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MILITARY SPECIFICATION

TELEPHONE EQUIPMENT, SOUND POWERED TELEPHONE HANDSET, HEADSET, AND HEADSET-NOISE ATTENUATING GENERAL SPECIFICATION FOR.

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

1. SCOPE

1.1 Scope. This specification covers sound powered telephone handsets, headsets, and headset-noise attenuating for Naval shipboard and shore use.

1.2 Classification. Telephone subsets are of the following types as specified (see 6.2).

(a) Type H-200/U - Headset.
(b) Type H-202/U - Headset-noise attenuating
(c) Type H-203/U - Handset.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, SEA 03Q42, Naval Sea Systems Command, 2531 Jefferson Davis Hwy., Arlington, VA 22242-5160 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

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

QQ-S-571 - Solder, Tin Alloy: Tin-Lead Alloy; and Lead Alloy.

MILITARY

MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for.
MIL-A-23899 - Aural Protector, Sound
MIL-H-24616 - Helmet Phonetalker MK 4 Mod 0.
MIL-J-24649 - Jackbox, Jack and Plug for Telephone, Sound Powered.
MIL-H-81735 - Helmets, Flight Deck Crewman's, Impact Resistant.
MIL-H-87819 - Headset-Microphone, Headset-Electrical, Headset-Non Electrical (Hearing Protective Type, High Ambient Noise Levels) General Specification For.

STANDARDS

MILITARY

MIL-STD-130 - Identification Marking of U.S. Military Property.
MIL-STD-454 - Standard General Requirements for Electronic Equipment.
MIL-STD-167-1- Mechanical Vibration s of Shipboard Equipment (Type I - Environmental)
MIL-STD-1399 - Interface Standard for Shipboard Systems Section 72 Part 2, Blast Environment, Gun Muzzle

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

269 - Standard Method for Measuring Transmission Performance of Telephone Sets.
S1.12 - Specifications for Laboratory Standard Microphones.
S3 2 - Method for Measuring the Intelligibility of Speech Over Communication Systems.

S3.7 - Method for Coupler Calibration of Earphones.

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

F 1166 - Standard Practices for Human Engineering Design for Marine Systems Equipment and Facilities.

D 3951 - Standard Practice for Commercial Packaging.

D 4169 - Performance Testing for Shipping Containers and Systems, Practice of

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187)

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

68-2-11Ka - Basic Environmental Testing Procedures, Part 2: Tests, Test Ka: Salt Mist.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specifications, specification sheets or MS standards), 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.4.

3.2 General requirements. The equipment shall be in accordance with the applicable requirements of MIL-STD-454 in addition to the requirements specified herein. Whenever a requirement of MIL-STD-454 conflicts with a requirement of this specification, the requirement of this specification shall govern.

3.2.1 Technology. Equipment manufactured in accordance with this document may utilize new technology provided form, fit, and function are maintained. The equipments manufactured incorporating new technology must meet or exceed the requirements of this document (see 6.6).

3.2.2 Sound powered telephone requirements. The sound powered telephone sets shall provide high intelligibility, ruggedness, reliability, simplicity, and ease of maintenance and operation (see 6.3). The sound powered telephone sets shall function to provide voice communication completely independent of any external electrical energy.

3.2.3 Salt fog. The sound powered telephone sets shall be subjected to a 20 percent hot salt spray, and hot air blast as specified in 4.6.3 Minute examination of the sound powered telephone sets after the salt fog test shall show no corrosion or other damage due to salt fog. Water shall not have entered into the cavities behind the diaphragm, nor into the electrical connections. In addition, all parts shall function satisfactorily after the material is reassembled. The sound powered telephone sets shall show no change in the acoustic or frequency response in excess of 1.5 decibels (dB) as specified in 3.5.9 and 3.5.10.

3.2.4 Shock. Sound powered telephone sets shall be subjected to a grade A, class 1, light weight, type A shock as specified in 4.6.4. Upon completion of the test there shall be no evidence of physical or electrical defects, except minor chipping or scratches. The sound powered telephone sets shall show no change in the acoustic or frequency response in excess of 1.5 dB as specified in 3 5.9 and 3.5.10.

3.2.5 Random drop. There shall be no evidence of breaking, cracking, or other physical or electrical damage to the sound powered telephone sets when the sound powered telephone sets are tested as specified in 4.6.5. The sound powered telephone sets shall show no change in the acoustic or frequency response in excess of 1.5 dB as specified in 3.5.9 and 3.5.10.

3.2.6 Interchangeability and standardization. In addition to the requirements of MIL-STD-454 Requirement 7 all parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable (see 6.3).

3.2.7 Designation and marking. Brass or nickel-copper identification plates shall be provided as part of the equipment. Assemblies and parts shall be marked for identification in accordance with MIL-STD-130. Unless otherwise specified (see 6.2), equipment identification shall include the following information:

(a) Sound powered handset (or headset).
(b) Type designation.
(c) Stock number.
(d) Manufacturer's name.
(e) Contract or order number
(f) Inspection stamp.

3.3 Electrical requirements.

3.3.1 Insulation resistance. The insulation resistance of sound powered telephone sets shall be greater than 10 megohms when subjected to the test as specified in 4.6.7.

3.3.2 Push-to-talk switch. The push-to-talk switch shall be a non-locking, normally open, spring return switch designed and located to permit ready operation with either the thumb or finger. The switch shall have one set of make contacts. The switch shall disconnect the microphone transducer from the external circuit when in the open position and shall connect the microphone transducer to the external circuit when in the closed (depressed) position. The switch button shall be insulated from the switch and the electrical circuit. Button and switch assemblies shall show no undue pitting of the contacts, bending of springs, or failure of parts after 100,000 cycles of operation when tested as specified in 4 6.8

3.4 Materials.

3.4.1 Wire terminals. Solderless wire terminals in accordance with requirement 19 of MIL-STD-454 are preferred. Wires subject to breakage at the connection shall be provided with terminals that grip the wire insulation. Where practical, wires soldered to terminals shall be looped not less than once and not greater than twice around the terminal before soldering. Solder shall be in accordance with type S, composition Sn60 of QQ-S-571.

3.4.2 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.4.3 Toxic products. The material shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertaining to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency.

3.5 Sound powered transducers - detailed design.

3.5 1 Sound powered transducer function. The microphone transducer shall be the primarily generator of electrical energy, sound being the only source of input energy. The receiver transducer shall receiving energy generated by the microphone transducer over 300 feet of #22 AWG wire (twisted pair), convert the energy received into sound, and shall reproduce the transmitted signal with an acoustical and frequency response as specified in 3.5.9 and 3.5.10. The microphone and receiver transducers, in an emergency, shall function bidirectionally (receive and transmit).

3.5.2 Sound powered transducers. The sound powered transducer shall consist of the necessary permanent magnet, armature, coils, and diaphragm assembly with all parts, other than the exterior of the diaphragm assembly, enclosed in a dustproof housing and ready for insertion in the microphone or receiver shell. The sound powered transducers shall be designed so that they may be quickly replaced in their shells without disturbing any electrical wiring; prevent exposure of the armature assembly to foreign matter; and prevent phase changes when replacing transducer. Electrical connections between the sound powered transducer and the circuit contact in the shell shall be made by fine silver-plated spring tensioned contacts (plating shall be not less than 0.001 inch thick) or other materials as specifically approved by the command or agency concerned (see 6.6)

3.5.3 Magnetic material. The magnetic material shall be the smallest size and weight possible, consistent with required magnetic strength, and shall be selected for its retentivity and corrosion-resistant properties. The permanent magnets shall be held in place in the transducer by a positive mechanical device

3.5.4 Internal connection Internal connections of the transducer shall be soldered. Solder shall be in accordance with type S, composition Sn60 of QQ-S-571.

