

23 November 1973

## MILITARY SPECIFICATION

## EARCUP, SOUND PROTECTIVE MX-8376/AR

## 1. SCOPE

1.1 This specification covers a sound protective earcup for the HGU-26/P flight helmet. The earcup is designated MX-8376/AR.

## 2. APPLICABLE DOCUMENTS

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

SPECIFICATIONSFederal

L-P-375	Plastic Film, Flexible, Vinyl Chloride
PPP-B-636	Boxes, Shipping, Fiberboard
PPP-P-291	Paperboard, Wrapping, Cushioning
PPP-T-60	Tape: Pressure-Sensitive Adhesive; Vinyl Plastic Film

Military

MIL-P-116	Preservation-Packaging, Methods of
MIL-D-1000	Drawings, Engineering and Associated Lists
MIL-C-5040	Cord, Nylon
MIL-F-21840	Fastener Tapes, Hook and Pile, Synthetic
MIL-E-25670	Earphone H-143/AIC
MIL-P-26514	Polyurethane Foam, Rigid or Flexible, for Packaging

STANDARDSFederal

FED-STD-595	Colors
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Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-143	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-831	Test Reports, Preparation of

DRAWINGS

Air Force

60A4277	Grommet-Electrical, Cord
7136037	Shell, Earphone-Headset
7136038	Cushion, Earphone-Headset

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

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

American Standards Association

Z24.22-1957	Method for Measuring Real Ear Attenuation of Ear Protectors at Threshold
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(Copies of this publication can be obtained from the American National Standards Institute, Inc. (formerly the American Standards Association), 1430 Broadway, New York, New York 10018.)

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

3. REQUIREMENTS

3.1 Preproduction. This specification makes provisions for preproduction testing (see 4.4 and 6.2).

3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 Materials. Materials shall conform to the requirements specified herein. Materials that are not covered by specifications or that are not specifically described herein shall be the best quality and shall be entirely suitable for the intended purpose.

3.3.1 Rigid shell. The material for the rigid shell shall be gray conforming to 26329 of FED-STD-595 and shall be molded plastic Cylolac Type T or an equally suitable material. (Cylolac is manufactured by Marbon Division, P.O. Box 68, Washington, West Virginia.)

3.3.2 Hook fastener tape. The hook fastener tape shall be 2 inches wide, shall have a solvent-activated-adhesive backing, and shall conform to type I, class 1 of MIL-F-21840. The color of the hook fastener tape is optional.

3.3.3 Draw cords. The material for the draw cords shall be natural color and shall conform to type I or IA of MIL-C-5040.

3.3.4 Polyurethane foam. The polyurethane foam for the cushion and for the fillers shall conform to type I, class 2 of MIL-P-26514. The density of the polyurethane foam for the cushion shall be 5 pounds per cubic foot. The minimum density of the polyurethane foam for the fillers shall be 3 pounds per cubic foot. The color of the polyurethane foam for the cushion and for the fillers is optional. The thickness of the polyurethane foam for the cushion shall be as specified on Drawing 7136038. The thickness of the polyurethane foam for the fillers will be optional provided the fillers conform to the requirements specified in 3.4.3.

3.3.5 Plastic film. The plastic film for the cushion shall conform to type II, class 2 of L-P-375 except that the temperature range shall be from minus 67 degrees Fahrenheit to plus 185 degrees Fahrenheit. The color of the plastic film shall conform to 26329 of FED-STD-595. The thickness of the plastic film shall be as specified on Drawing 7136038.

3.4 Design and construction. The design of the earcup shall provide a sound attenuation earcup that can be comfortably worn by all personnel, including personnel wearing eyeglasses, and that will be compatible with the H-143/AIC earphone which is specified in MIL-E-25670. The earcup shall consist of a shell, a cushion, and fillers. The earcup shall be designed to permit easy assembly and disassembly without the use of any tool except for the installation of an earphone which will require the tightening of set screws against electrical conductors. The earcup shall conform to the requirements that are specified herein and on the applicable drawings. In the event of conflict between the text of this specification and the drawings, the text of this specification shall govern.

3.4.1 Shell. The shell shall consist of a rigid shell, a grommet, hook fastener tape, and two draw cords.

3.4.1.1 Rigid shell. If the rigid shell is made of more than one piece of material, the pieces shall be permanently joined together. The joining seam shall be smooth. The shape of the rigid shell shall be rounded and suitable for both the right and the left sides of the head so that the earcup can be worn on either the left or the right ear. The dimensions of the rigid shell shall conform to the dimensions shown on Drawing 7136037.

