

MIL-A-23899B(AS)
17 August 1984
SUPERSEDING
MIL-A-23899A(AS)
2 August 1971

MILITARY SPECIFICATION

AURAL PROTECTOR, SOUND

This specification is approved for use by the Naval Air Systems Command, Department of the Navy, and is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the design and performance requirements for one type of sound aural protector.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATIONS

FEDERAL

L-P-375	Plastic Film, Flexible, Vinyl Chloride
L-P-1183	Plastic Molding Material, Acrylonitrile-Butadiene-Styrene (ABS), Rigid
QQ-C-320	Chromium Plating (Electrodeposited)
QQ-N-290	Nickle Plating (Electrodeposited)
PPP-B-566	Boxes, Folding, Paperboard

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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SPECIFICATIONS

FEDERAL (Continue)

PPP-B-601 Boxes, Wood, Cleated Plywood
 PPP-B-621 Box, Wood, Nailed and Lock-Corner
 PPP-B-636 Box, Shipping, Fiberboard
 PPP-B-676 Boxes, Setup

MILITARY

MIL-H-6875 Heat Treatment of Steel (Aircraft Practice), Process for
 MIL-B-7883 Brazing of Steels, Copper, Copper Alloys, Nickle Alloys,
 Aluminum and Aluminum Alloys
 MIL-S-7947 Steel, Sheet and Strip (1095), Aircraft Quality
 MIL-P-26514 Polyurathane Foam, Rigid or Flexible, for Packaging

STANDARDS

FEDERAL

FED-STD-595 Colors

MILITARY

MIL-STD-105 Sampling Procedures and Tables for Inspection by
 Attributes
 MIL-STD-129 Marking for Shipment and Storage
 MIL-STD-130 Identification Marking of U.S. Military Property
 MIL-STD-794 Parts and Equipment, Procedures for Packaging of
 MIL-STD-889 Dissimilar Metals
 MS15795 Washer, Flat Metal, Round, General Purpose (In/mm)
 MS16633 Ring, Retaining, External, "E", (Reduced Section Type)
 MS21083 Nut, Self Locking, Hexagon, Non-Metallic, Insert, Low
 Height, 250°F

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

* **2.2 Other publications.** The following documents form a part of this specification to the extent specified herein. The issue of the document which is indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN STANDARDS ASSOCIATION (ASA)

ASA Z24.22-1957 American Standard Method for the Measurement of the Real-Ear Attenuation of Ear Protectors at Threshold.

(Application for copies should be addressed to the Commander, Naval Air Development Center (Code 6031), Warminster, PA 18974.)

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM A29-81 Steel Bars, Carbon and Alloy, Hot Wrought and Cold-Finished, General Requirements for

(Application for copies should be addressed to the American Society of Testing and Materials, 1916 Race St., Philadelphia, PA 19103.)

* **2.3 Order of precedence.** In the event of a conflict between the text of this specification and the references specified herein, the text of this specification shall take precedence.

3. REQUIREMENTS

* **3.1 Qualification.** The sound aural protector furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.2 Materials. Materials shall conform to applicable specifications as specified herein. Materials which are not covered by applicable specifications or which are not specifically described herein and on applicable drawings, shall be of the best quality, lightest practicable weight and suitable for the purpose intended.

3.2.1 Metal parts. All metal parts shall be of a corrosion resistant material or treated in a manner to render them adequately resistant to corrosion.

* **3.2.1.1 Dissimilar metals.** Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.

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* 3.2.2 Protective treatment. When materials are used in the construction of the sound aural protector that are subject to deterioration when exposed to environmental conditions likely to occur during service usage, they shall be protected against such corrosion in a manner that will in no way prevent compliance with the performance requirements of this specification. Protective coating that will chip or scale during normal service life or under extremes of environmental conditions shall not be used.

3.2.3 Fungus-proof materials. Materials which are nutrients for fungi shall not be used where it is practicable to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the acquiring activity. However, if they will be used in a hermetically sealed enclosure, fungicidal treatment will not be necessary.

* 3.2.4 Standard parts. MS and AN standard parts shall be used where they suit the purpose.

* 3.3 Design and construction. The sound aural protector shall be designed to meet all the requirements and tests specified herein and shall conform to figures 1 through 14.

3.4 Performance.

* 3.4.1 Sound attenuation. The sound attenuation of the aural protector shall be as specified in table I when measured as specified in 4.5.2.

3.5 Finish. Protective coating and finishes which will crack, chip or scale during normal service life or because of atmospheric conditions shall not be used.

* 3.6 Workmanship. The sound aural protector shall be uniform in quality and shall be free from irregularities or defects which could adversely affect safety, performance, reliability or durability.

3.7 Marking. The sound aural protector shall be marked in accordance with MIL-STD-130. The marking shall be applied once on the headpad support. The nomenclature of the marking shall be as follows:

AURAL PROTECTOR, SOUND
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Contract number
Manufacturer's name

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 specified herein. Except as otherwise specified, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless

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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 inspections. The examination and testing of the sound aural protectors shall be classified as follows:

- a. Qualification inspection. Qualification inspection consists of examinations and tests performed on samples submitted for approval as qualified products (see 3.1, 4.3 and 6.3).
- b. Quality conformance inspection. Quality conformance inspection consists of examinations and tests performed on individual products or lots to determine conformance of the product or lots with the requirements set forth in this specification (see 4.4).

4.3 Qualification inspection. Qualification inspection shall consist of all the tests and examinations listed in this specification.

* 4.3.1 Qualification samples. Qualification samples shall consist of three complete sound aural protectors for which qualification is required. Samples shall be forwarded to a test facility set forth in the letter of authorization to submit samples (see 6.3). The samples shall be plainly identified by securely attached durable tags marked with the following information:

Samples submitted by (name)(date) for qualification inspection in accordance with the requirements of MIL-A-23899B(AS) and number under authorization (reference authorizing letter and number)(see 6.3).

4.3.2 Retention. The retention of qualification shall consist of periodic verification to determine compliance of the qualified sound aural protectors with the requirements of this specification. The time and method of periodic verification shall be specified by the activity responsible for the qualified products list and shall be included in the Notice of Qualification letter.

4.4 Quality conformance inspection. The sampling and inspection levels and acceptance criteria shall conform to MIL-STD-105. Quality conformance inspection shall consist of the following:

Visual examination
Dimensional examination

4.4.1 Sampling.

4.4.1.1 Inspection lot.

4.4.1.1.1 Sound aural protector. An inspection lot size shall be expressed in units of sound aural protectors, made under essentially the same conditions and from the same materials and components. The sample unit shall be one sound aural protector.

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4.4.1.1.2 Packaging. An inspection lot size shall be expressed in units of one fully prepared shipping container, containing complete sound aural protector fully prepared for delivery and made from essentially the same materials and components. The sample unit shall be one fully prepared shipping container, containing sound aural protectors fully prepared for delivery, with the exception that it need not be sealed.

4.4.1.2 Sampling for tests and examinations of the sound aural protectors. The sample size, acceptance criteria, tests and examinations required for the sound aural protectors shall be as specified in table II.