3 5.5 Impedance. The impedance of the sound powered transducers shall be of the following values when measured as specified in 4.6.9.

Transducer	Ohms
Handset and headset receivers	1200 ± 120 (see 4.6.9.1)
H-203/U handset microphone	1200 ± 120 (see 4.6.9.2)
Headset microphones	110 ± 11 (see 4.6.9.3)

3.5.6 Microphone transducer. The output voltage of the microphone transducer shall be 25 ± 2 millivolts over a frequency range as specified in 3.5.10 when tested as specified in 4.6.10.

3.5.7 Receiver transducer. The audible output of the receiver transducer shall comply with 3.5.9 when tested as specified in 4.6 12 or 4.6.12.1.

3.5.8 Stability. The stability of the armature shall be such that, when pressed against either pole piece, it shall not strike to the opposite pole piece upon release when tested as specified in 4.6.13.

3.5.9 Acoustic response. Sound powered telephone sets shall meet the minimum output requirements shown in table I For approval, none of the sets tested shall fall below the minimum response indicated when tested as specified in 4.6.12 For quality conformance inspection an allowance of plus or minus 1 Db will be allowed in each frequency band.

TABLE I. Minimum response (in Db referred to 20 micropascals at the speech meter).

Frequency band (Hz)	Number of sets in parallel on the line			
	Two H-200/U	Two H-203/U or H-202/U	Ten H-200/U	Ten H-203/U or H-202/U
750 - 1250	96	98	90	89
1250 - 1750	103	105	97	96
1800 - 2600	103	102	94	93
500 - 2500	101	102	94	93

3 5.10 Frequency response. The overall frequency response for two sound powered telephone sets of the same type operating in parallel shall not fall below the curve shown on figure 1 when tested as specified in 4.6.14.

3.5.11 Magnetic stability, endurance, immersion, temperature, vibration, and gun muzzle requirements. Sound powered telephone sets, when subjected to the tests specified in 4.6.15 through 4.6.20, shall show no mechanical derangement or damage or change of characteristics in excess of 1.5 Db from the actual values originally determined for the sets, as determined by an acoustic and frequency response test performed after these tests (see 3.5.9 and 3.5.10).

3.5.12 Overload. When the sound powered telephone sets are subjected to the overload test specified in 4.6.21 there shall be no rattling or other evidence of the armatures striking the pole pieces.

3.5.13 Speech intelligibility. The speech intelligibility of the sound powered telephone sets shall enable the listener to repeat correctly at least 85 percent of the information received when tested as specified in 4.6.22. The speech intelligibility test shall also be performed after the immersion test (see 4.6.17), vibration test (see 4.6.19), gun muzzle test (see 4.6.20), and overload test (see 4.6.21).

3.6 Type H-200/U headset - detailed design.

3.6.1 Headset. The sound powered telephone headset, type H-200/U, shall be compatible in fit with the Navy phonetalkers helmet in accordance with MIL-H-24616. Each headset shall consist of the following:

(a) 2 sound powered receiver transducers.
(b) 1 sound powered microphone transducer.
(c) 1 headband assembly.
(d) 1 microphone support.
(e) 1 transmitter assembly.
(f) 2 receiver assemblies.
(g) 1 cord and plug.

3.6.2 Sound powered transducers. The sound powered transducers shall comply with the applicable requirements of 3.5. Full side tone shall be provided in the receiver transducers. Interconnection of the sound powered transducers shall be as shown on figure 2.

3.6.3 Headband assembly. The headband shall be a single band, slide adjustable with a positive locking mechanism. The adjustment shall be smooth and uniform throughout the entire adjustment range. The headband shall permit rotation of the receivers about both a horizontal and vertical axis parallel to the plane of the diaphragm. The mounting axis of the receiver assembly shall pass through approximately the center of gravity of the completed assembly. Any metal parts of the headband shall not come into contact with the user's skin. Headband sizing shall be in accordance with the anthropometry data of MIL-STD-1472. The headband shall be padded and designed to preclude operator discomfort. The headband shall show no permanent set or loss of elasticity when tested as specified in 4.6.23.

3 6.3.1 Acoustic seal. The headband shall produce a force on the receiver assemblies (see 3.6.6) sufficient to provide optimum acoustic seal (see 3.6.6.2). The spring loading of the headband shall maintain the optimum acoustic seal over a spread of 135 to 160 millimeters.

3.6.4 Microphone support. The microphone support shall permit the microphone assembly to be adjusted vertically and horizontally to within 0.5 inch of the users mouth. The microphone support shall maintain the position of the microphone assembly in the relationship to the users mouth. The microphone support sizing shall be in accordance with the anthropometry data of MIL-STD-1472.

3.6.5 Transmitter assembly. The transmitter assembly shall consist of a microphone transducer (see 3.5), a microphone housing, and a push-to-talk switch.

3.6.5 1 Microphone housing. The microphone housing shall provide a protective enclosure for the microphone transducer, and an acoustic mouth piece. The microphone transducer shall be easily replaceable without the use of special tools

3.6 5.2 Push-to-talk switch. The push-to-talk switch shall be as specified in 3 3 2

3 6.5.3 Acoustic mouth piece. The acoustic mouth piece shall be constructed from a flexible material to prevent injury to the user and shall exclude external noise from the microphone transducer.

3.6.6 Receiver assembly. The receiver assembly shall consist of a receiver transducer (see 3.5), a receiver shell, and earcushions. The receiver assembly shall be easily replaceable in the headband (see 3.6.3) by the user without the use of tools. The receiver transducer shall be easily replaceable in the receiver assembly by the user without the use of special tools.

3.6.6.1 Receiver shell. The receiver shell shall provide for the interconnection of the receiver transducers, suitable housing for the receiver transducers, and earcushions

3.6.6.2 Earcushions The earcushion shall form a seal around the arm of eye-glasses and shall attenuate external noise at least 2 Db when tested as specified in 4.6.24. The earcushions shall not be cemented to the receiver shell, however they shall remain attached during normal use.

3.6.7 Cord and plug. The cord shall consist of 20 feet of 2-conductor, insulated, stranded soft annealed copper wire, and a strength member, incased in a flexible protective jacket. Each conductor of the cord shall have a crimped terminal lug, or other equally effective means, so as not to depend on solder for mechanical strength when terminated. Each conductor shall withstand a pull of 5 pounds without becoming detached, before any solder is applied. Solder may be used to form a low resistance connection. One end of the cord shall be secured to the headset; the other end to the plug and the strength member securely fastened at each end. The plug shall be type H-39A in accordance with MIL-J-24649.

3.7 Type H-202/U headset-noise attenuating - detailed design.

3.7 1 Headset The headset shall consist of aural protectors, size and shape in accordance with MIL-A-23899, and a microphone assembly and straps in accordance with MIL-H-87819. The headset shall be compatible in fit with the HGU-24/P and HGU-25/P helmet assemblies in accordance with MIL-H-81735. Each type H-202/U headset shall consist of the following.

(a) 2 sound powered receiver transducers.
(b) 1 sound powered microphone transducer.
(c) 1 aural protector
(d) 1 microphone assembly.
(e) 1 cord and plug.

