SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE STANDARD

SAE AS23899

Issued 1999-05

Aural Protector, Sound

FSC 4240

NOTICE

This document has been taken directly from U.S. Military Specification MIL-A-23899B(AS) and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-A-23899B(AS). Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8510 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

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
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, Nickel 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

2.1.1 (Continued):

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

(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.

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
MIL-A-23899B(AS)
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 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.

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).

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:

AURAL PROTECTOR, SOUND
MIL-A-23899B(AS)
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.

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 qualifcation 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 This paragraph was deleted as it did not pertain to the converted SAE document.

Table I. Sound attenuation requirements.

Group	Test frequencies (Hurtz)	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.

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.

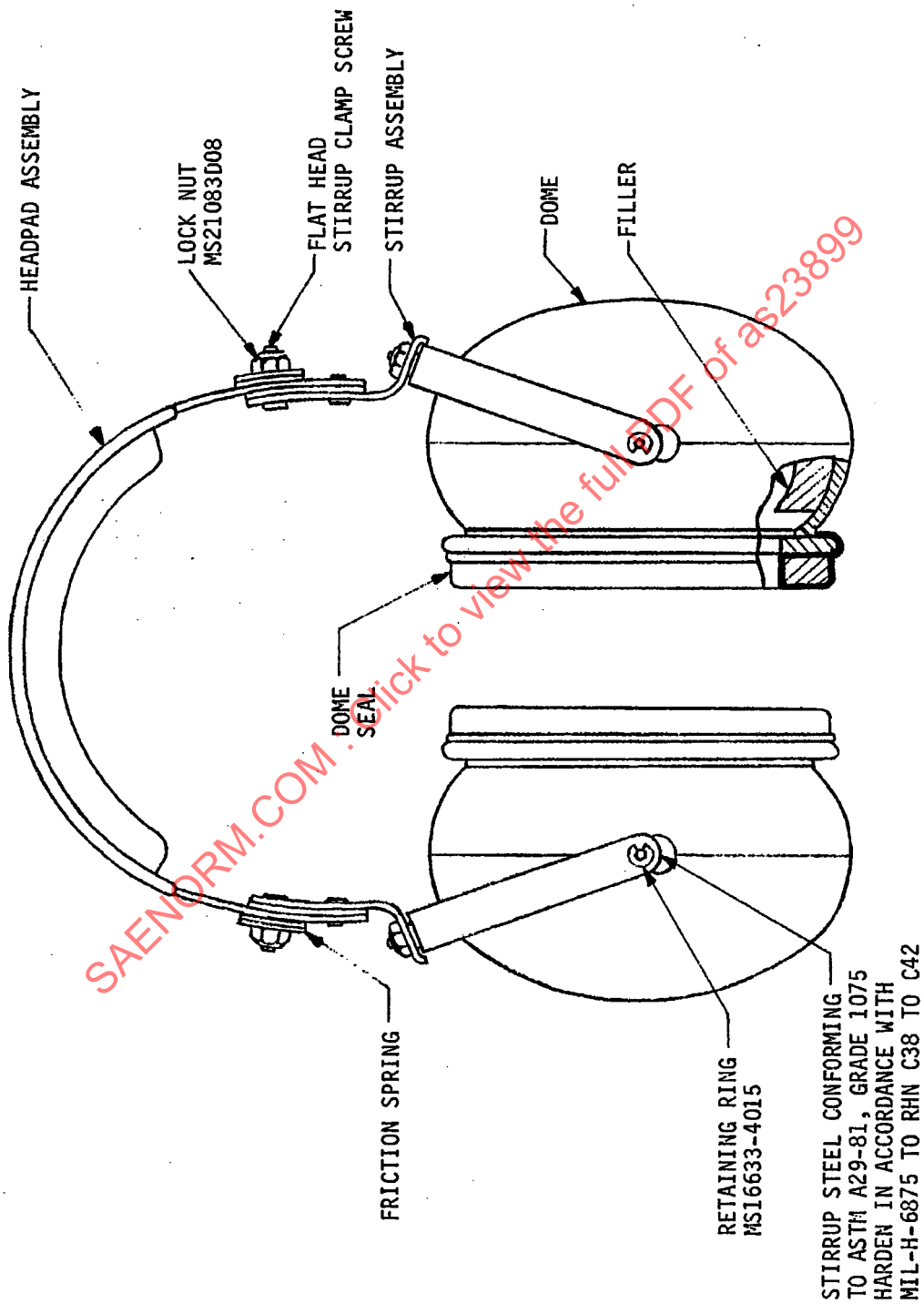
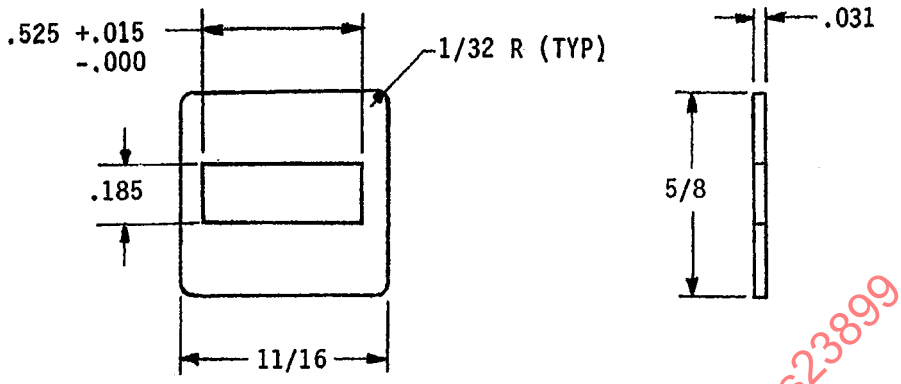


