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DETAIL SPECIFICATION
MICROPHONE, CARBON
(MICROPHONE M-29()/U and M-52()/U)

INACTIVE FOR NEW DESIGN AS OF 30 MARCH 1999

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

1. SCOPE

1.1 Scope. This specification covers two types of hand-held, noise-canceling microphone with an impedance of 40 to 100 ohms, designated as Microphone M-29()/U and Microphone M-52()/U (see 6.3).

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-DTL-5794 - Microphone Unit M-6A/UR and Microphone, Carbon M-51/UR (Carbon Noise Canceling)

DEPARTMENT OF DEFENSE STANDARD

MIL-STD-810 - Environmental Test Methods and Engineering Guidelines.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center, Columbus, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or emailed to sound@dsc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

DRAWINGS

ARMY DRAWINGS

SC-B-22581	-	Spring
SC-B-60159	-	Wire assembly
SC-B-68419	-	Bushing
SC-B-68422	-	Washer
SC-B-68426	-	Stud
SC-B-83087	-	Switch assembly
SC-B-74475	-	Lead assembly
SC-C-77023	-	Microphone M-51/UR
SC-D-60157	-	Case assembly
SC-D-60158	-	Cord assembly
SC-D-74472	-	Microphone, carbon M-52A/U assembly
SC-D-74473	-	Case assembly
SC-D-74474	-	Cable assembly
SM-B-96093	-	Spring
SM-B-96094	-	Washer
SM-B-96095	-	Holder
SM-B-96096	-	Insulator
SM-C-96099	-	Boot
SM-B-96100	-	Plate
SC-DL-69010	-	Cover, microphone CW-292/U
SC-DL-76334	-	Microphone M-52()/U
SC-DL-85584	-	Microphone M-29()/U

(Copies of these documents are available online at <http://www.dscc.dla.mil/programs/milspec/> or from the Defense Supply Center Columbus, ATTN: VAI, P.O. Box 3990, Columbus, Ohio 43218-3990.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, 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. REQUIRMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.1.1 Description of microphones. Microphone M-29()/U and Microphone M-52()/U are hand held noise canceling type microphones for general purpose use. Microphone M-29()/U is equipped with a five conductor retractile type cord terminated in ten pin connector. Microphone M-52()/U is equipped with a three conductor, non-retractile type cord terminated in a telephone type plug.

3.2 Construction.

a. Microphone M-29()/U. Construction of Microphone M-29()/U shall be in accordance with drawing data list SC-DL-85584 and on [figure 1](#).

b. Microphone M-52()/U. Construction of Microphone M-52()/U shall be in accordance with drawing data list SC-DL-76334 and on [figure 2](#).

3.2.1 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of handsets and components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.5)

3.3 Switch. The switch shall be capable of operation for a minimum of 500,000 cycles in accordance with 4.7.4 and exhibit a contact pressure of not less than 25 grams in accordance with 4.7.6 when the switch is closed.

3.4 Cleaning. Metal parts, after fabrication, shall be cleaned in accordance with good commercial practice. Cleaning processes shall have no detrimental, damaging or destructive effect on the equipment. Corrosive material shall be removed completely before parts are assembled into the microphone. After assembly, units shall be cleaned thoroughly and shall be free from foreign material.

3.5 Dielectric strength and insulation resistance. The microphone, with Microphone, Carbon M-51()/UR removed and the switch in the non-operate position, shall withstand without breakdown, a DC potential of 500 volts and shall show an insulation resistance of not less than 50 megohms. (see 4.6).

3.6 Operation. When tested in accordance with 4.7.3, operation of the microphone and switch shall be indicated by the reproduction of audible speech through the test amplifier and loudspeaker. Proper activation of the switch circuit shall be indicated by the continuity check specified in 4.7.3.

3.7 Service conditions. The microphones shall, meet the requirements of this specification after subjection to the following conditions.