3.7.2 Sound powered transducers. The sound powered transducers shall comply with the applicable requirements of 3.5. Full side tone shall be provided in the receiver transducers.

3.7.3 Aural protector. The aural protector dome shall provide for the interconnection of the receiver transducers, provide secure mount of the receiver transducers (see 3.5), and provide fastening devices for the microphone assembly and straps.

3.7.3.1 Dome. The left dome shall provide screw terminals for connecting the cord and plug to the headset. Interconnection of the circuit shall be as specified on figure 3.

3 7.4 Microphone assembly. The microphone assembly, MIL-H-87819, shall be modified to accommodate the microphone transducer (see 3.5) and the push- to-talk switch.

3.7.4.1 Push-to-talk switch. The push-to-talk switch shall be as specified in 3.3.2.

3 7 5 Cord and plug. The cord and plug shall be as specified in 3.6 7.

3.8 Type H-203/U handset - detailed design.

3.8 1 Handset. The sound powered telephone handset, type H-203/U, shall consist of the following·

(a) 1 sound powered receiver transducer.
(b) 1 sound powered microphone transducer.
(c) 1 handle assembly.
(d) 1 mouthpiece.
(e) 1 ear cap.
(f) 1 retractable cord.

3.8.2 Sound powered transducer. The sound powered transducers shall comply with the applicable requirements of 3.5. Full side tone shall be provided in the receiver transducer.

3.8.3 Size and shape. The handset shall closely follow the size and shape as specified on figure 4. Minor changes in dimensions may be made to fit individual molding techniques. The handset shall be compatible in fit with handset holder type Z-33 in accordance with MIL-T-24649.

3 8.4 Handle assembly. The handle assembly shall house the sound powered transducers, push-to-talk switch, mouth piece and ear cap, capacitor, and screw terminals for internal connection of components. Interconnection of the components shall be as specified on figure 5. 3.8.4.1 Push-to-talk switch. The push-to-talk switch shall be as specified in 3.3.2.

3.8.4.2 Mouth piece The mouth piece shall be constructed to direct the users voice toward the microphone transducer, prevent injury to the user, and exclude external noise from the microphone transducer.

3.8.4.3 Ear cap. The ear cap shall be constructed to direct the output of the receiver transducer to the users ear and provide a seal between the users ear and the handset.

3.8.5 Retractable cord Each handset shall be provided with a nonkinking retractable cord. The length of the coiled portion of the cord shall be approximately 1 foot retracted and not less than 5 feet extended. In addition to the coiled portion, there shall be a 4-inch straight portion at each end. The cord shall enter the handle assembly through a suitable stuffing gland nut. The cord shall be mechanically secured within the handle shell by a crimp type lug or other equally effective means, so as not to depend on solder for mechanical strength. Each conductor shall withstand a pull of 5 pounds without becoming detached before solder is applied.

3.9 Workmanship. Workmanship shall be as specified in 4.6.6.

4 QUALITY ASSURANCE PROVISIONS

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

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

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

(a) First article inspection (see 4.4).
(b) Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.6.1 and 4.6.2.

4.4 First article inspection. Ten sound powered telephone handsets or headsets of each type shall be subjected to all the applicable examinations and tests as specified herein. Examinations and tests shall be performed, in general, in the order listed. The sound power telephone sets subjected to the first article inspection shall be tested in accordance with 4 6.

4.5 Quality conformance inspection. Quality conformance inspection shall be as specified in table II. The telephone equipment shall conform to all requirements of this specification and shall conform to the applicable requirements of MIL-STD-454. Whenever a requirement of MIL-STD-454 conflicts with a requirement of this specification, the requirement of this specification shall govern.

4.5.1 LOT. For the purpose of quality conformance inspection, a lot is defined as all the sound powered telephone sets of the same type, produced in one facility, using the same production processes and materials, and being offered for delivery at one time.

4.5.2 Sampling for quality conformance inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed sound powered telephone sets in accordance with TABLE II and inspect and test them in accordance with TABLE III. Sound powered telephone sets for Group A inspection shall be selected in accordance with TABLE II sampling plan A. The telephone sets for Group B inspection shall be selected in accordance with TABLE II sampling plan B. Telephone sets for Group C inspection shall be selected in accordance with TABLE II sampling plan C. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. The contractor has option of screening 100% of the lot for the defective characteristic(s) or providing a new lot which shall be inspected and retested in accordance with the sampling plans contained herein. The contractor shall maintain for a period of three years after contract completion all records of inspections, tests, and any resulting rejections.

TABLE II. Sampling for quality conformance inspection.

Lot Size	Plan A	Plan B	Plan C
2 to 8	All	3	2
9 to 25	8	3	2
26 to 50	8	5	3
51 to 90	8	6	4
91 to 150	12	7	5
151 to 280	19	10	6
281 to 500	21	11	7
501 to 1200	27	15	8
1201 to 3200	35	18	9

4.6 Test procedures.

4.6.1 Test conditions. All measurements and tests shall be made at a temperature of 23 ± 2 degrees Celsius (°C) (73 ± 4 degrees Fahrenheit (°F)), air pressure of 650 to 800 millimeters of mercury, and relative humidity of 50 ± 2 percent.

4.6.2 Acoustic environment The environment in which the acoustic response and frequency response tests are made shall be free from reflected sound waves that would affect the measured results by not greater than 2 Db at any frequency in the 200 to 8,000 hertz (Hz) range. The maximum sound pressure level produced by ambient noise shall not exceed 0.2 pascals root mean square (rms) at any point within 3 feet of the microphone of the telephone set when the set is mounted in the test position.

4.6.3 Salt fog. For first article inspection two sound powered telephone sets of each type shall be subjected to salt fog tests in accordance with IEC 68-2-11Ka. Upon completion of the salt fog test the acoustic and frequency response shall be measured. The sound powered telephone set shall comply with 3.2.3.

4.6.4 Shock. For first article inspection, two sound powered telephone sets of each type shall be subjected to shock tests in accordance with MIL-S-901. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. In making these tests the handset shall be mounted in a standard handset holder (MIL-T-24649) which shall be secured to the shock machine. The headset or headset-noise attenuating shall be placed within a headset stowage box (MIL-T-24649) which shall be secured to the table of the shock machine. The cover of the stowage box shall be fastened to prevent its opening during the test. Upon completion of the shock test the acoustic and frequency response shall be measured. The sound powered telephone set shall comply with 3.2.4.

TABLE III. Quality conformance inspection.

Inspection	Requirement	Test method
Group A		
General requirements	3.2	4.5
Designation and marking	3.2.7	4.6.25
Workmanship	3.9	4.6.6
Insulation resistance	3.3.1	4.6.7
Group B		
General requirements	3.2	4.5
Impedance	3.5.5	4 6.9
Microphone transducer	3.5.6	4 6.10
Acoustic response	3.5.7	4.6.12
Frequency response	3 5.10	4.6.14
Speech intelligibility	3.5.13	4.6.17 4.6.19-22
Acoustic insulation	3 6 6.2	4.6.24
Group C		
Salt fog	3.2.3	4.6.3
Shock	3.2.4	4 6.4
Random drop	3.2.5	4.6.5
Push-to-talk switch	3.3.2	4.6 8
Armature stability	3.5.8	4 6.13
Magnetic stability	3.5.11	4.6.15
Endurance	3.5.11	4.6.16
Immersion	3.5.11	4.6.17
Temperature	3.5.11	4.6.18
Vibration	3.5.11	4.6.19
Gun muzzle	3.5.11	4.6.20
Overload	3.5.12	4.6.21
Headband spread	3.6.3	4.6.23

4.6.5 Random drop. For first article inspection, two sound powered telephone sets of each type shall be dropped six times from a height of 4 feet onto a concrete floor. The sound powered telephone sets shall strike not less than once on the receiver and once on the transmitter Upon completion of the random drop test the acoustic and frequency response shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone sets shall comply with 3 2 5

4.6.6 Workmanship. Workmanship shall be in accordance with requirement 9 of MIL-STD-454 (see 3.9).

4.6.7 Insulation resistance. The insulation resistance of the sound powered telephone sets with cord assemblies shall be measured with a high quality 50 volts direct current (Vdc) megger. All transducers shall be removed during the test. Measurements shall be made between each conductor of the cord with the push-to-talk switch opened and closed. The insulation resistance shall comply with 3.3.1.