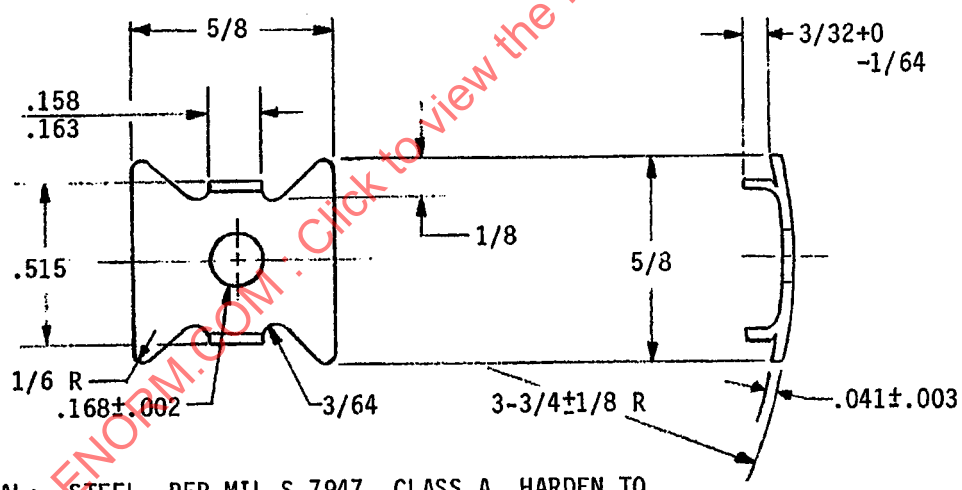
FIGURE 1. Sound aural protector.



MATERIAL: MOLYBDENUM IMPREGNATED NYLON, DARK GRAY

DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS ±1/64, DECIMALS ±.005

FRICTION SPRING LINER



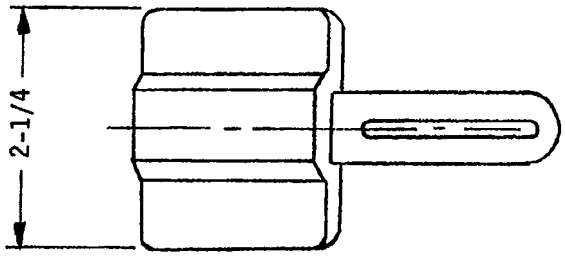
MATERIAL: STEEL, PER MIL-S-7947, CLASS A, HARDEN TO
ROCKWELL C40-45, SPRING TEMPER MIL-H-6875

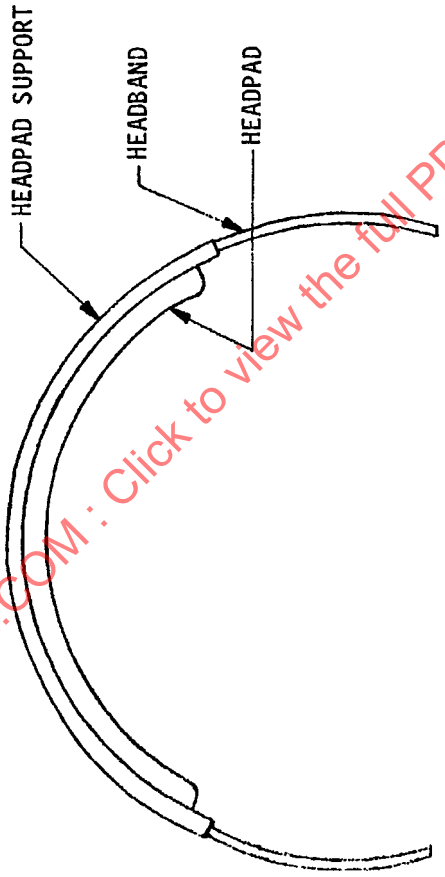
FINISH: NICKEL PLATE IN ACCORDANCE WITH QQ-N-290 (CLASS I, TYPE IV (QS))
CHROME PLATE IN ACCORDANCE WITH QQ-C-320 (CLASS I, TYPE I)

DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS ±1/64 DECIMALS ±.005

FRICTION SPRING

FIGURE 2. Details.





