivalent to flexing cycles specified herein may be used upon approval by the procuring activity. The sample lengths shall be clamped and suspended through holes in a rectangular (1/2 by 5/8 inch) metal bar in the manner described below:

a. The clamping point shall be immediately above the metal bar; the cable clamp shall reset on top of the metal bar.
b. The cable shall be clamped in such a manner that it will not turn in the hole during the flexing test.
c. The length of the through holes in the metal bar shall be 5/8 inch. The diameter of the through holes shall be 0.005 to 0.010 inch greater than the diameter of the cable undergoing tests.
d. The through holes in the metal bar shall incorporate a 1/8 inch radius at the end from which the cable emerges (bending point).
e. A knot shall be tied near the free end of the cable and a 1/2 pound weight shall be hung from the knot.
f. The four center conductors plus shield of each sample length of cable, a small low-current drain, 6-volt/150 mA lamp, and a suitable power source shall be connected in series to indicate electrical continuity. The metal bar, supported horizontally, shall then be rotated about its longitudinal axis back and forth through an angle of 120 degrees (60 degrees each side of vertical) at a rate of approximately 85 cycles per minute. The arithmetical average of the number of flexes of each of the 5 sample lengths of cable, before electrical discontinuity occurs, shall be taken as the flexing life of the cable.

4.7.4.3 Cable anchorage (see 3.7.3.3). A pull of 8 pounds shall be applied to the cable in the direction of the axis of the connector plug for a minimum of 30 minutes. The cable assembly shall be examined to determine whether any slippage has occured at the clamp and if any strain has been exerted on the conductors.

4.7.4.4 Conductor strain relief and twist relief (see 3.7.3.4). With the pins of one connector plug anchored rigidly in an earphone in a vertical position, a 5-pound weight shall be suspended from the pins of the other connector plug of the cord assembly for a period of at least 30 minutes. During the last 5 minutes of the pull test, the lower plug connector with the 5-pound weight suspended shall be twisted 3 turns clockwise and 3 turns counter-clockwise from the normal resting position. The twisting cycle shall be repeated 3 times. The impedance of the microphone and earphones with cable assembly in place shall be measured at 1000 Hz and a mechanical inspection shall be made before and immediately upon completion of the test. A dielectric withstanding voltage test shall be made on the cord assembly in accordance with the procedure specified in 4.7.4.5 the impedance measurement and mechanical inspection have been made.

4.7.4.5 Dielectric withstanding voltage of cable assembly (see 3.7.3.5). The dielectric of the finished cable assembly shall be determined in accordance with MIL-C-27500.

4.7.4.6 Insulation resistance of cable assembly (see 3.7.3.6). The insulation resistance of the finished cable assembly shall be determined in accordance with MIL-C-27500.

4.7.5 Environmental.

4.7.5.1 Temperature altitude (see 3.7.4.1). Apply Method 504, Procedure I, for Class 1B equipment in accordance with table 504-II of MIL-STD-810 with the exception that the temperature specified for step 1 and 5 shall be changed to -57° and +71°C, respectively. Steps 2, 4, 7, 10, and 12 shall be omitted. Operation of the equipment is required during step 14 only and shall meet the requirements of 3.7.2.1. Step 14 shall be conducted at 15,000 feet. In addition, the procedure shall include a one-hour exposure (non-operating) to a pressure of 5.6 inches of height simulating air transport at 40,000 feet.

4.7.5.2 Humidity (see 3.7.4.2). The equipment shall be capable of meeting the test of Method 507, Procedure II, of MIL-STD-810. In step 8, the equipment shall meet the requirements of 3.7.1.1 and 3.7.2.1.

4.7.5.3 Immersion (see 3.7.4.3). The equipment shall be capable of meeting the test of Method 512, Procedure I, of MIL-STD-810. Within one (1) hour following the immersion period, the equipment shall meet the requirements of 3.7.2.1.