4.6.8 Push-to-talk switch. The push-to-talk switch assembly shall be tested for compliance with 3.3.2. The push-to-talk switch shall be operated for 100,000 cycles at a rate of 60 cycles per minute. One cycle shall consist of making and breaking a current of 20 milliamperes at 115 Vdc, through a pure resistive load.

4.6.9 Electrical impedance.

4.6.9.1 Handset or headset receiver transducer impedance. Handset or headset receiver transducer impedance shall be determined in accordance with ANSI S3.7. The impedance of the receiver transducer shall be such that maximum output is obtained when the impedance of the source complies with 3.5.5. If there are capacitors associated with the telephone units, a proportional amount of capacity shall be associated in the same manner during impedance tests.

4.6.9.2 Handset microphone impedance. The handset, with the receiver transducer disconnected or removed, shall be positioned with its mouthpiece in front of the artificial voice, modal head (see 4.6.11), and connected to the test circuit shown on figure 6, using an initial transformer impedance ratio of 1200 to 600 ohms for the headset. The transformer loss shall vary not greater than 0.2 Db over the range of 500 to 2500 Hz. The microphone shall be subjected to a warble tone having a band of frequencies from 500 to 2500 Hz at a 100 Db sound pressure level. The equivalent resistance of the test circuit shall be varied to obtain maximum output from the microphone. The impedance value of the unit shall be such that maximum power into the test circuit is obtained when the equivalent resistance of the test circuit complies with 3.5.5. If there are capacitors associated with the units, a proportional amount of capacity shall be associated in the same manner during impedance tests.

4.6.9.3 Headset microphone impedance. The headset, with the receiver transducer disconnected or removed, shall be positioned with the microphone mouthpiece in front of the artificial voice, modal head (see 4.6.11), and connected to the test circuit shown on figure 6 using an initial transformer impedance ratio of 110 to 600 ohms. The transformer loss shall vary not greater than 0.2 Db of the range of 500 to 2500 Hz at a 100 Db sound pressure level. The equivalent resistance of the test circuit shall be varied to obtain maximum output from the microphone. The impedance value of the microphone unit shall be such that maximum power into the test circuit is obtained when the equivalent resistance of the test circuit complies with 3.5.5. If there are capacitors associated with the units, a proportional amount of capacity shall be associated in the same manner during impedance tests.

4.6.10 Microphone output. The microphone transducer output shall be the voltage measured across a pure resistive load equivalent to the transducer impedance (see 3.5.5). The microphone transducer shall be subjected to a steady tone of 1000 Hz at a 100 Db sound pressure level 0.5 inch in front of the artificial mouth (see 4 6.11). The measured voltage shall be as specified in 3.5.6.

4.6.11 Sound source. The sound source for testing the sound powered telephone sets shall be a modal head in accordance with ANSI269.

4.6.11.1 Artificial voice requirements. The artificial voice shall provide a 100 ± 2 Db sound pressure level output for any test frequency from 200 to 8,000 Hz with a maximum harmonic distortion of 1 percent.

4.6.11.2 Calibration. The sound pressure field produced by the artificial voice shall be calibrated by means of a standard microphone. The standard microphone shall be a pressure operated microphone that meets the requirements of ANSI S1 12 for type L. The standard microphone shall be mounted in front of the artificial voice so that its axis is collinear with that of the voice. The microphone face shall be 0.5 inch from the front surface of the artificial voice. Calibration of the artificial ear shall be in accordance with ANSI 269.

4.6.11.3 Warble tone. A warble tone which varies at a logarithmic rate shall be applied to the artificial voice transducer of the modal head. The warble tone shall cycle approximately 5.55 times per second. The following frequency bands in hertz shall be used:

750 - 1250
1250 - 1750
1800 - 2600
500 - 2500

4.6.11.4 Input sound pressure level. With the effective free field sound pressure 0.5 inch ahead of the artificial voice kept at an average of 100 Db, the various specified frequency bands shall be impressed, and the effective response in decibels equivalent free field sound pressure at the artificial ear microphone and cavity shall be recorded. The acoustic response shall comply with 3.5.9.

4.6.12 Handset acoustic response For the handset acoustic response test, one handset shall be positioned as shown on figure 7. The receiver shall be loaded with an artificial ear (see 4.6.11). The other handset shall have its microphone open to the air with its receiver held in contact with the seating surface of the artificial ear by a constant total weight of 5 pounds. Both push-to-talk switches shall be closed. The handset positioned as on figure 7 shall be subjected to a warble tone (see 4.6.11.3) at a 100 Db sound pressure level; the acoustic response shall be measured across the artificial ear of the other handset. The acoustic response shall comply with 3.5.9 (see 3.5.7).

4.6.12.1 Headset acoustic response For the headset acoustic response test each headset shall be placed on the modal head in its normal operating position. One headset with its push-to-talk switch closed shall be subjected to a warble tone (see 4.6.11.3) at a 100 Db sound pressure level; the acoustic response shall be measured across the artificial ear of the other headset The acoustic response shall comply with 3.5.9 (see 3 5.7)

4.6.13 Armature stability. The sound powered transducer, completely assembled except for the cover, shall be tested for compliance with 3.5.8 by pressing the armature against each pole piece and releasing.

4 6.14 Frequency response. Frequency response tests shall be conducted using the same test equipment and input sound pressure level as that specified in 4.6.11.4, however, in lieu of the warble tones specified in 4.6.11.3 the audio signal frequency shall be swept through 500 to 4,000 Hz and the acoustical response shall be recorded using audio frequency semilogarithmic graph paper. The resulting response curve shall be compared with figure 1 to determine compliance with 3.5.10.

4.6.15 Magnetic stability. For first article inspection two sound powered telephone sets of each type shall be subjected to three successive discharges from a 10 microfarad capacitor charged to 130 volts. The test shall then be repeated with the direction of the discharge reversed. Upon completion of the magnetic stability test the acoustic and frequency response shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone set shall comply with 3.5.11.