3.4.1.2 Grommet. A grommet shall be installed in the access hole for the electrical conductors to the earphone. The grommet shall conform to Drawing 60A4277 except that the dimensions for wall thickness shall be compatible with the earcup being fabricated.

3.4.1.3 Attaching and adjusting provisions. A 2-inch-square piece of hook fastener tape shall be approximately centered on the outside of the rigid shell and securely attached to the rigid shell. Two draw cords shall be attached to the rigid shell: one on the top and one on the bottom of the rigid shell. Each draw cord shall be 9 inches (plus or minus 1/4 inch) long.

3.4.2 Cushion. The cushion shall be designed as an easily replaceable item. The cushion shall consist of polyurethane foam with a cover that is made of plastic film and heat sealed. The cushion shall conform to the dimensions shown on Drawing 7136038. The inner seam around the opening for the ear shall be folded inward during manufacturing to remove all sharp edges. The cushion shall not be cemented to the earcup; however, the cushion shall remain attached to the earcup during normal usage. The cushion shall not be treated in any manner that will cause skin irritation.

3.4.3 Fillers. The fillers shall have a cavity that will accept the H-143/AIC earphone specified in MIL-E-25670. The fillers shall be installed, without gluing to the shell, so that the fillers will not protrude from the rigid shell and so that the fillers can be removed from the earcup and replaced without damage to the fillers or any other part of the earcup. The fillers shall not be treated in any manner that will cause skin irritation.

### 3.5 Performance

3.5.1 Mechanical stability. After the earcup has been cooled to a temperature of minus 40 degrees Fahrenheit and then dropped from a height of 6 feet onto an uncovered concrete floor, the earcup shall not have cracked or chipped..

3.5.2 Sound attenuation. The earcup shall provide the sound attenuation specified in table I.

TABLE I. Sound Attenuations

Group	Frequencies (Hertz)	Minimum Group Attenuations (Decibels) <u>1/</u>	Minimum Single Attenuation (Decibels)
A	125	23	
	250		
B	500	178	23
	1,000		32
	2,000		35
	3,000		35
	4,000		35
C	6,000	60	
	8,000		

1/ The minimum group attenuation for a group shall be the sum of all the attenuations measured for all the frequencies listed for the group.

3.5.3 Wearability. The earcup shall not have any design or material property that might cause discomfort or affect wearability.

3.6 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirements of MIL-D-1000 shall govern the manufacturer's part number and changes thereto.

3.7 Identification of product. The earcup shall be marked for identification in accordance with MIL-STD-130.

3.8 Workmanship. The earcup shall be constructed in accordance with good commercial practice. The earcup shall be clean and free from any defect that might affect functionality. The shell shall be smooth and free of chips and cracks. The cushion shall be smooth and free of sharp edges in areas adjacent to user's ear.

#### 4. QUALITY ASSURANCE PROVISIONS

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

4.2 Classification of inspection. The examinations and the tests required by this specification are classified as follows:

- (a) Preproduction tests
- (b) Quality conformance tests.

4.3 Test conditions. Unless otherwise specified herein, the examinations and the tests specified herein shall be performed under the following standard test conditions:

- (a) Temperature between plus 15 degrees centigrade and plus 35 degrees centigrade
- (b) Normal ground altitude
- (c) Prevailing room ambient humidity
- (d) No vibration.

4.4 Preproduction tests. The preproduction tests shall consist of all of the examinations and tests described under 4.6. Six of the preproduction samples specified in 4.4.1 shall be subjected to all of the examinations and tests described under 4.6. The preproduction tests shall be performed in the following order:

- (a) Examination of product
- (b) Mechanical stability
- (c) Sound attenuation.

4.4.1 Samples. The preproduction samples shall consist of 16 earcups that are representative of the earcups to be manufactured during production. The preproduction samples shall have been manufactured in the same facilities and with the same equipment that are to be used for the manufacture of the production items. The preproduction samples shall be marked with the manufacturer's part number and any other information specified by the procuring activity. The ten untested preproduction samples shall be submitted to the procuring activity (see 6.2) for any verification deemed necessary of any tests and of adaptability of the earcup to the HGU-26/P helmet. The six tested preproduction samples shall be available to the procuring activity.