4.5 Inspection methods.

4.5.1 Visual examination.

* 4.5.1.1 Sound aural protector. Each sound aural protector shall be examined visually to determine conformance to this specification. The classification of defects, table III, shall be used to classify the defects found.

* 4.5.1.2 Dimension. Each sound aural protector selected as a sample unit from the lot shall be thoroughly checked dimensionally to determine conformance to this specification.

* 4.5.1.3 Packaging. Each of the fully prepared shipping containers, containing sound aural protectors, selected as a sample unit from the lot, shall be visually examined to determine the packaging, packing and marking conform to this specification. The classification of defects, table IV, shall be used to classify the defects found.

* 4.5.2 Sound attenuation. The attenuation of the sound aural protector shall be measured in accordance with ASA Z24.22-1957. Attenuation will be tested at all test frequencies listed in table I. The grand mean and standard deviation at each test frequency shall be reported to the nearest 0.1 decibel. The sound aural protector shall pass the requirements specified in 3.4.1.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or C as specified (see 6.2.1c). Other than as specified in 5.1.1, no preservation shall be required.

5.1.1 Level A. The sound aural protectors shall be packaged individually in accordance with MIL-STD-794 utilizing a container conforming to PPP-B-566 or PPP-B-676.

5.1.2 Level C. The sound aural protectors shall be packaged to afford the minimum degree of protection necessary to prevent damage during shipment under environmental conditions and commercial modes of transportation.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.2.1c).

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5.2.1 Level A. Sound aural protectors, packaged as specified in 5.1.1, shall be packed in overseas exterior type container conforming to PPP-B-566, PPP-B-601, PPP-B-621 or PPP-B-636.

5.2.2 Level B. Sound aural protectors, packaged as specified in 5.1.1, shall be packed in domestic exterior type containers conforming to PPP-B-566, PPP-B-601, PPP-B-621 or PPP-B-636.

5.2.3 Level C. Intermediate packages that require overpacking for acceptance by carriers shall be packed in exterior type shipping containers in a manner that will insure safe transportation at the lowest rate to the point of delivery, and shall meet, as a minimum, the requirements of the rules and regulations applicable to the mode of transportation selected.

5.3 Marking. Unit packages, intermediate packages and shipping containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be:

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FSC 4240

6. NOTES

6.1 Intended use. The sound aural protectors covered by this specification are intended for protection against noise encountered by flight deck crews during flight operations on aircraft carriers and by all personnel engaged in activities involving exposure to hazardous noises.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Quantity to be furnished.
- c. Applicable levels of packaging and packing (see 5.1 and 5.2).

* 6.2.2 Data requirements. For information of contractors and contracting officers, any of the data specified in applicable documents listed in section 2 of this specification or referenced lower-tier documents need not be prepared for the Government and shall not be furnished to the Government unless specified in the contract or order. The data to be furnished shall be listed on DD Form 1423 (Contractor Data Requirements List), which shall be attached to and made a part of the contract or order.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date.

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The attention of the contractors is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Commander, Naval Air Systems Command, Department of the Navy, Washington, D.C. 20360; however, information pertaining to the qualification of products may be obtained from the Commander, Naval Air Development Center, Warminster, PA 18974, Attention: Code 6031. Prior to submission of the samples for qualification inspection, the manufacturer shall submit a request to the Naval Air Development Center, Code 6031, indicating a date on which samples can be forwarded and also request an authorization number to accompany the samples.

* 6.4 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. 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 and relationship to the last previous issue.

Preparing activity
Navy - AS
(Project 4240-N811)

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Table I. Sound attenuation requirements.

Group	Test frequencies (Hertz)	Minimum Group Attenuation 1/ (Decibels)
A	125 250	35
B	500 1000 2000 3000 4000	185
C	6000 8000	60

1/ The minimum group attenuation is the sum of the attenuation measured for the test frequencies contained in that group. The acceptable minimum sound attenuation for each of the single test frequencies contained in Group A shall be 14 decibels for 125 Hz and 250 Hz, Group B shall be 25 decibels for 500 Hz and 35 decibels for 1000, 2000, 3000 and 4000 Hz.

Table II. Sample size, acceptance criteria, tests and examination of the sound aural protector.

Inspection	Method Paragraph	Sample size	Acceptance Criteria
Visual examination	4.5.1.1	Every unit for major defects. Inspection level II for minor defects.	Reject all units with any major defects. An acceptable quality level of 15 defects per 100 units for minor defects.
Dimensional	4.5.1.2	Inspection level S-2	An acceptable quality level of 2.5 defects per 100 units.
Packaging	4.5.1.3	Inspection level S-2	An acceptable quality level of 2.5 defects per 100 units.

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Table III. Classification of defects for visual examination of the sound aural protector.

Defects	Major	Minor
Any characteristic not in accordance with specified requirements.	X	
Any hole, cut, tear, rip, brittle area or crack in the headpad, dome seal or dome filler.	X	
Any component missing, cracked or broken, malformed or not functioning properly.	X	
Any components improperly assembled or brazed.	X	
Any sharp edges or burrs and damaged or stripped threads.	X	
Scratched, scuffed or abraded areas on dome surface.		X
Marking missing, incorrect, incomplete, illegible, misplaced or not as specified.		X

Table IV. Classification of defects for packaging.

Examine	Defects
Markings	Omitted, incorrect, illegible; improper size, location, sequence or method of application.
Materials	Any component missing; any component damaged, affecting serviceability.
Workmanship	Inadequate application of components such as incomplete closure of case liners, container flaps, loose strapping or inadequate stapling; bulging or distortion of containers.
Exterior & interior weight or content	Number of intermediate packages is more or less than required; gross or net weight exceed requirements.