4.6.16 Endurance. For first article inspection two sound powered telephone sets of each type, with switch operated, shall be connected to a source of voltage whose frequency varies over the band from 500 to 2500 Hz. The input shall be adjusted to deliver 10 millivolt-amperes at the peak frequency (taken from a representative single frequency response curve) of the receiver units. The receiver assembly shall be loaded with an artificial ear (see 4.6.11). The above excitation shall continue for 48 consecutive hours. A check of the excitation shall be made periodically by measuring the output of the receiver units on the artificial ear. Upon completion of the endurance test the acoustic and frequency response shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan c. The sound powered telephone set shall comply with 3.5.11

4.6.17 Immersion. For first article inspection two sound powered telephone sets of each type shall be immersed for 10 minutes in tap water to a depth of 6 inches. After removal, the telephone shall be shaken vigorously to remove superfluous moisture. After shaking off superfluous moisture, the telephone shall be operative. The receiver assemblies, transmitter assemblies, and sound powered transducers shall then be removed from their shells. The parts shall be shaken vigorously to remove moisture, exposed surfaces wiped dry, and the telephone reassembled. After the sound powered telephone set is reassembled, the acoustic and frequency response, and speech intelligibility shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone set shall comply with 3.5.11.

4.6.18 Temperature. For first article inspection two sound powered telephone sets of each type shall be subjected to the following test for the effect of temperature variation; five cycles of temperature change from minus 40 to plus 77°C starting at room temperature and finishing at the same temperature. The units shall be placed in a temperature of minus 40°C and permitted to remain in this temperature for 1 hour. They shall then be removed, permitted to return to room temperature by natural means, then placed in an oven at plus 77°C for 1.5 hours, and again permitted to return to room temperature. At the conclusion of the five cycles, the instruments shall stand at room temperature for 12 hours.

Upon completion of the temperature test, the acoustic and frequency response shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone sets shall comply with 3.5.11.

4.6.19 Vibration. for first article inspection, two sound powered telephone sets of each type, less line cords, shall be subjected to vibration test for vital equipment in accordance with MIL-STD-167-1. Upon completion of the vibration test the acoustic and frequency response, and speech intelligibility shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone set shall comply with 3.5.11.

4.6.20 Gun muzzle. For first article inspection two sound powered telephone sets of each type, shall be tested in accordance with MIL-STD-1399 Sec 072 Part 2. Upon completion of the gun muzzle test, the acoustic and frequency response, and speech intelligibility shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The sound powered telephone set shall comply with 3.5.11.

4.6.21 Overload. For first article inspection, two sound powered telephone sets of each type shall be tested for compliance with 3.5.12 with a source of voltage whose frequency varies over the band of 500 to 2500 Hz. The voltage of the source shall be adjusted to provide 10 milliwatts into a pure resistance load equal in value to the specified impedance of the receiver and microphone transducers in parallel. The telephone shall then be substituted for the load resistance and the artificial ear (see 4.6.11) placed in close proximity to (1) the receiver assembly and (2) the transmitter assembly. Upon completion of the overload test the acoustic and frequency response, and speech intelligibly shall be measured. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan C. The results of the test shall comply with 3.5 12.

4.6.22 Speech intelligibility. For first article inspection, three sound powered telephone sets of the same type shall be interconnected for normal operation separated by 300 feet of #22 AWG wire (twisted pair). One talker and two listeners shall conduct a monosyllabic word intelligibility test in accordance with ANSI S3.2. For quality conformance inspection, the quantity for testing shall be in accordance with TABLE II sampling plan B. The results of the test shall comply with 3 5.13.

4.6.23 Headband spread. The headband assembly shall be set at the midpoint of its adjustment, with the headband assembly in its normal resting position. The distance between the receiver assembly pivot points shall be measured. The headband assembly shall be spread 5.5 inches measured at the receiver assembly pivot points; the force required to spread the headband shall be not greater than 2.5 pounds. The headband assembly shall be spread from the normal resting position to 12 inches measured from the receiver pivot points, for 200 cycles. One cycle shall consist of spreading the headband assembly from rest to 12 inches and return to rest. At the end of 200 cycles the distance between the receiver assembly pivots shall be measured. The measurement shall be not greater than 0.25 inches of the initial measurement. Upon completion of the above test the headband shall comply with 3 6 3

4.6.24 Acoustic insulation of headset earcushions. The acoustic insulation test of the headset earcushions shall be conducted in an acoustically treated room. A modal head (see 4.6.11) and standard microphone (see 4.6.11.2) shall be positioned 4 feet from the sound source, with the artificial ear and microphone on the same axis. The artificial ear and microphone shall be calibrated to provide equal response to frequencies between 100 and 2000 Hz. The headset shall be placed on the modal head forming a good seal between the artificial ears and the headset. The ambient sound pressure level and the sound pressure level of the modal head shall be measured; the difference in the two measurements shall be the acoustic insulation of the sound powered telephone headset. The sound powered telephone shall be subjected to a warble tone in accordance with 4.6.11.3. The acoustic insulation shall comply with 3.6.6.2.

4.6.25 Inspection of designation and marking. All sample sound powered telephone sets shall be inspected for designation and marking in accordance with paragraph 3.2.7

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, packing and marking for shipment and storage shall be in accordance with the requirements of ASTM D 4169.

5. PACKAGING

5.1 Preservation, packing, and marking. The equipment shall be preserved by and packaged as specified in accordance with ASTM D 3951(see 6.2).

5.2 Domestic shipment and early equipment installation.

5.2.1 Preservation. Preservation shall be sufficient to afford adequate protection against corrosion, deterioration, and physical damage during shipment from the supply source to the user activity and until early installation.

5.2.2 Packing. Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the user activity for early installation. The shipping containers or method of packing shall conform to carrier regulations as applicable to the mode of transportation.

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 sound powered telephone equipment covered by this specification is intended primarily for Naval shipboard use as follows:

(a) Type H-200/U - Headset - General use.
(b) Type H-202/U - Headset-noise attenuating - Special, for use in areas having high ambient noise levels.
(c) Type H-203/U - Handset - General use, primarily for one-to-one talking.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number, and date of this specification.
(b) Type and quantity of equipment required (see 1.2).
(c) Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
(d) Whether first article inspection is required (see 3.1).
(e) Whether stock number is to be entered on the identification plate (see 3.2.7).
(f) Preservation, packing, and marking if other than as specified (see 5.1).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.2.2, 3.2.6, and appendix	DI-DRPR-80651	Engineering drawings	----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 First article. When a first article inspection is required, the contracting officer should provide specific guidance whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first 10 production items, a standard production item from the contractor's current inventory, and the number of items to be tested as specified in 4.4. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples of first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6 4.1 First article samples. First article samples that have passed the first article inspection specified in 3.1 are not to be considered for shipboard installation regardless of the degree of refurbishment required Unless otherwise directed by NAVSEA, the passed first article samples are to be retained by the first article test facility for future reference.

6.5 Provisioning. Provisioning Technical Documentation (PTD), spare parts, and repair parts should be furnished as specified in the contract

6.5.1 Repair parts. When ordering spare parts or repair parts for the equipment covered by this specification, the contract should state that such spare parts and repair parts should meet the same requirements and quality assurance provisions as the parts used in the manufacture of the equipment. Packaging for such parts should also be specified.

6.6 NAVSEA approval and direction. Deviations from specified materials, procedures, and requirements and selection of specific alternative materials and procedures require NAVSEA approval or direction. Requests should include supporting documentation.