3.7.1 Temperature.

- (a) Operating: Ambient temperature in the range of +150°F (65.5°C) to -40°F (-40°C). (See 4.7.1)
- (b) Non-operating: Exposure in the range of +160°F (71.1°C) to 80°F (26.6°C). (See 4.7.1)

3.7.2 Relative humidity, non-operating. 90 to 98 percent. (See 4.7.2).

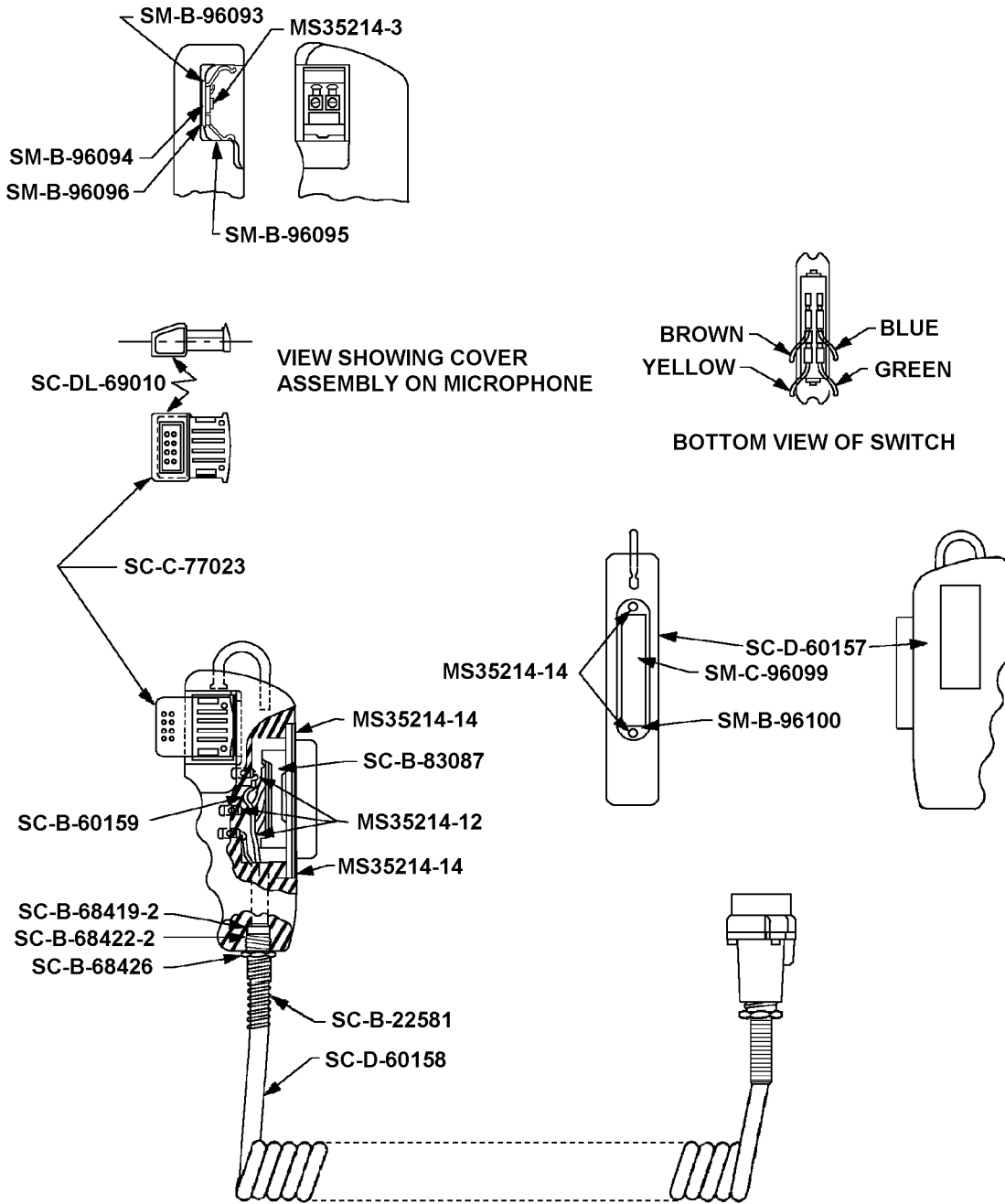
3.7.3 Immersion non-operating. Three feet of water for 2 hours. (See 4.7.5).

