

INCH-POUND
MIL-DTL-83425A
w/AMENDMENT 1
19 June 2015
SUPERSEDING
MIL-DTL-83425A
30 June 2006

DETAIL SPECIFICATION

EARCUP, SOUND PROTECTIVE MX-8376/AR

Inactive for new design after 30 June 2006.

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

1. SCOPE

1.1 Scope. 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 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.

FEDERAL STANDARD

FED-STD-595/26329 - Colors Used in Government Procurement (Gray, Semigloss)

COMMERCIAL ITEM DESCRIPTION

A-A-55126 - Fastener Tapes, Hook and Loop, Synthetic

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-C-5040 - Cord, Fibrous, Nylon
MIL-PRF-25670/2 - Earphone Element, High- and Low-Altitude, H-143/AIC, and Low
Altitude, Water-Immersion, H-143A/AIC
MIL-PRF-26514 - Polyurethane Foam, Rigid or Flexible, for Packaging

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Columbus, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or emailed to Sound@dsccl.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil/>.

AMSC N/A



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DEPARTMENT OF DEFENSE STANDARD

MIL-STD-130 - Identification Marking of US Military Property
MIL-STD-31000 Technical Data Packages

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

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 of these documents are those cited in the solicitation or contract.

Air Force

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

(Copies of 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.)

2.3 Non-Government publications. The following documents 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.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S12.6 - Methods for Measuring the Real-Ear Attenuation of Hearing Protectors

(Copies of this document are available online at <http://www.ansi.org>.)

ASTM INTERNATIONAL

ASTM D1593 - Standard Specification for Nonrigid Vinyl Chloride Plastic Film and Sheeting
ASTM D4673 - Molding and Extrusion Materials, Acrylonitrile-Butadiene-Styrene (ABS), Plastics and Alloys

(Copies of these documents are available online at <http://www.astm.org>.)

2.4 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. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 4.3).

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

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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 molded plastic conforming to group 01, class 2, grade 5 of ASTM D4673, and shall be semigloss gray in color conforming to FED-STD-595/26329.

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 A-A-55126. 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-PRF-26514. The minimum 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 shall be optional. The thickness of the polyurethane foam for the cushion shall be as specified in Drawing 7136038. The thickness of the polyurethane foam for the fillers shall be optional, provided the fillers conform to the requirements specified in 3.4.3.

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

3.3.6. Plastic film. The plastic film for the cushion shall conform to type I of ASTM D1593, except that the temperature range shall be from -67 degrees to +185 degrees Fahrenheit. The color of the plastic film shall be semigloss gray and conform to FED-STD-595/26329. The thickness of the plastic film shall be as specified in 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-PRF-25670/2. 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 specified in 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.

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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 \pm 0.25 inch (228.6 \pm 6.35 mm) 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 conforming to MIL-PRF-25670/2. 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 -40 degrees Fahrenheit and then dropped from a height of 6 (six) feet onto an uncovered concrete floor, the earcup shall not be cracked or chipped (see 4.5.2).

3.5.2 Sound attenuation. The earcup shall provide the sound attenuation specified in table I (see 4.5.3).

TABLE I. Sound attenuations.

Group	Frequencies (Hertz)	Minimum group attenuations (Decibels) ^{1/}	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 (see 4.5.4).

3.6 Part numbering of interchangeable parts. All parts having the same manufacturer's Part or Identifying Number (PIN) shall be functionally and dimensionally interchangeable. The item identification and PIN requirements conforming to MIL-STD-31000 shall govern the manufacturer's PIN and changes thereto.

3.7 Identification of product. The earcup shall be marked for identification conforming to MIL-STD-130.

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3.8 Workmanship. The earcup shall be clean and free from any defect that might affect function ability. 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. VERIFICATION

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

- a. First article inspection (see 4.3).
- b. Conformance inspection (see 4.4).

4.2 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 +15 degrees and +35 degrees centigrade
- b. Normal ground altitude.
- c. Prevailing room ambient humidity.
- d. No vibration.

4.3 First article inspection. The first article test shall consist of all of the examinations and tests described (see 4.5). Six (6) of the first article samples specified in 4.3.1 shall be subjected to all of the examinations and tests described. The first article tests shall be performed in the following order:

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

4.3.1 Samples. The first article samples shall consist of 16 (sixteen) earcups that are representative of the earcups to be manufactured during production. The first article 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 first article samples shall be marked with the manufacturer's PIN and any other information specified by the procuring activity. The 10 (ten) untested first article samples shall be submitted, as specified in the contract or purchase order (see 6.2), for any verification deemed necessary of any tests and of adaptability of the earcup to the HGU-26/P helmet. The 6 (six) tested first article samples shall be made available to the procuring activity.

4.3.2 Report. When specified by the procuring activity (see 6.2), a first article test report shall be prepared and submitted, as specified in the contract or purchase order. The first article test report shall list each failure that occurred during the first article tests, shall specify the degree to which the limit was exceeded, how the failure was corrected, and the steps taken to avoid repetition of the failure. The preparer of the report may refer to military handbook titled "Preparation of Test Reports"(see 6.4), for additional information.

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4.4 Conformance inspection. The conformance inspection shall consist of the following:

- a. Individual tests.
- b. Sampling tests.

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

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

4.4.2.1 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.

4.4.2.2 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.

4.4.3 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.

4.5 Test methods

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

4.5.2 Mechanical stability. The earcup shall be subjected to a temperature of -40 degrees Fahrenheit for a minimum of 2 (two) hours. Within 1 (one) minute after removal of the earcup from the temperature of -40 degrees Fahrenheit, the earcup shall be dropped, from a height of 6 (six) feet, onto an uncovered concrete floor. The earcup shall then be examined for cracks and chips (see 3.5.1).

4.5.3 Sound attenuation. The attenuation of the earcup shall be measured conforming to ANSI S12.6. The attenuation requirements specified 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 conforming to MIL-PRF-25670/2 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.

4.5.4 Wearability. When specified in the contract or purchase order, the 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 shall be conducted by the procuring activity (see 3.5.3).

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

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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. 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 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. First article requirements (see 3.1, 4.3.1, 4.3.2 , and 4.5.4)
- c. Packaging requirements (see 5.1).

6.3 Tin whisker growth (see 3.3.5). The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Additional reference document (see 4.3.2). The following document is not directly referenced herein, but should be used as a guideline.

MIL-HDBK-831 - Preparation of Test Reports.

6.5 Subject term (key word) listing.

Communication
Cushion
Fillers
Flight helmet
High intensity
Polyurethane foam
Rigid shell
Attenuation
Wearability

6.6 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>. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein.

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6.7 Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

CONCLUDING MATERIAL

Custodians:
Air Force - 99
DLA - CC

Preparing activity:
DLA - CC

(Project 5965-2015-009)

Review activity:
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