6.7 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.9 Subject term (key word) listing.

cord
earcushions
plug
receiver
microphone
transducers
wire

User interest:
MC

Preparing activity.
Navy-SH
(Project 5965-N215)

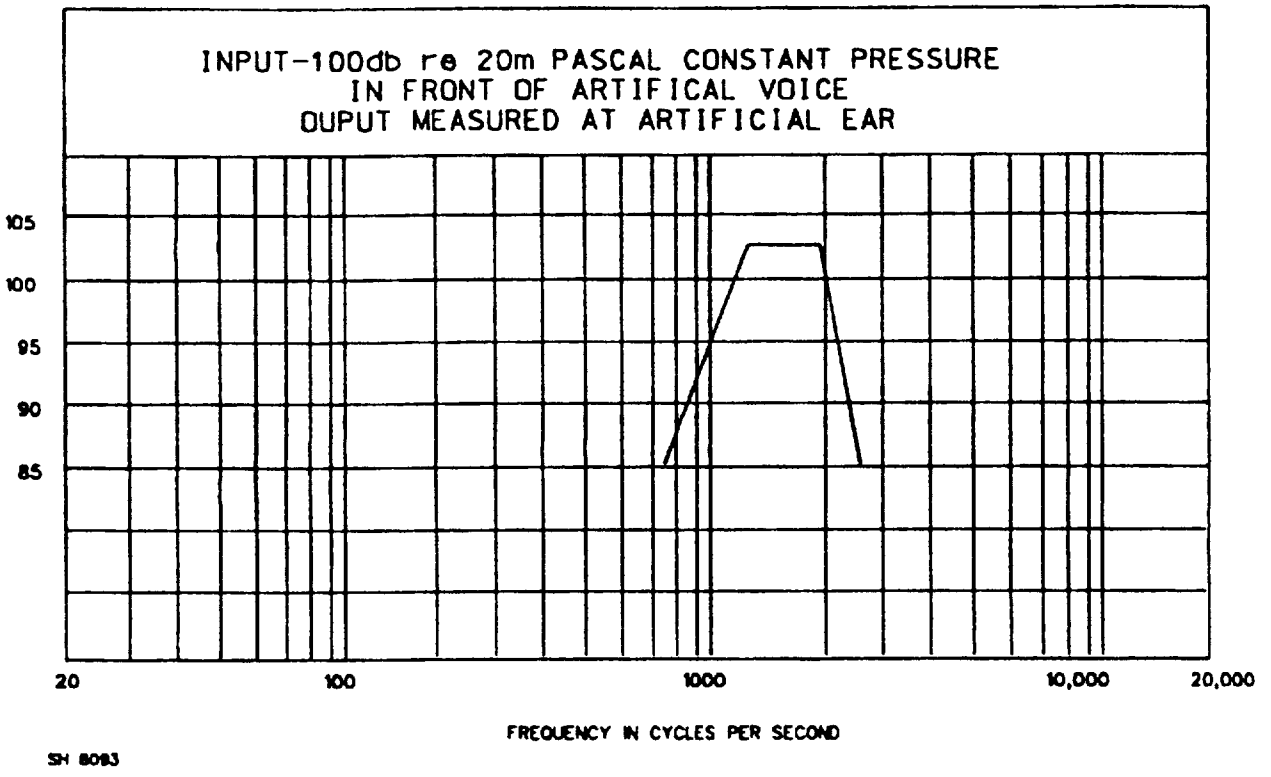

FIGURE 1. Overall frequency response minimum limits.

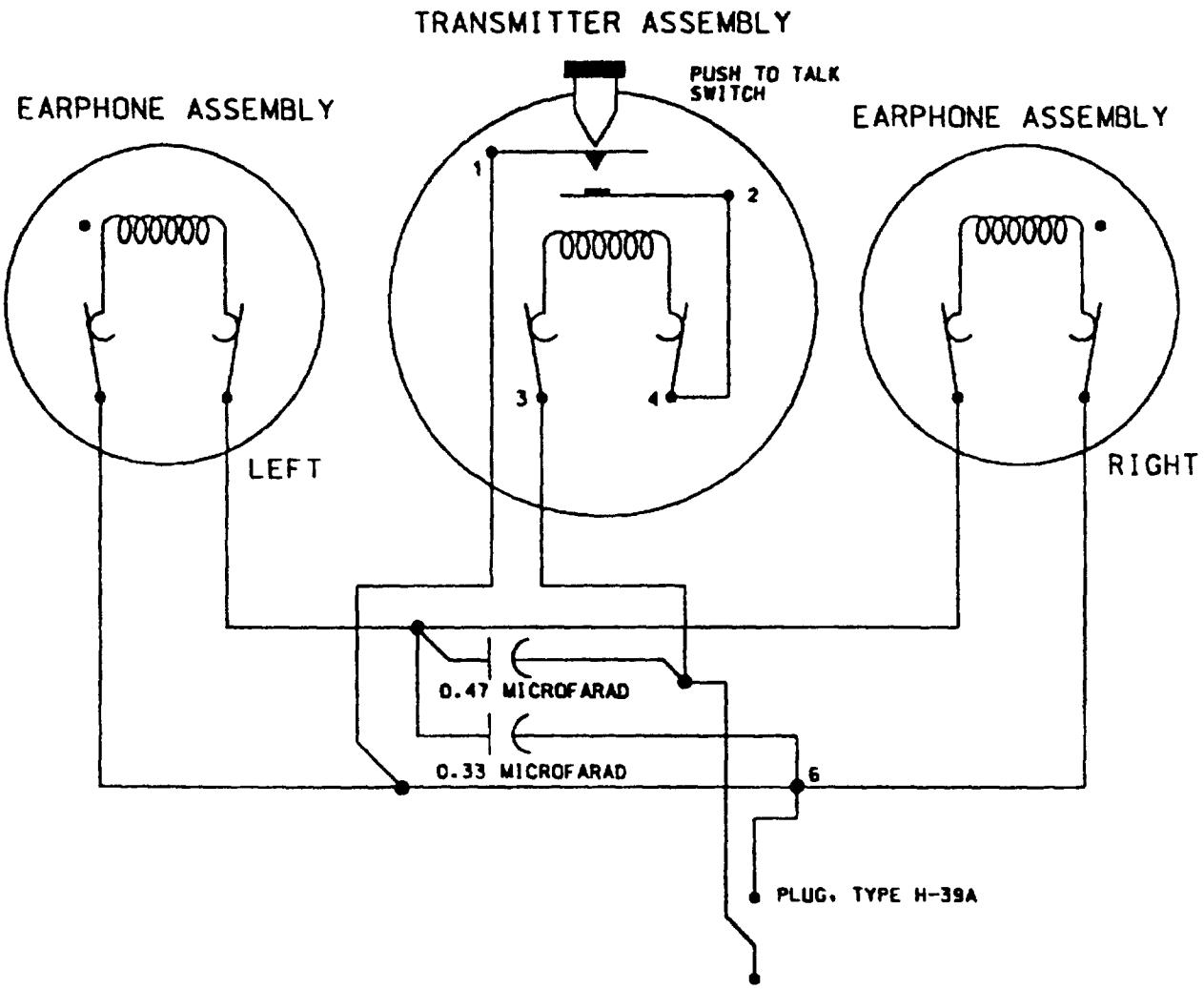

FIGURE 2. H-200/U interconnection.