3.7.4 Elevation: Up to 10,000 feet above sea level (see MIL-DTL-5794).

3.8 First article samples. The contractor shall furnish six (6) first article samples for approval if required by the invitation for bids and contract. After approval, one sample will be used exclusively for the interchangeability test in 4.2. This sample shall be kept latest for this purpose.

3.9 Interchangeability. Like units and replaceable parts shall be physically and functionally interchangeable, without modification of such items for fit or performance or of the microphone. Individual items shall not be hand-picked for fit or performance (see 4.8).

3.10 Workmanship. All electrical connections shall be tight, taper pins shall be thoroughly seated. Terminal screws shall be tight. Studs on the switch handle and on the connector shall be properly seated and tight. The switch shall operate freely and positively. The switch cover shall be properly clamped to insure a moisture proof seal. There shall be no abrasions or cuts on the cover. Microphone, Carbon M-51()/UR shall be firmly seated in the mounting clip. All screws, nuts and other fasteners shall be free of burrs. The mounting hook shall be solidly mounted in the microphone body. Nomenclature marking shall be clear and distinct. Wiring Identification shall be in accordance with the drawings. Microphone cover CW-292()/U shall fit the microphone unit and the window portion firmly when mounted shall be limp.



NOTE: Part number SC-B-68419-2 is referenced on drawing SC-B-68419 and part number SC-B-68422-2 is referenced on drawing SC-B-68422.

FIGURE 1. Microphone M-29B/U.