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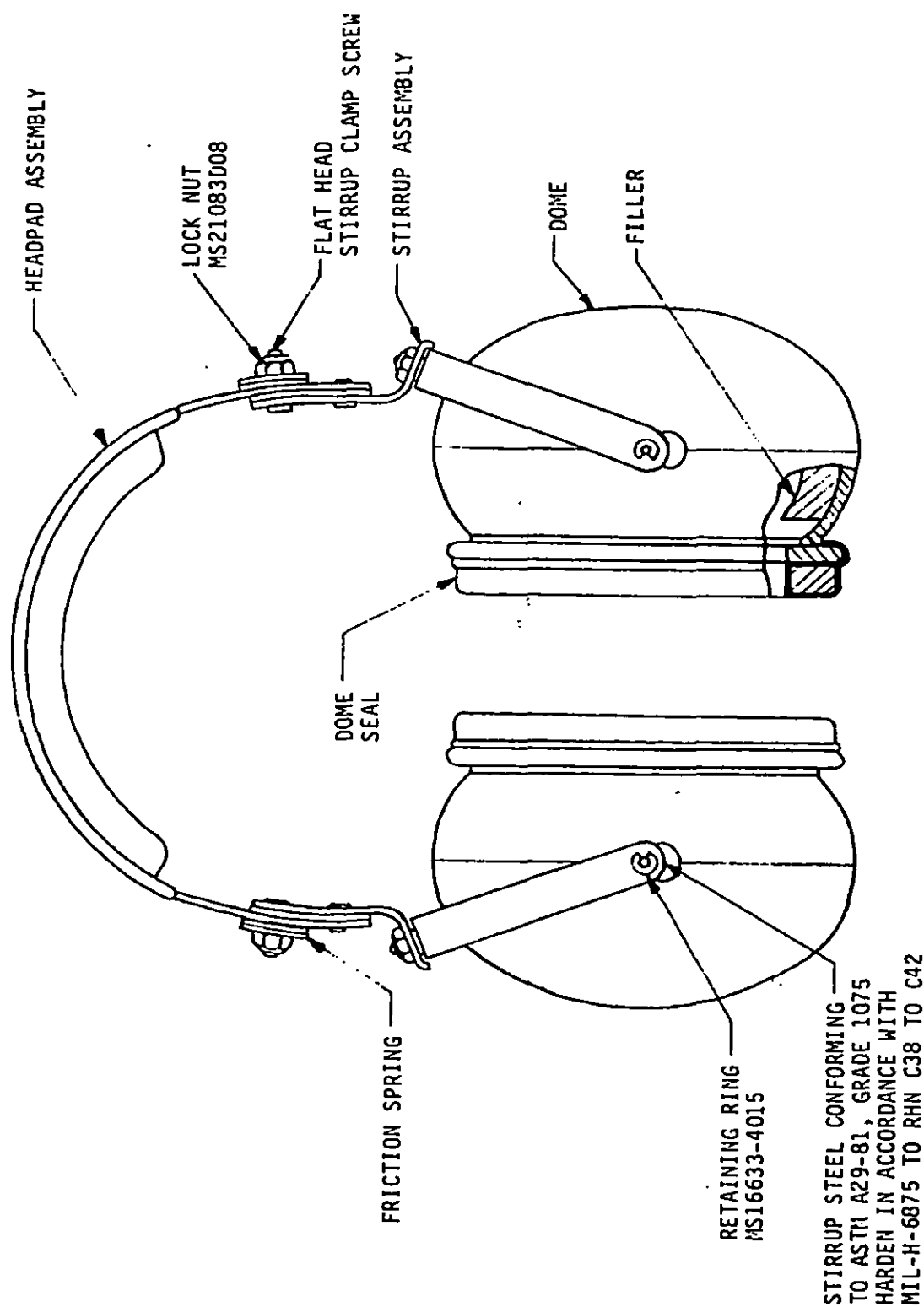
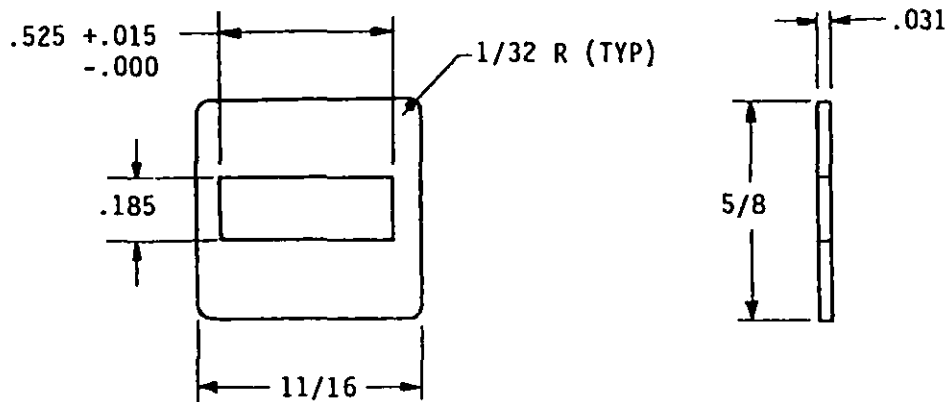


FIGURE 1. Sound aural protector.

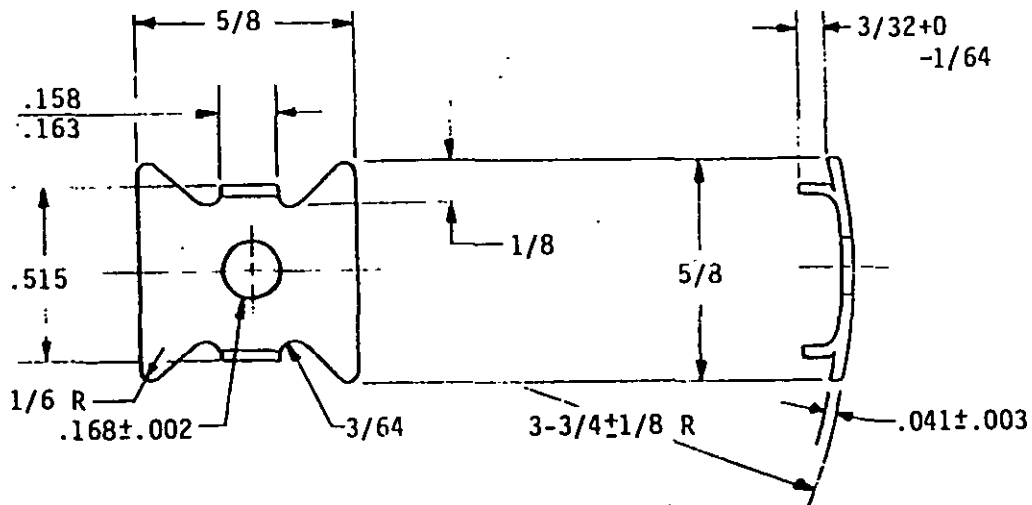
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MATERIAL: MOLYBDENUM IMPREGNATED NYLON, DARK GRAY

DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS $\pm 1/64$, DECIMALS $\pm .005$

FRICTION SPRING LINER

MATERIAL: STEEL, PER MIL-S-7947, CLASS A, HARDEN TO ROCKWELL C40-45, SPRING TEMPER MIL-H-6875

FINISH: NICKEL PLATE IN ACCORDANCE WITH QQ-N-290 (CLASS I, TYPE IV (QS))
CHROME PLATE IN ACCORDANCE WITH QQ-C-320 (CLASS I, TYPE I)