4.4.2 Report. When specified by the procuring activity (see 6.2), a preproduction test report shall be prepared in accordance with MIL-STD-831. The preproduction test report shall list each failure that occurred during the preproduction tests, shall specify the degree the limit was exceeded, how the failure was corrected, and the steps taken to avoid repetition of the failure.

4.5 Quality conformance tests. The quality conformance tests shall consist of the following:

- (a) Individual tests
- (b) Sampling tests.

4.5.1 Individual tests. Each earcup shall be subjected to the examination of product described in 4.6.1.

4.5.2 Sampling tests. One complete earcup shall be selected at random from each lot of 500, or fraction thereof, and shall be subjected to the mechanical stability test described in 4.6.2.

4.5.2.1 Rejection and retest. If one or more items from a lot fail to meet this specification, acceptance of all items in the lot shall be withheld until the extent and cause of failure have been determined. The contractor shall explain fully to the Government representative and notify the procuring activity

in writing the cause of failure, the action taken to preclude recurrence, and the impact this failure may have in scheduled deliveries. After correction, all of the sampling tests shall be repeated.

4.5.2.2 Individual tests may continue. For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. Final acceptance of the entire lot or lots produced later shall not be made until it is determined that all items meet all the requirements of this specification.

4.5.3 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 Test methods

4.6.1 Examination of product. The earcup shall be examined for compliance with this specification with respect to materials, design, construction, dimensions, marking, and workmanship.

4.6.2 Mechanical stability. The earcup shall be subjected to a temperature of minus 40 degrees Fahrenheit for a minimum of 2 hours. Within 1 minute after removal of the earcup from the temperature of minus 40 degrees Fahrenheit, the earcup shall be dropped, from a height of 6 feet, onto an uncovered concrete floor. The earcup shall then be examined for cracks and chips.

4.6.3 Sound attenuation. The attenuation of the earcup shall be measured in accordance with the American Standards Association Method Z24.22-1957. The attenuation requirements specified in table I shall be demonstrated, at each frequency listed in table I, to determine conformance to the requirements specified in 3.5.2. The pressure required against the subject's head to attain the attenuation specified in table I shall not exceed 3 pounds. An H-143/AIC earphone that conforms to MIL-E-25670 or a simulated equal mass shall be installed in the earcup during the sound attenuation test. The communication cord opening in the earcup shall be plugged during the sound attenuation test.

4.6.4 Wearability. Design and material properties that might cause discomfort or affect wearability of the earcup shall be determined by subjective evaluation through actual wear and usage of the earcup by a group of selected individuals. The wearability test will be conducted by the procuring activity.

### 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. The earcups shall be preserved and packaged in accordance with method III of MIL-P-116. The quantity per unit package shall be one earcup. Each earcup shall be wrapped with material conforming to PPP-P-291 and shall be packaged in a unit container conforming to type CF, class domestic of PPP-B-636.

5.1.2 Level C. Preservation and packaging of the earcups shall be the minimum necessary to afford protection against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity.

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

5.2.1 Level A. The earcups shall be packed in overseas-type containers conforming to PPP-B-636. The containers shall be the minimum weight and cube, shall be uniform in size and shape, and shall contain (when practical) like quantities. The gross weight of the containers shall be governed by the container specification. Closure of the containers shall be in accordance with the container specification and appendix thereto. All joints and seams of the containers shall be sealed with tape conforming to PPP-T-60.

5.2.2 Level B. The earcups shall be packed as specified in 5.2.1, except that the containers shall be domestic type and that the closure shall be in accordance with the requirements for domestic-type containers.

5.2.3 Level C. Packages that require overpacking for acceptance by the carrier shall be packed in shipping containers in a manner that will ensure safe delivery at the lowest transportation and packing charges. The containers shall be in accordance with the rules of carriers or regulations as applicable to the mode of transportation.

5.3 Marking. In addition to any special marking required by the contract or order, unit packages, intermediate packages, and shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. The earcup covered by this specification is intended to be worn with the HGU-26/P flight helmet to protect the ears of personnel against high intensity sound.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification
- (b) Preproduction requirements (see 3.1, 4.4.1, 4.4.2, and 4.6.4)
- (c) Selection of applicable levels of preservation and packaging and packing (see 5.1 and 5.2).

Custodian:  
Air Force - 11

Preparing activity:  
Air Force - 11

Reviewer:  
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