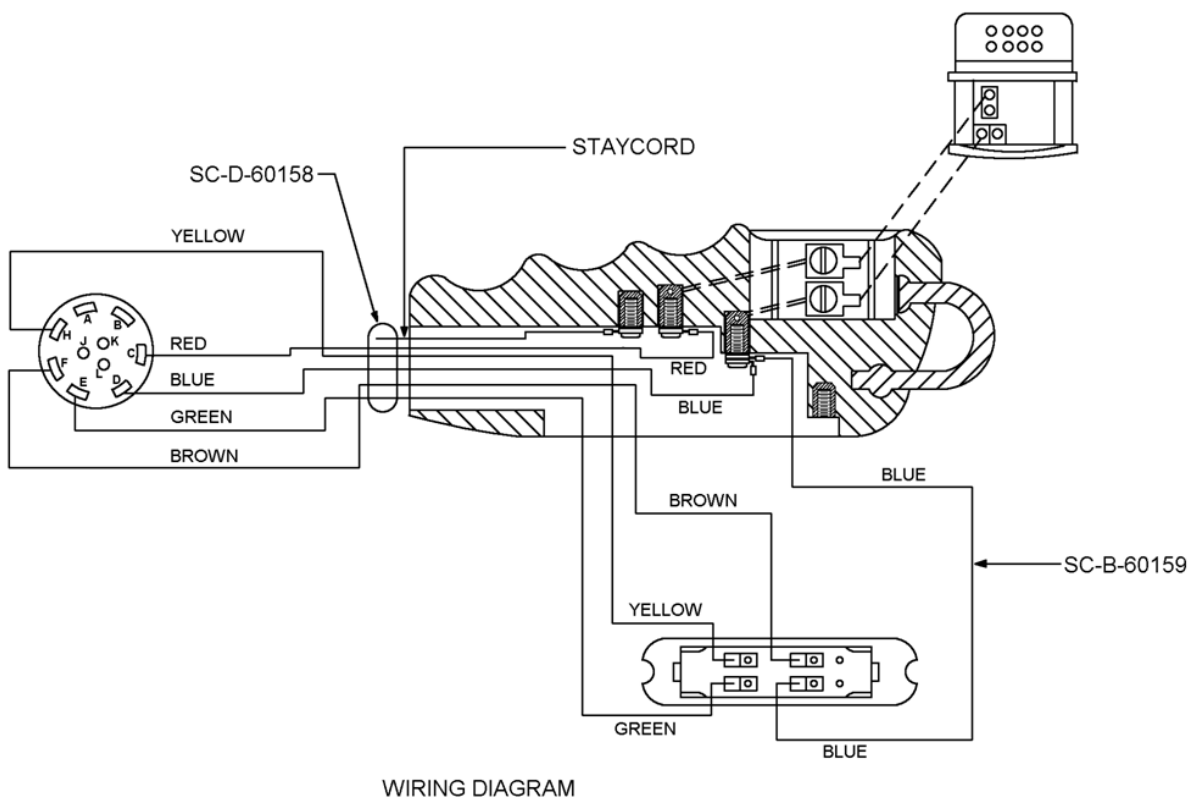
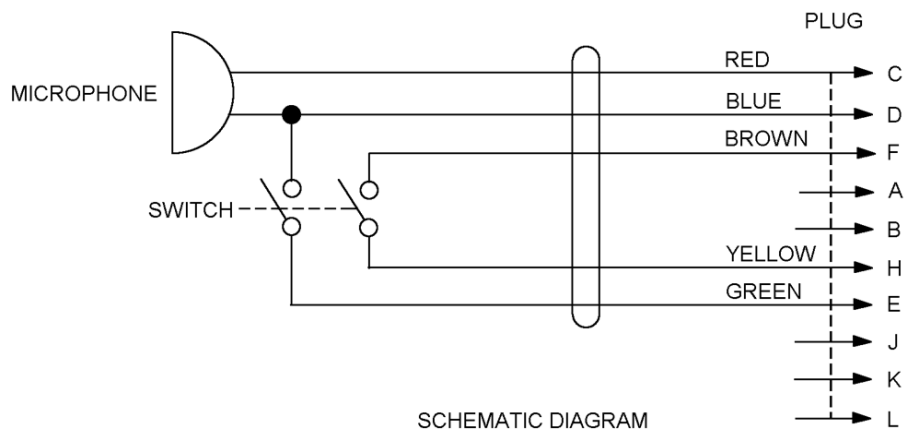
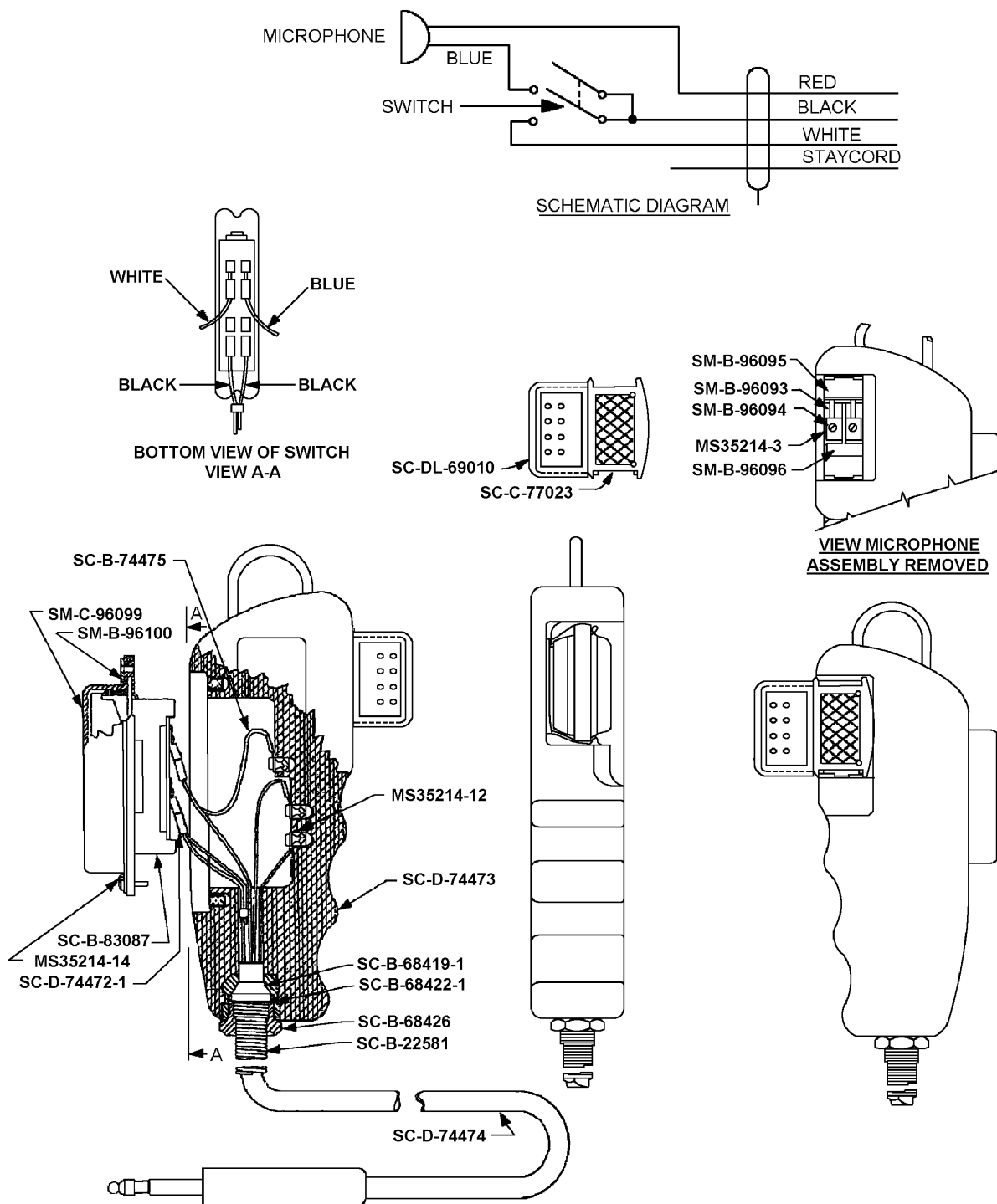