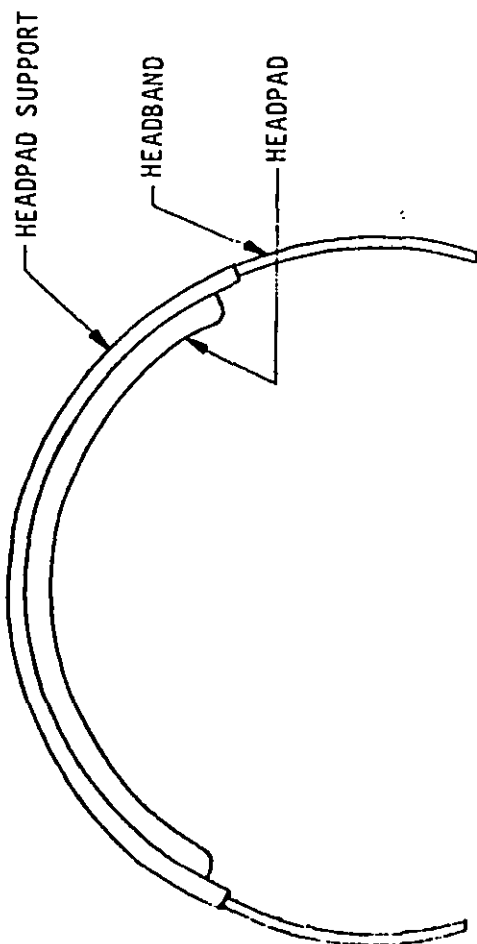
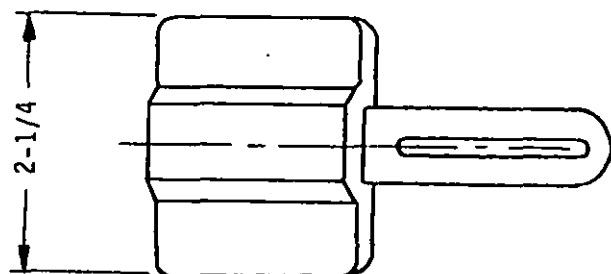
DIMENSIONS IN INCHES

UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS $\pm 1/64$ DECIMALS $\pm .005$

FRICTION SPRING

FIGURE 2. Details.

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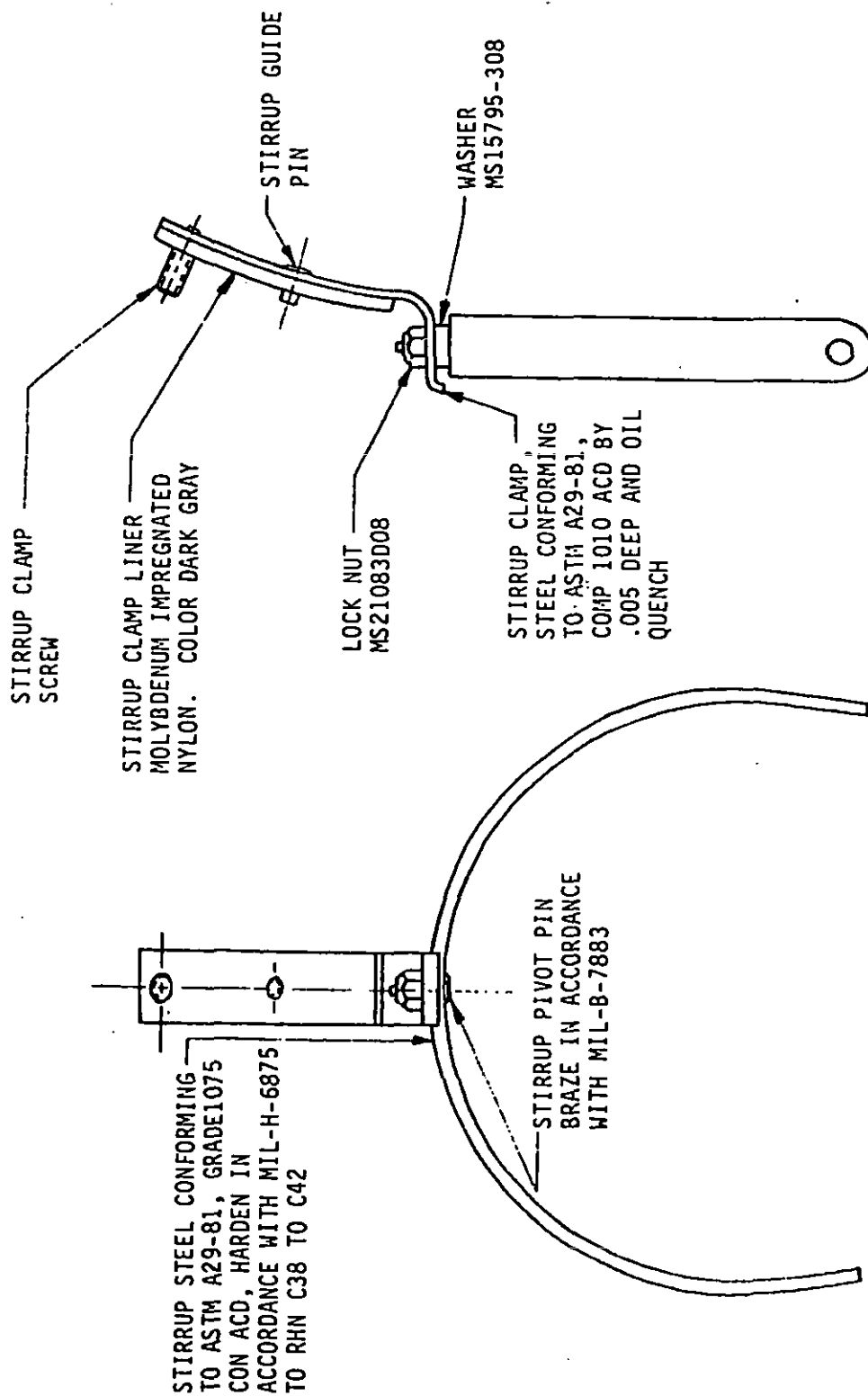


DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS $\pm 1/16$

FIGURE 3. Headband assembly.



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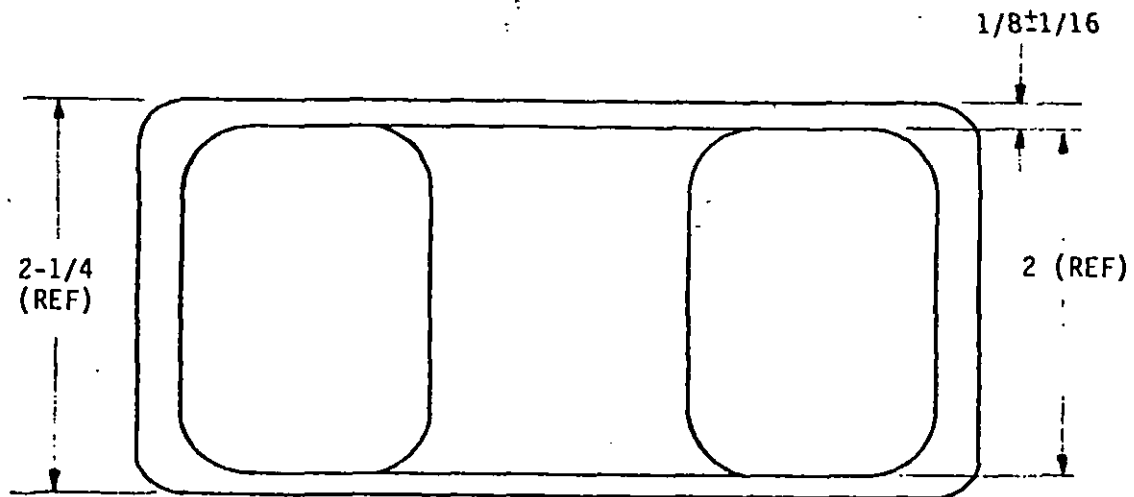
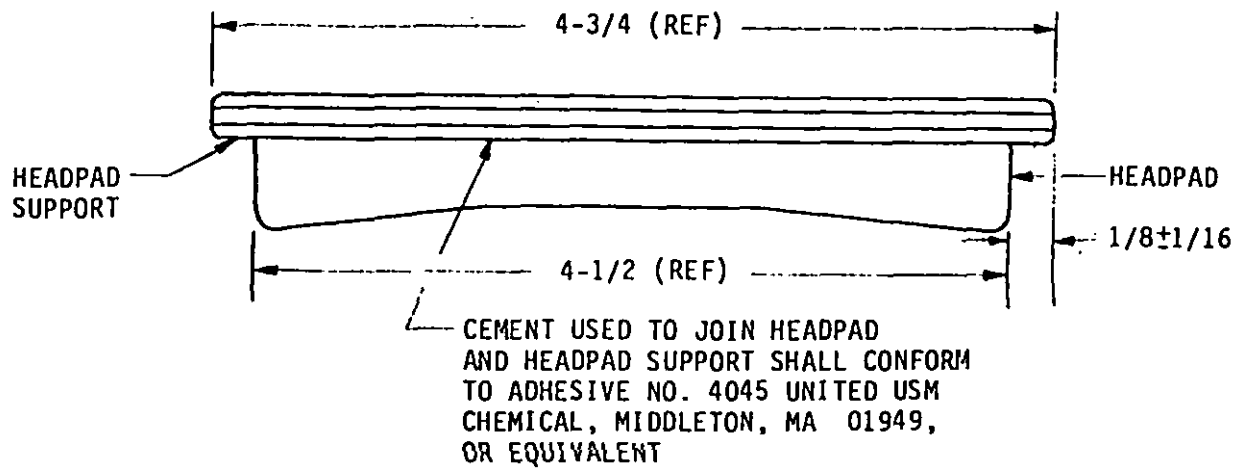