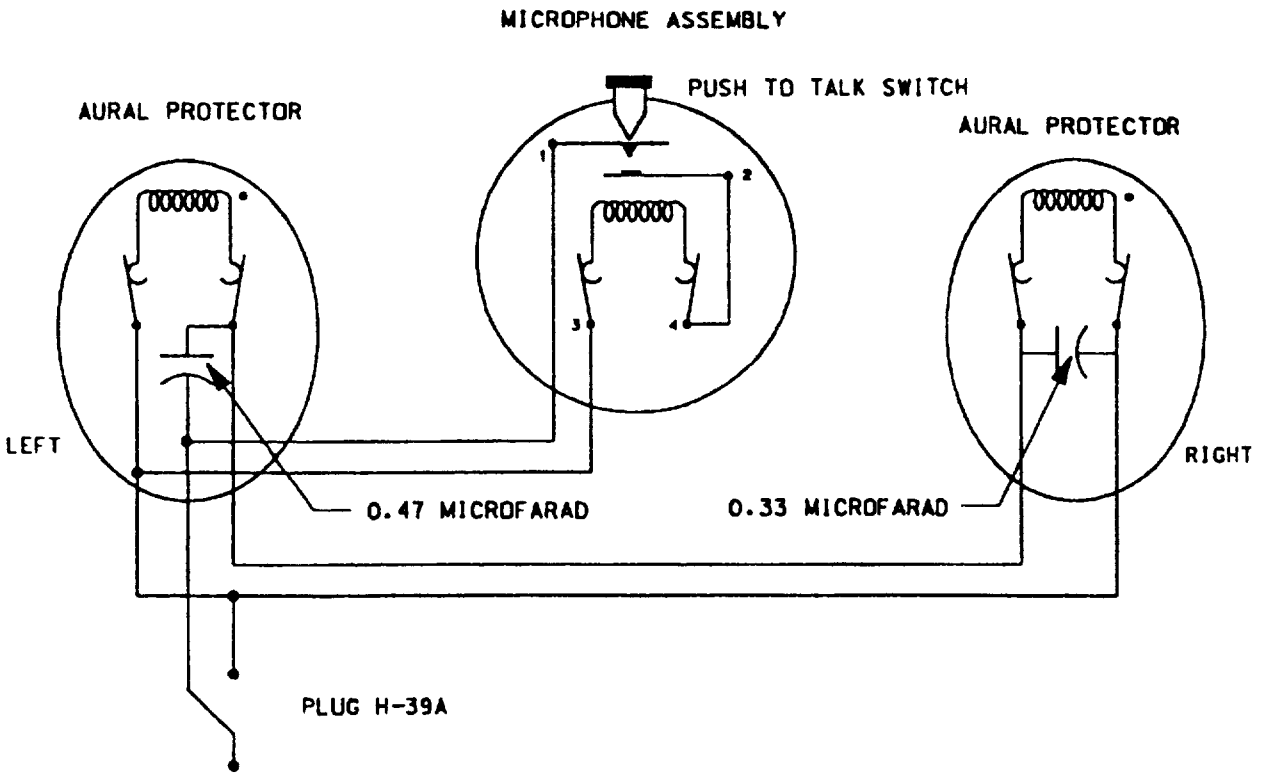

FIGURE 3. H-202/U interconnection.

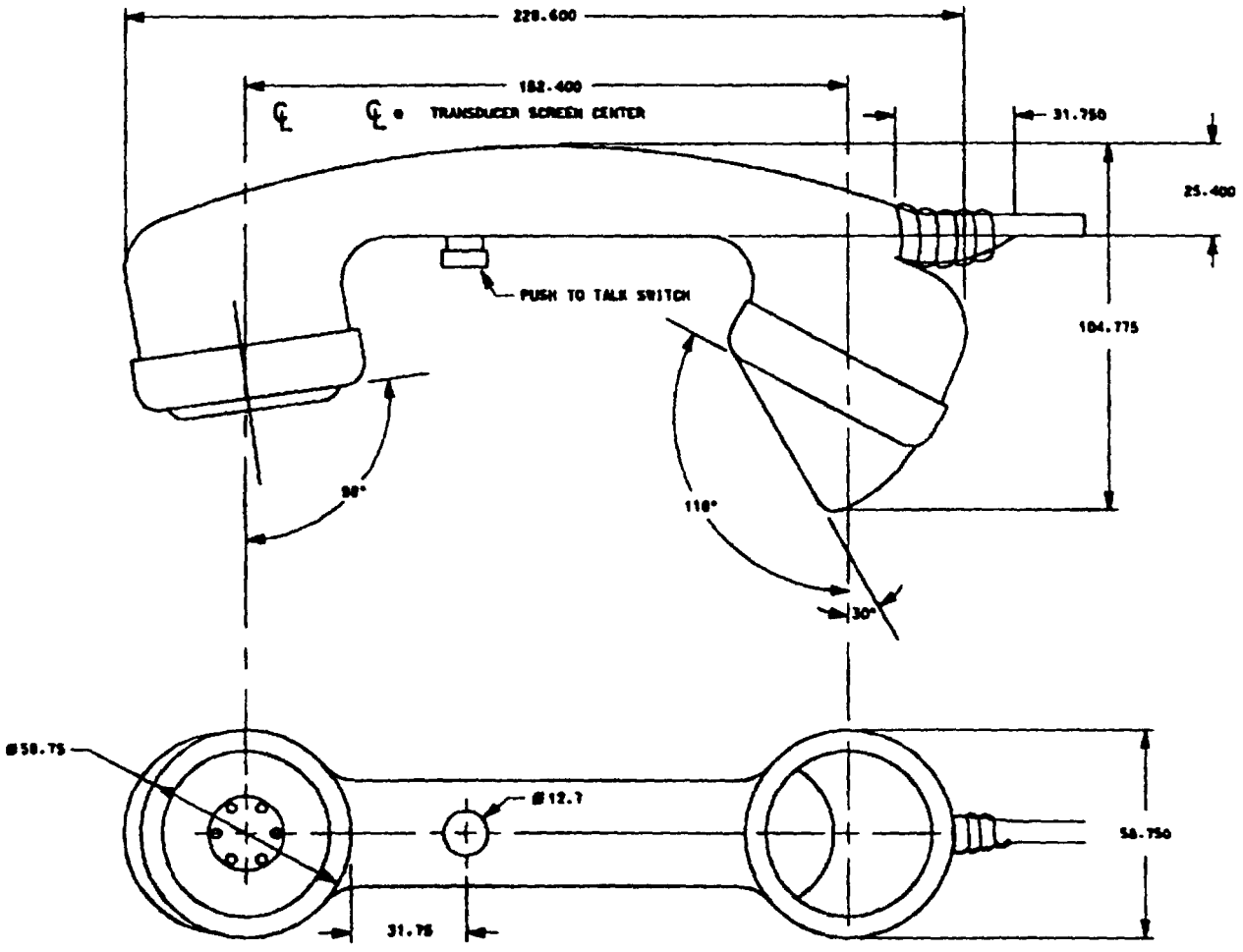

FIGURE 4. H-203/U dimensions.

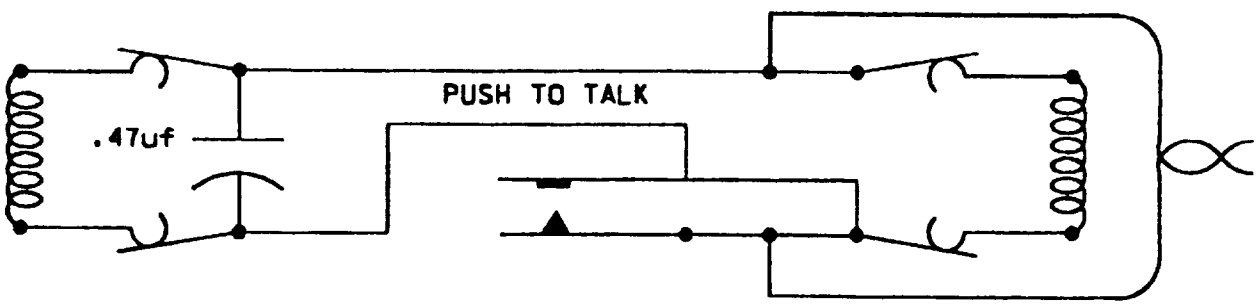

FIGURE 5. H-203/U interconnection.