FIGURE 1. Microphone M-29B/U – Continued.



NOTE: Part number SC-B-68419-1 is referenced on drawing SC-B-68419, part number SC-B-68422-1 is referenced on drawing SC-B-68422 and part number SC-D-74472-1 is referenced on drawing SC-D-74472.

FIGURE 2. Microphone M-52A/U.

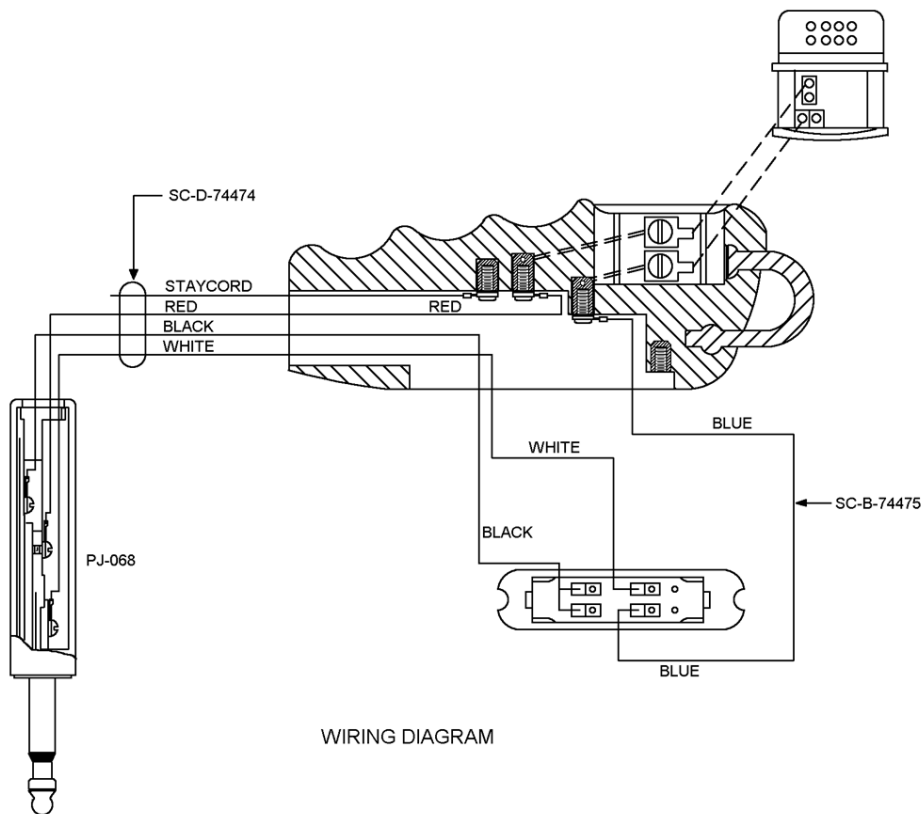


FIGURE 2. Microphone M-52A/U – Continued.