FINISH: NICKEL PLATE IN ACCORDANCE WITH QQ-N-290 (CLASS I, TYPE IV (QS))
CHROME PLATE IN ACCORDANCE WITH QQ-C-320 (CLASS I, TYPE I)

DIMENSIONS IN INCHES

FIGURE 5. Stirrup assembly.

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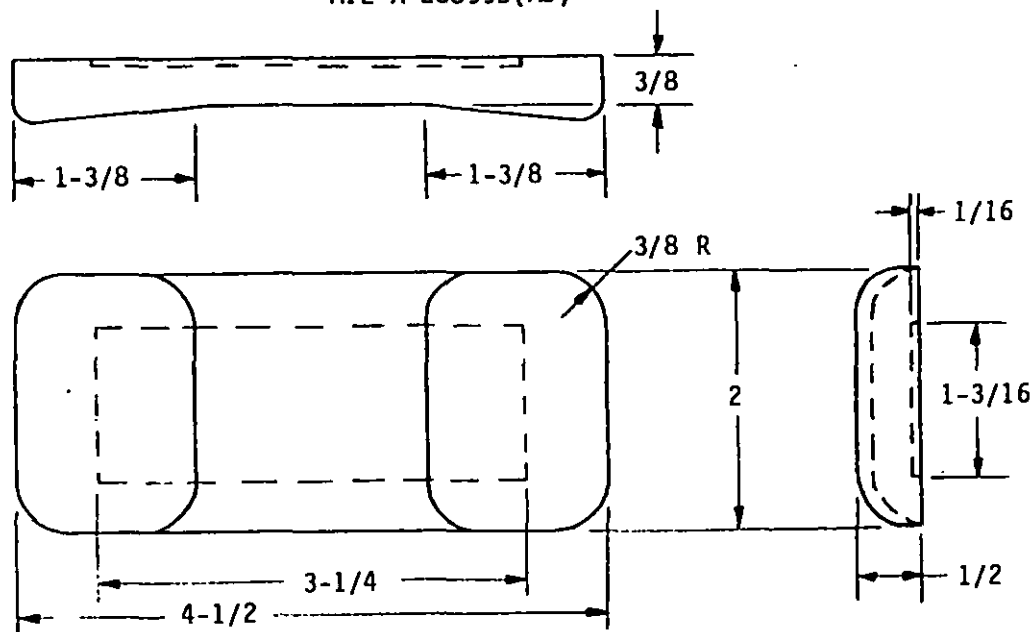


DIMENSIONS IN INCHES

NOTE: SEE FIGURE 9 FOR ALTERNATE METHOD OF MANUFACTURE

FIGURE 7. Headpad assembly.

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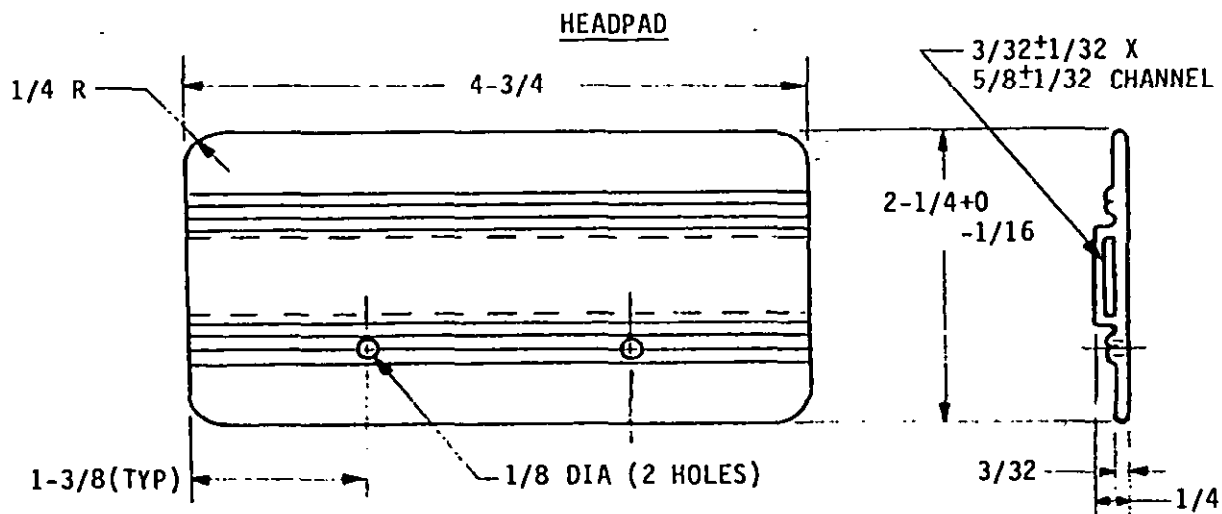


MATERIAL: VINYL FOAM, CLOSED CELL P/N 78X873 STANLEY
CHEMICAL INC. EAST BERLIN, CONN. 06023

COLOR: 36231 OF FED-STD-595

FIRMNESS: SHALL READ 30 ± 10 WHEN MEASURED ON THE VERY CENTER OF THE
HEADPAD (SIDE THAT RESTS ON THE HEAD) WITH A PANDU
MODEL 302S SPONGE RUBBER GUAGE

DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES $\pm \frac{1}{8}$



MATERIAL: POLYVINYLCHLORIDE, P/N 120-232, NEW ENGLAND
TAPE CO. HUDSON, MA 01749

HARDNESS: SHORE "00" 90-95

COLOR: 70188 OF FED-STD-595

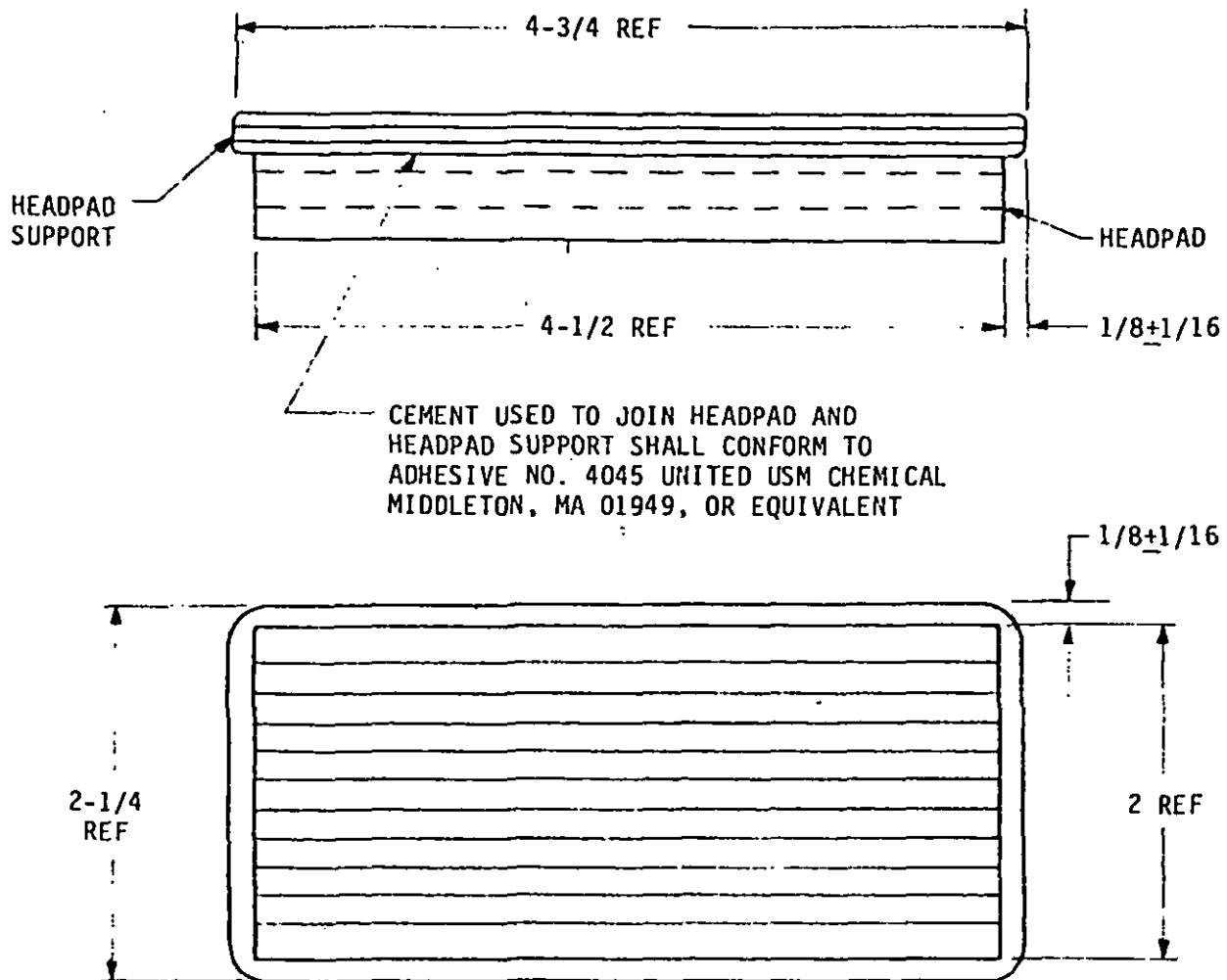
DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES $\pm \frac{1}{16}$

HEADPAD SUPPORT

NOTE: SEE FIGURE 10 FOR ALTERNATE METHOD OF MANUFACTURE FOR HEADPAD

FIGURE 8. Headpad details.

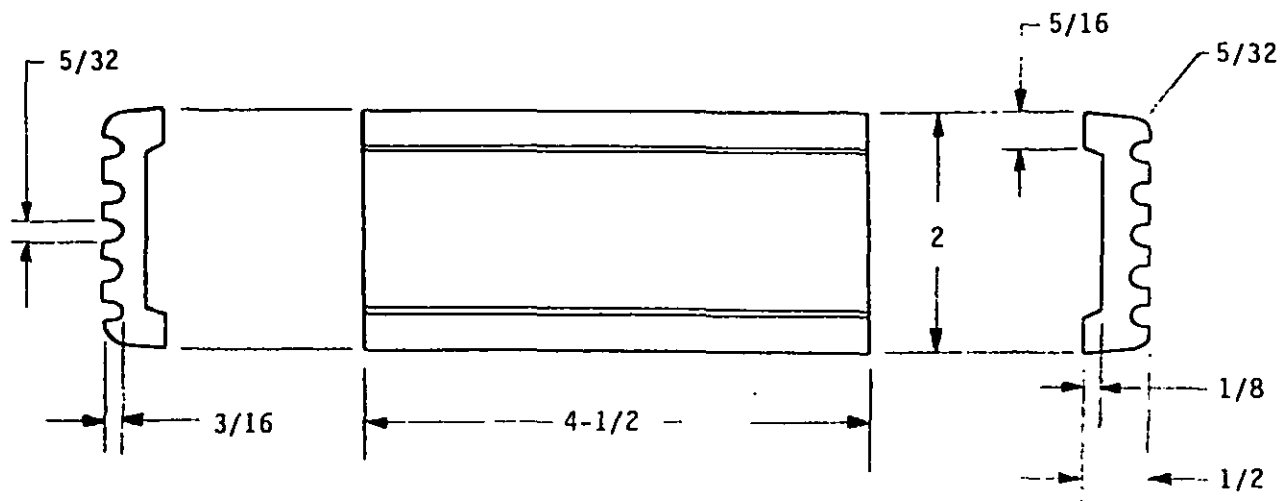
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DIMENSIONS IN INCHES

* FIGURE 9. Headpad assembly (alternate method of manufacture).