4.7.5.4 Dust (see 3.7.4.4). The equipment shall be capable of meeting the test of Method 510, Procedure I, of MIL-STD-810. In step 5, the equipment shall meet the requirements of 3.7.2.1.

4.7.5.5 Salt fog (see 3.7.4.5). The equipment shall be capable of meeting the test Method 509, Procedure I, of MIL-STD-810. Operation of the equipment shall not be required. Following the rest, the equipment shall meet the requirements of 3.7.1.1 and 3.7.2.1.

4.7.5.6 Fungus (see 3.7.4.6). The equipment model in the assembled and as ready for delivery condition, shall be capable of meeting 28 day test of Method 508, MIL-STD-810. The equipment test model shall not be specially cleaned for the fungus test, except for the cleaning it receives during or after production. If it is necessary for the manufacturer after assembly to remove accumulated production and handling contaminants by cleaning prior to packaging and delivery, the equipment shall not be tested for three days after cleaning to allow for complete evaporation of the cleaning compound. All enclosed or gasketed assemblies shall be opened and the interior sprayed with the specific mixed spore suspension. After 14 and 28 days of test, the control items per Method 508, MIL-STD-810 shall show profuse growth over at least 50 percent of the area of the control items. The test shall be repeated if the control items fail to show profuse growth after 14 and 28 days of test.

4.7.5.7 Blast (see 3.7.4.7). Each MK-2193/AIC being tested shall be mounted on the carriage of the U.S. Navy Simulated Gun Blast Equipment in accordance with Bureau of Ships Drawing SK-N-864 with the front edge of the earphone element in the test plane, and with its axis coincident with that of the explosion chamber. The earphone element shall be subjected to 30 rounds of blast at a nominal peak pressure of 9.5 pounds per square inch.

4.7.5.8 Vibration (see 3.7.4.8). The test item shall be attached to the vibration exciter table in a horizontal position, with the applied vibration in a direction perpendicular to the plane of the microphone. Subject the equipment to sinusoidal vibration over a frequency range of 5 to 20 Hz at a constant displacement (double amplitude) of 0.10 inches, and over a frequency range of 20 to 500 Hz at a constant acceleration of 2 G (curve B, MIL-STD-810). The frequency of the applied vibration shall be swept logarithmically over the specified frequency range. One vibration cycle (5-500-5) shall consume 15 minutes. Total time of test shall be 2 hours. Repeat the above vibration in the fore/aft and side to side axis. Upon completion of the test, the equipment shall be undamaged and shall meet the requirements of 3.7.2.1.

4.7.5.9 Shock, drop (see 3.7.4.9). The MK-2193/AIC shall be dropped at random from a height of 6 feet, 12 times onto a concrete surface. At completion of the test, the microphone and earphones shall meet the requirements of 3.7.1 and 3.7.2.1. There shall be no evidence of breaking, cracking or other structural damage.

4.7.5.10 Rain (see 3.7.4.10). The equipment shall be subjected to the test of Method 506.1, Procedure I, of MIL-STD-810. The equipment shall be operated during the last 10 minutes of the 30 minute period.

4.7.5.11 Overload (see 3.7.4.11). The earcup transducer assembly shall be subjected to 8 hours of operation with 2.3 volts input at 1,000 Hz. At the end of 8 hours the assembly shall meet the requirements of 3.7.2.1.

4.7.5.12 Talk out (see 3.7.4.12). The MK-2193/AIC shall be connected to a suitable amplifier with side tone included. The microphone shall also be connected to a 10 Vdc power supply or battery to power its internal amplifier. The tester shall wear the MK-2193/AIC and with lips touching the microphone, shall speak directly into the microphone and listen to the earphones. The tester shall determine compliance with paragraph 3.7.4.12.

4.7.5.13 Reliability (see 3.11).

4.7.5.13.1 Reliability test procedures. The reliability of the MK-2193/AIC shall be demonstrated in accordance with test plan XVII C, MIL-STD-781 on a minimum sample of two (2) equipments.