4. VERIFICATION

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

- (a) First article inspection (see 4.2)
- (b) Conformance inspection (see 4.3)

4.2 First article. Unless otherwise specified in the contract or purchase order, the first article inspection shall be performed by the contractor.

4.2.1 First article inspection. First article inspection shall consist of the group A inspection and nondestructive group B and group C inspection specified in table I, table II, and table III, respectively. Other nondestructive inspection on first article samples may be performed to determine compliance with specified requirements. First article inspection will normally be performed in this order: (1) vibration, (2) resistance to impact, and (3) immersion; other first article inspection may precede, follow, or be interspersed between the foregoing.

TABLE I. First article Inspection.

Inspection (for additional first article Inspection, see 4.2)	Requirement paragraph	Inspection paragraph
Temperature	3.7.1	4.7.1
Humidity	3.7.2	4.7.2
Detailed examination	3.2	4.5

4.3 Conformance inspection. The contractor, to demonstrate compliance with specified requirements, shall perform the inspection specified in 4.3.1 through 4.3.3. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The Government may review and evaluate the contractor's inspection procedures and examine the contractor's inspection records. In addition the Government at Its discretion may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements. Test equipment for Government verification inspection shall be made available by the contractor. No group B inspection is specified for these microphones.

4.3.1 Group A inspection. Units presented for acceptance shall be inspected for conformance with the criteria specified in [table II](#). Lots shall be formed and subjected to the sampling plan as indicated.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Inspection paragraph
Visual and mechanical	3.10	4.4
Performance		
Switch contact pressure	3.3	4.7.6
Dielectric strength and Insulation resistance	3.5	4.6
Operation	3.6	4.7.3

4.3.2 Group C inspection. This inspection shall be as listed in [table III](#). Samples shall be selected from those which have passed group A inspection.

4.3.2.1 Sampling for group C inspection. One microphone out of each 1,000 or fraction thereof shall be selected at random for each test listed in [table III](#).

4.3.2.2 Noncompliance. If a sample unit fails group C inspection, the contractor shall immediately investigate the cause of failure and shall report to the Government inspector the results thereof and details of the corrective action taken on the process and all units of product which were manufactured with the same conditions, materials, processes, etc. If the Government inspector does not consider that the corrective action will enable the product to meet specified requirements, or if the contractor cannot determine the cause of failure, the matter shall be referred to the contracting officer (see [6.4](#)).

TABLE III. Group C inspection.

Inspection	Requirement paragraph	Inspection paragraph
Switch Life	3.3	4.7.4
Immersion	3.7.3	4.7.5
Interchangeability	3.9	4.8

4.3.3 Reinspection of conforming group C sample units. Unless otherwise specified sample units which have been subjected to and passed group C inspection, may be accepted on contract, provided that switches which have been life tested are replaced and the units are reworked and pass group A Inspection.

4.4 Visual and mechanical inspection. The microphone shall be examined for compliance with the workmanship requirements of [3.10](#).

4.4.1 Sampling plan. Accept on zero, for general inspection as specified in table IV. If one or more defects are found, the lot shall be rescreened and defects removed. After screening and removal of defects, a new sample of parts shall be randomly selected in accordance with table IV. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE IV. Sampling plan for group A inspection.

Lots Size	Sample Size
2 to 12	* 1/
13 to 150	13
151 to 290	20
291 to 500	29
501 to 1,200	34
1,201 to 3,200	42
3,201 to 10,000	50
10,001 to 35,000	60
35,001 to 150,000	74
150,001 to 500,000	90
500,001 and over	102

1/. * Indicates entire lot must be inspected.