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MATERIAL: POLYVINYLCHLORIDE FOAM, EXTRUDED CLOSED CELL,
P/N R-1932-H, RUBATEX CORPORATION, BEDFORD, VA 24523

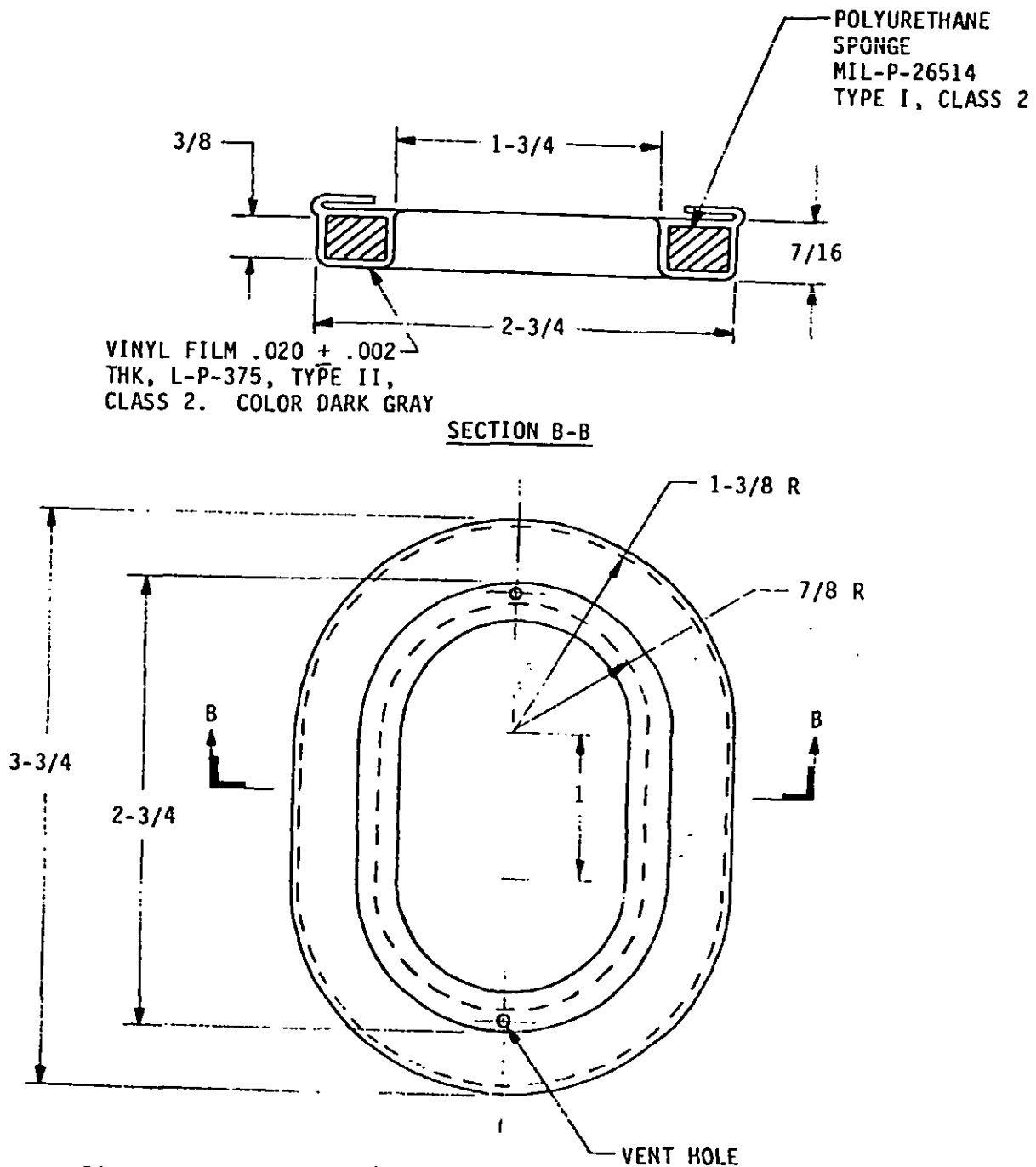
COLOR: BLACK

FIRMNESS: SHALL READ 30 ± 10 WHEN MEASURED ON THE VERY CENTER OF
THE HEADPAD RIB (SIDE THAT RESTS ON THE HEAD) WITH A
SHORE INSTRUMENT MFG. CO. INC. DUROMETER HARDNESS TYPE 00

DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES $\pm 1/8$

*FIGURE 10. Headpad details (alternate method of manufacture).

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DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS $\pm 1/16$

FIGURE 11. Dome seal.

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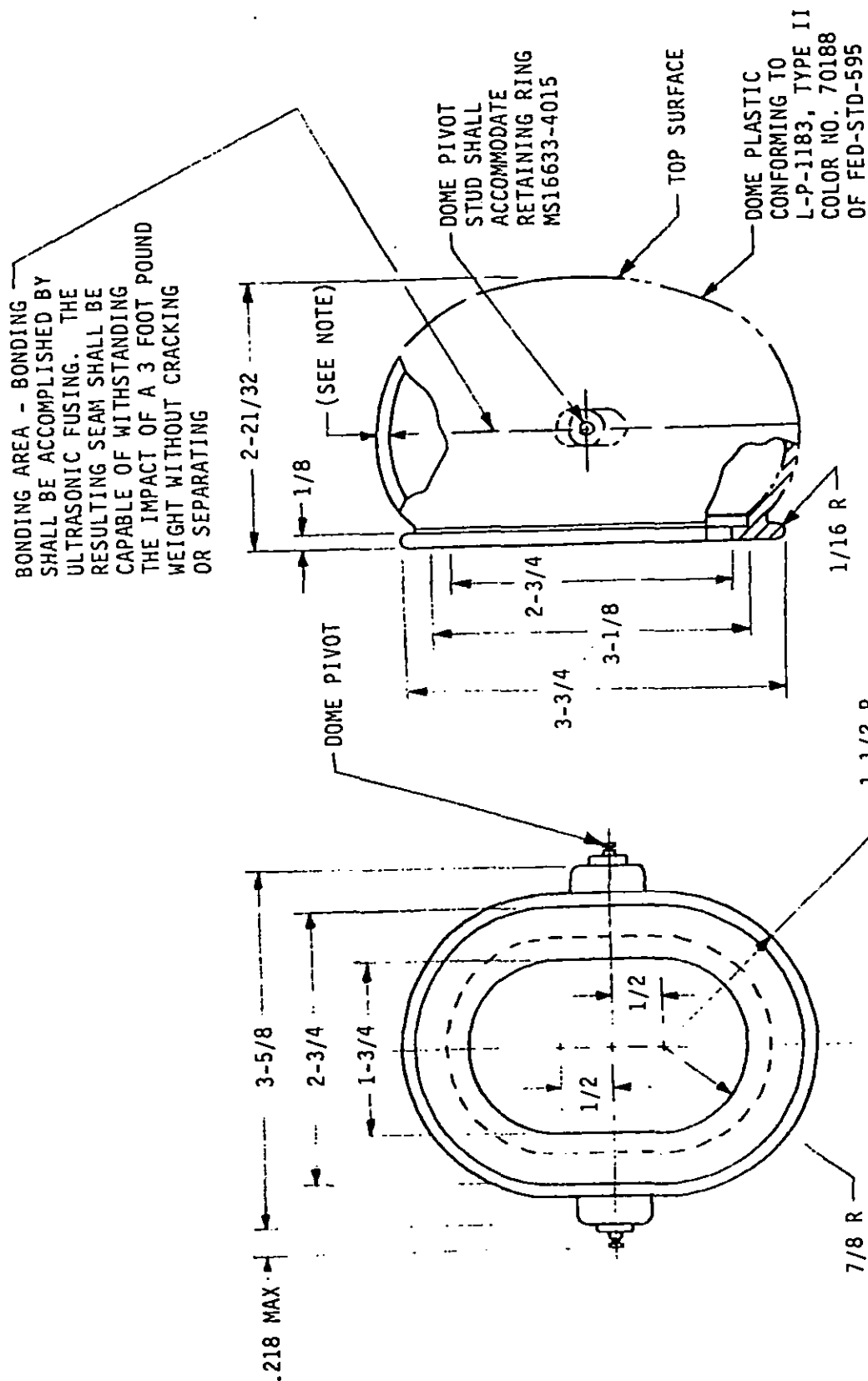


FIGURE 12. Dome.