4.7.5.13.2 Reliability qualification test conditions. The reliability qualification test conditions shall be in accordance with Appendix B, paragraph 50.5 of MIL-STD-781. A failure is defined as the inability of the equipment to perform its required function. This includes catastrophic failures as well as any event which causes any departure from performance as required by this specification. Proper instrumentation shall be provided to insure immediate recongnition of failure.

4.7.5.13.3 Parameters to be measured. As a minimum, Frequency Response (see 3.7.2.1). and Harmonic Distortion (see 3.7.2.3) shall be measured and recorded daily in accordance with paragraph 5.5.3 of MIL-STD-781• with the exception that a complete set of measurements shall be taken daily duirng both the high and the low temperature stabilization. Vibration shall not be avoided during measurement. Parameters to be measured shall be those included in the contractor's approved reliability test procedure.

Parameter	Requirement Paragraph
Frequency Response	3.7.2.1
Harmonic Distortion	3.7.2.3

4.7.5.13.4 Rework and retest provisions. Once a reject decision has been reached, no rerun can be made of that test on the same or a new sample from the same lot, unless positive action, consisting of design change, modification, or rework actually relating to observed failures, has been applied to the lot. Any subsequent return must start at zero hours operating time.

4.7.6 Electromagnetic.

4.7.6.1 Effect of external magnetic field (see 3.7.5.1). The earphone element shall demonstrate the requirement of paragraph 3.7.5.1 by using the procedures in a contractor prepared, Government approved EMI Test Plan for test methods RS01 and RS02.

4.7.6.2 Stray magnetic field of MK-2193/AIC (see 3.7.5.2). The stray magnetic field of the MK-2193/AIC shall be determined as follows, using a Keuffel and Esser Type No. 5600 compass, or its approved equivalent. The microphone and earphone transducers shall be placed with their geometric center 12 inches from the pivot point of the compass needle and on the perpendicular bisector of the needle in the plane of rotation of the needle. The microphone and earphones shall be oriented in all directions and the maximum of the compass observed. This test shall be made in a location substantially free from stray magnetic disturbances.

4.7.6.3 Effects of electromagnetic interference (EMI) (see 3.7.5.3). The MK-2193/AIC shall be subjected to the following test procedures of MIL-STD-462, Notice 3:

a. Conducted emissions - Method - C303 and CE05.
b. Radiated emissions - Method - RE01, RE02 and RE02.1.
c. Radiated susceptibility - Methods - RS01, RS02, RS03, and RS03.1.

5. PACKAGING

5.1 Preservation. Preparation shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Headset-microphone kits shall be cleaned in accordance with MIL-P-116, process C-1.

5.1.1.2 Drying. Headset-microphone kits shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

5.1.1.4 Unit packs. Each headset-microphone kit shall be unit packed on each in accordance with submethod IA-15 of MIL-P-116 insuring compliance with the applicable requirements of that specification. The container shall conform to PPP-B-636.

5.1.1.5 Intermediate packs. Intermediate packs are not required.

5.1.2 Level B. The requirements for level B shall be as specified for level A except that submethod IC-2 of MIL-P-116 shall be as the method of preservation.

5.1.3 Level C. The level C preservation of headset-microphone kits shall conform to the MIL-STD-794 requirements for this level.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.2).

5.2.1 Level A. Headset-microphone kits, preserved as specified in 5.1, shall be packed in wood boxes conforming to PP-B-601, overseas type of PPP-B-621, class 2. Closure and strapping shall be in accordance with the applicable container specification except that metal strapping shall conform to QQ-S-781, Type 1, finish A. The requirements for level B packing shall be used when the total quantity of a stock numbered headset-microphone kit for a single destination does not exceed a packed volume of one cubic foot.

5.2.2 Level B. Headset-microphone kits, preserved as specified in 5.1, shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. The requirements for box closure, waterproofing and reinforcing shall be in accordance with method V of the PPP-B-636 appendix.

5.2.3 Level C. Headset-microphone kits, preserved as specified in 5.1, shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the appendix thereto.