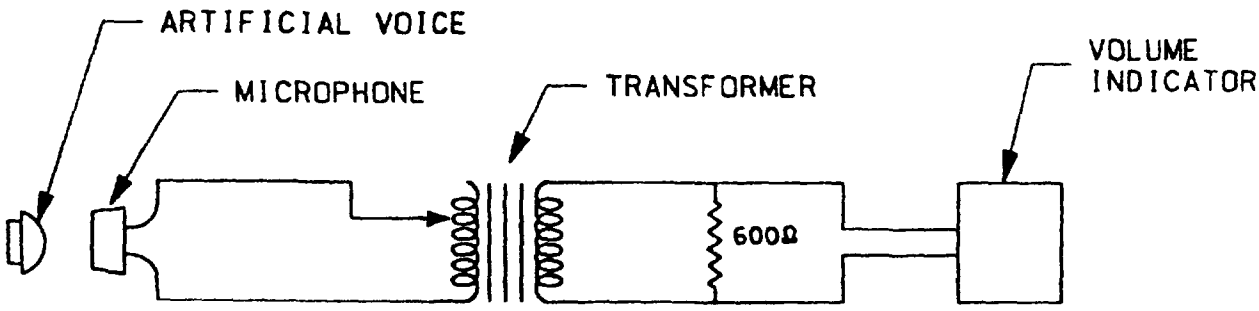

FIGURE 6. Electrical impedance test circuit.

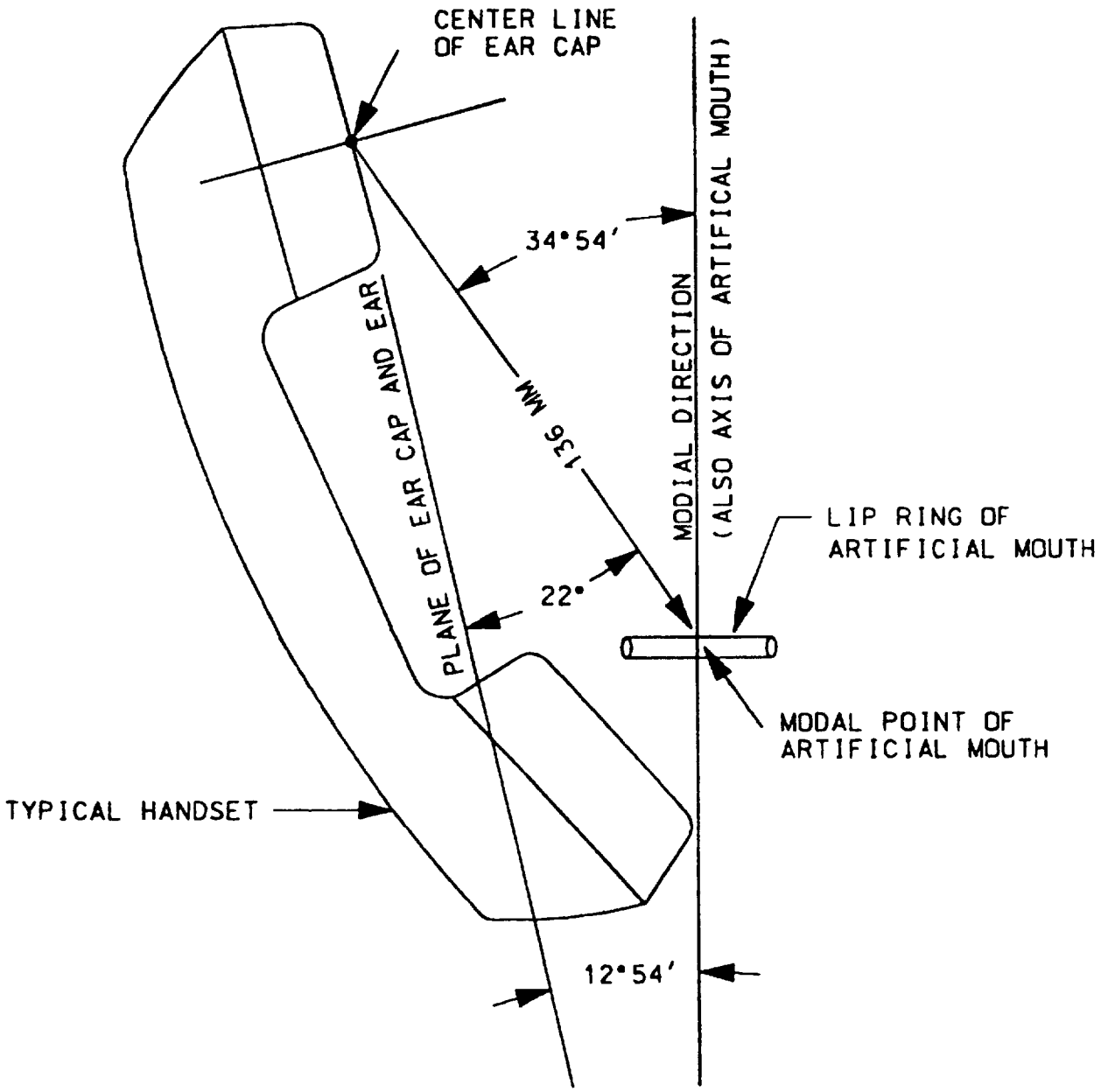

FIGURE 7. Handset test setup.

APPENDIX

ENGINEERING DRAWINGS TECHNICAL CONTENT REQUIREMENTS

10. SCOPE

10.1 Scope. This appendix covers information that shall be included on the drawings when specified in the contract or order. This appendix is mandatory only when data item description DI-DRPR-80651 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

30. DRAWING CONTENTS

30.1 Drawings. Drawings of sound powered telephone handsets specified herein are intended for guidance only. Prospective suppliers of sound powered telephone sets under this specification shall submit level II drawings of each type of set for which approval is desired. When approval under this specification is granted, corrected drawings disclosing the equipment as approved, shall be forwarded to the command or agency concerned for information and retention. Any subsequent change approved for the equipment shall be reflected in a modification of these drawings.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1 The preparing activity must complete blocks 1, 2 3, and 8 In block 1, both the document number and revision letter should be given

2 The submitter of this form must complete blocks 4, 5, 6, and 7

3 The preparing activity must provide a reply within 30 days from receipt of the form

NOTE This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements

I RECOMMEND A CHANGE:	1 DOCUMENT NUMBER MIL-T-15514F(NAVY)	2 DOCUMENT DATE (YYMMDD) 8 SEPTEMBER 1993

3. DOCUMENT TITLE
TELEPHONE EQUIPMENT, SOUND POWERED TELEPHONE HANDSET, HEADSET, AND HEADSET-NOISE

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible Attach extra sheets as needed)

5 REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8 PREPARING ACTIVITY

a NAME COMMANDER SEA 03Q42	b TELEPHONE (Include Area Code) (1) Commercial (703) 602-6020	(2) AUTOVON (AV) 332-6020
c ADDRESS (Include Zip Code) 2531 JEFFERSON DAVIS HWY ARLINGTON, VA 22242-5160	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	