4.5 Detailed examination.

(a) Every part of Microphone M-29()/U shall be examined and measured for compliance with the drawings and specifications on Drawing and Data List BC-DL-85585 (see 3.2).

(b) Every part of Microphone M-52()/U shall be examined and measured for compliance with the drawings and specifications on Drawing and Data List SC-DL-76334 (see 3.2).

4.6 Dielectric strength and insulation resistance. A potential of 500 volts DC shall be applied for not less than 2 seconds between each conductor and the remaining conductors connected together and to the exposed metal parts. Immediately after the dielectric-strength test, the Insulation resistance shall be measured with a galvanometer or other instrument approved by government inspector, using a DC potential of 500 volts, applied for not less than 2 seconds between each conductor and the remaining conductors connected together and to the exposed metal parts (see 3.5).

4.7 Service conditions and operational tests.

4.7.1 Temperature. The microphone shall be subjected to the temperature cycle shown. Operation test shall be made at 150°F (65.5°C), 77°F (25°C), -40°F (-40°C) and repeat 77°F (25°C) in accordance with method 503, procedure I of MIL-STD-810, (see 3.6 and 3.7.1)

4.7.2 Humidity test. Subject the microphone to continuous cycling for a total of five 48 hour cycles. Each cycle shall be in accordance with method 507 of MIL-STD-810. No repair or replacement of parts shall be made. Afterwards there shall be no corrosion of metal parts or binding of moving parts and the microphone shall meet the operation test of 4.7.3 (see 3.7.2).

4.7.3 Operation. The microphone shall be connected to an amplifier and loudspeaker capable of indicating operation of the microphone when spoken into. A test circuit shall be provided indicating continuity of the switch cord, and connector or plug when the switch is activated. (See 3.6).

4.7.4 Switch life test. The switch shall be tested by operating it for 500,000 make and break cycles at a rate of not less than 25 cycles per minute. The switch contacts shall open and close a one ampere current at 24 volts through a resistance load. Electrical counters shall be placed in each switch circuit and a mechanical counter on toe mechanism for operating the switch. At the completion of 500,000 operational cycles the difference in reading between either electrical counter and the mechanical counter shall, not exceed 1,000 operations (see 3.3).

4.7.5 Immersion test. The microphone shall be immersed to a minimum depth of 3 feet of fresh water (65 to 80°F) for 2 hours. After immersion, the microphone shall be removed from the water, wiped dry on exterior surfaces, and the switch cavity opened; leakage constitutes failure (see 3.7.3).

4.7.6 Switch contact pressure. With the switch closed by depressing the activating bar, a minimum force of 25 grams shall be required, using a spring gage, to separate each pair of switch contacts. This test may be made on completed switches before they are installed in the microphones.

4.8 Inspection for interchangeability. Each replaceable part listed below in the selected microphone shall be interchanged with the corresponding part in the approved first article sample in sequential order. At the completion of this inspection, the interchanged parts shall be reassembled in their original microphones. Non-interchangeability of these parts constitutes failure.

- Switch
- Boot
- Retainer plate
- Cable relief spring, retaining bushing, end cord
- Microphone mounting clip
- Mounting screws

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. Microphones M-29()/U and M-52()/U are intended for general purpose use.

6.2 Acquisition requirements. Acquisition documents should specify the following.

- (a) Title, number, and date of this specification.
- (b) Type required.
- (c) Number of preparation samples required.
- (d) First article inspection (see 6.6).

6.3 Nomenclature. The parenthesis in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example; M-29W/U. The contractor should apply for nomenclature in accordance with the applicable clause in the contract (see 1.1).

6.4 Group C inspection. Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action (see 4.3.2.2).

6.5 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin) (see 3.2.1).

6.6 First article. The contracting officer should 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 for 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.

6.7 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see section 3).

6.8 Subject term (keyword) listing.

Dielectric strength
Insulation resistance
Schematic diagram
Switch
Wiring diagram

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

CONCLUDING MATERIAL

Custodians:
Army – CR
Air Force – 85
DLA – CC

Preparing activity:
DLA – CC

(Project 5965-2007-004)

Reviewer activity:
Air Force – 99

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