5.2.4 Unitized loads. Unitized loads, commensurate with the level of packing specified in the contract or order, shall be used whenever total quantities for shipment to one destination equal 40 cubic feet or more. Quantities less than 40 cubic feet need not be unitized. Unitized loads shall be uniform in size and quantities to the greatest extent practicable.

5.2.4.1 Level A. Headset-microphone kits, packed as specified in 5.2.1, shall be unitized on pallets in conformance with the MIL-STD-147, load Type I, with a wood cap (storage aid 5) positioned over each load.

5.2.4.2 Level B. Headset-microphone kits, packed as specified in 5.2.2, shall be unitized as specified in 5.2.4.1 except that weather resistant fiberboard caps (storage aid 4) shall be used in lieu of wood caps.

5.2.4.3 Level C. Headset-microphone kits, packed as specified in 5.2.3, shall be unitized as specified in 5.2.4.2 except that the fiberboard caps shall be class domestic.

5.3 Marking. In addition to any special or other identification marking required by the contract (see 6.2), each unit and exterior container and unitized load shall be marked in accordance with MIL-STD-129. The complete military or contractor's type or part number, as applicable (including the FSCM), shall be marked on all unit and supplementary packs in accordance with the identification marking provisions of MIL-STD-129.

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2 and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Packaging inspection. The inspection of these packaging requirements shall be in accordance with 4.6.2.

5.4.3 Army acquisitions.

5.4.3.1 Level A and B packing. When the gross weight exceeds 200 pounds or the container length and width is 48 x 24 inches or more and the weight exceeds 100 pounds, 3 x 4 inch skids (laid flat) shall be applied in accordance with the requirements of the container specification. Unitization shall be required when the containers specified in 5.2.1 and 5.2.2 do not require skids; quantities per destination exceed either a total of 250 pounds (excluding the pallet) or a volume of 20 cubic feet; and the container size permits use of one of the pallet patterns of MIL-STD-147. A quantity of containers, packed as specified, except that container strapping may be omitted, shall be placed on a pallet, load type I conforming to MIL-STD-147. For level B, unit containers which meet these requirements may be palletized without further packing. The pallet shall conform to NN-P-71, type IV, group I or II woods. The load shall be "bonded" to the pallet by strapping conforming to QQ-S-781, type I, finish A, or shrink film conforming to L-P-378, type IV. Strength wrap in accordance with MIL-STD-147 is authorized for shipments within the continental United States and for containerized shipments.

6. NOTES

6.1 Intended use. The MK-2193/AIC contains a linear earcup transducer assembly with improved far field noise attenuation properties over the MK-896A/AIC, it also contains the Microphone, Linear M-170/AIC which is a noise-cancelling dc powered, high gain microphone. The MK-2193/AIC is intended for use in the improved SPH-4A aviator's helmet which is part of the airborne communications system which will provide communications of high intelligibility under the extreme noise conditions encountered in military aircraft.

6.1.1 Packaging requirements. The preservation, packing and marking specified herein are intended for direct shipments to the Government. However, at the option of the contractor or when so specified, the packaging provisions herein are also applicable for the preparation of headset-microphone kits for shipment from the parts contractor to the original equipment manufacturer.

6.2 Ordering data. Procurement documents should specify the following:

a. Levels of preservation and packing required (see 5.1 and 5.2).
b. If special or additional identification marking is required (see 5.2).

6.3 Engineering data. Headset-Microphone Kit, MK-2193/AIC replaces MK-896A/AIC when used with specific digital and analog systems. It requires a power supply capable of delivering 10 volts DC at up to 8 milliamps, and therefore is not electrically interchangeable with the MK-896A/AIC kit.

6.4 Conditions for use of level B preservation. When level B preservation is specified (see 5.1.2), this degree of protection should be used for the acquisition of headset-microphone kits for resupply worldwide under known favorable handling, transportation and storage conditions.

Custodian:
Army - AV

Preparing activity:
Army - AV
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