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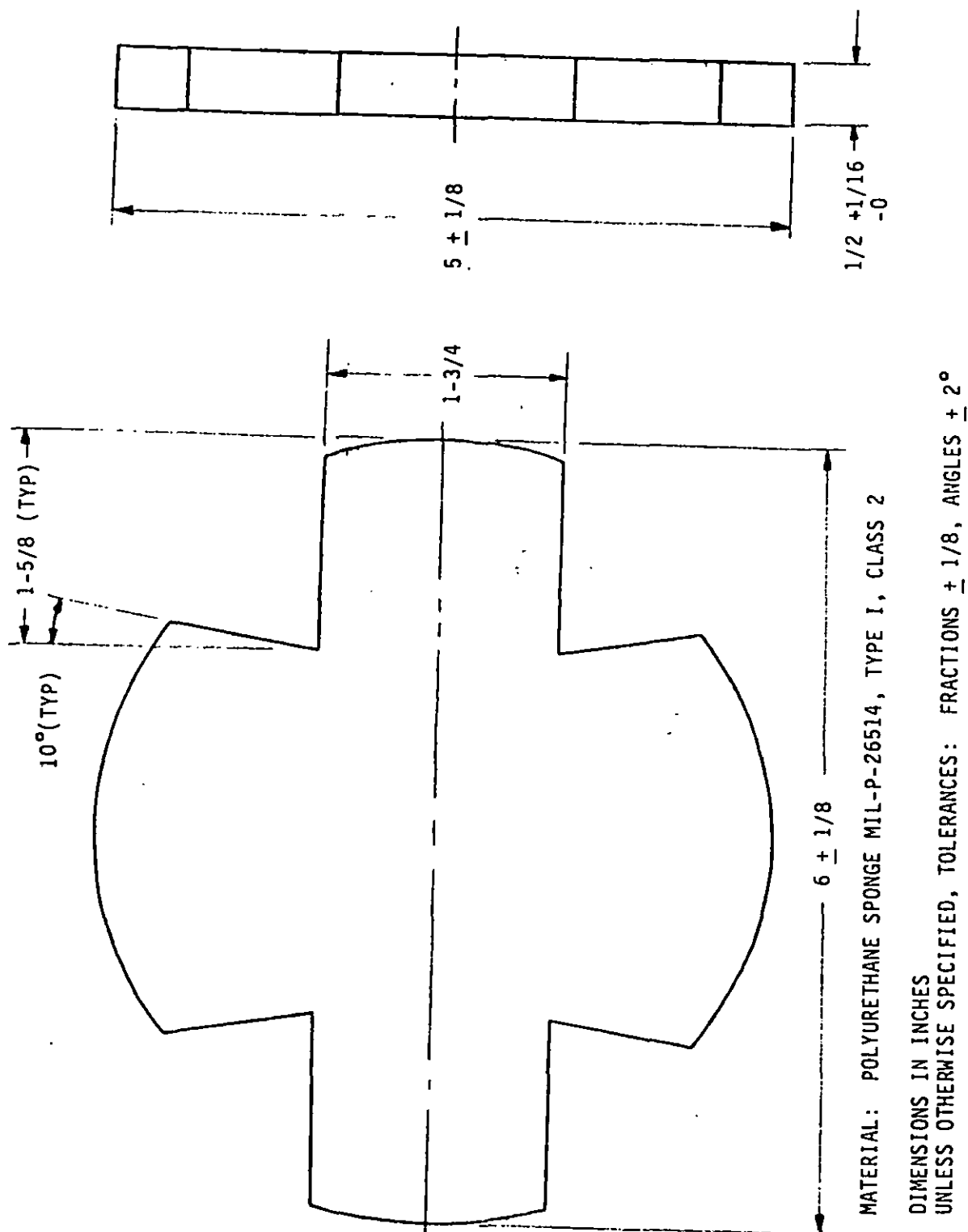
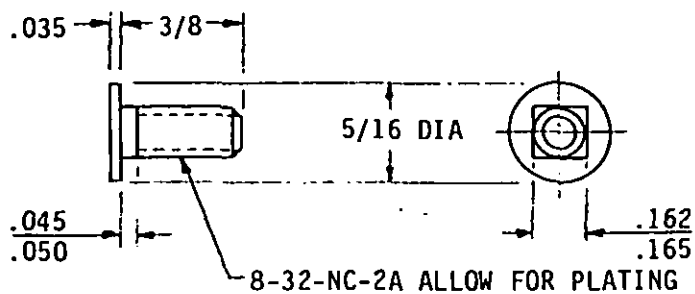
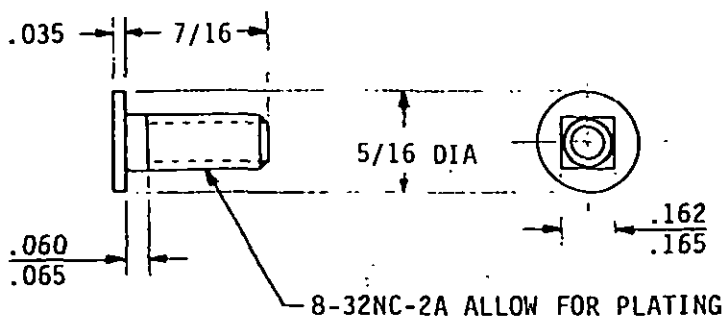


FIGURE 13. Dome filler.

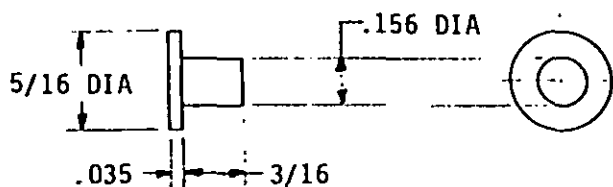
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STIRRUP PIVOT PIN

MATERIAL: STEEL, ASTM A29-81, COMP 1020, COND CD

STIRRUP CLAMP SCREW

MATERIAL: STEEL, ASTM A29-81, COMP 1020, COND CD

STIRRUP GUIDE PIN

MATERIAL: STEEL, ASTM A29-81, COMP 1020, COND CD

FOR ALL DETAILS, DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS $\pm 1/64$, DECIMALS $\pm .005$

FIGURE 14. Details.

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (**DO NOT STAPLE**), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-A-238998(AS)		2. DOCUMENT TITLE Aural Protector. Sound	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	