DIMESIONS IN INCHES
UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS ± 1/16

FIGURE 3. Headband assembly.

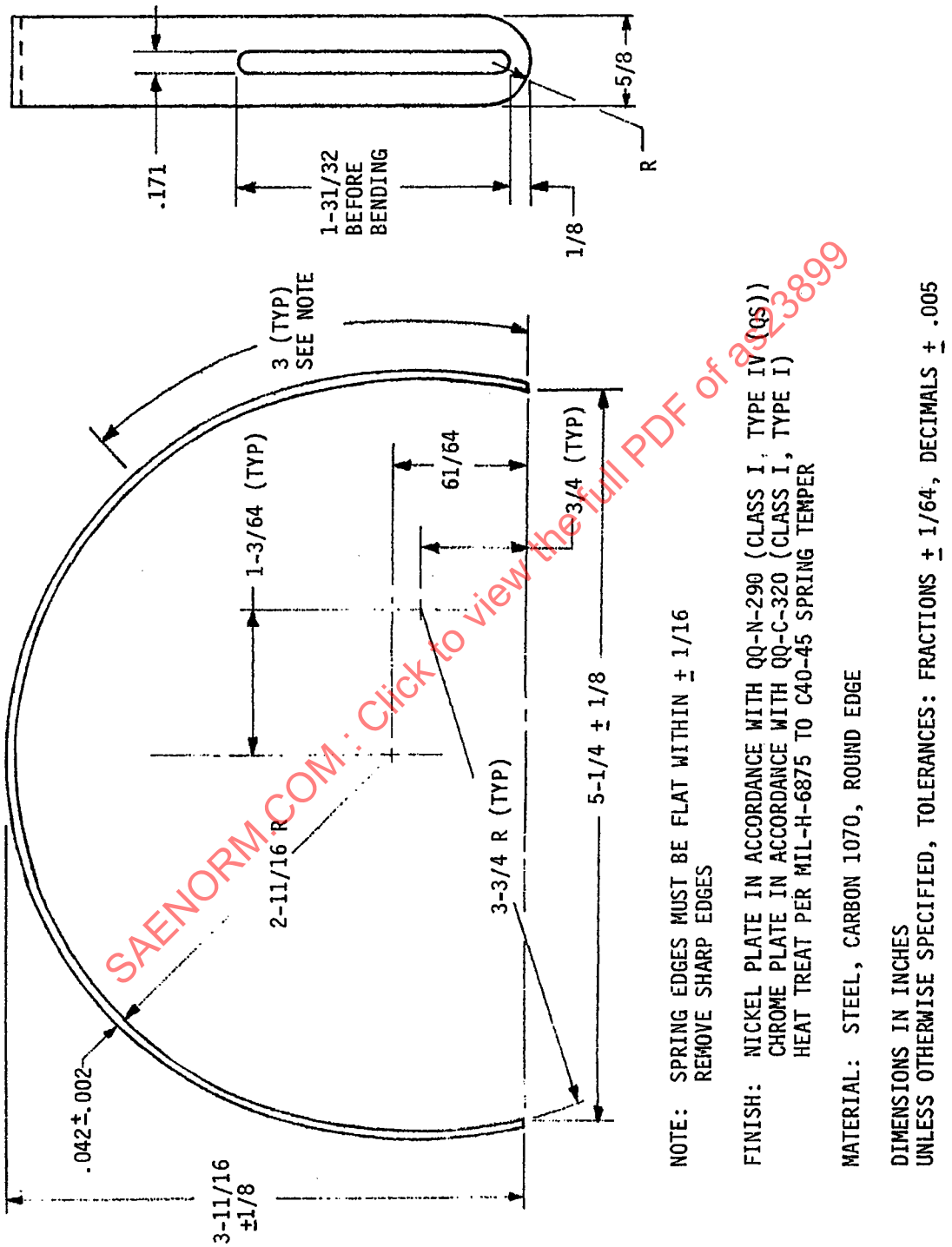


FIGURE 4. Headband.

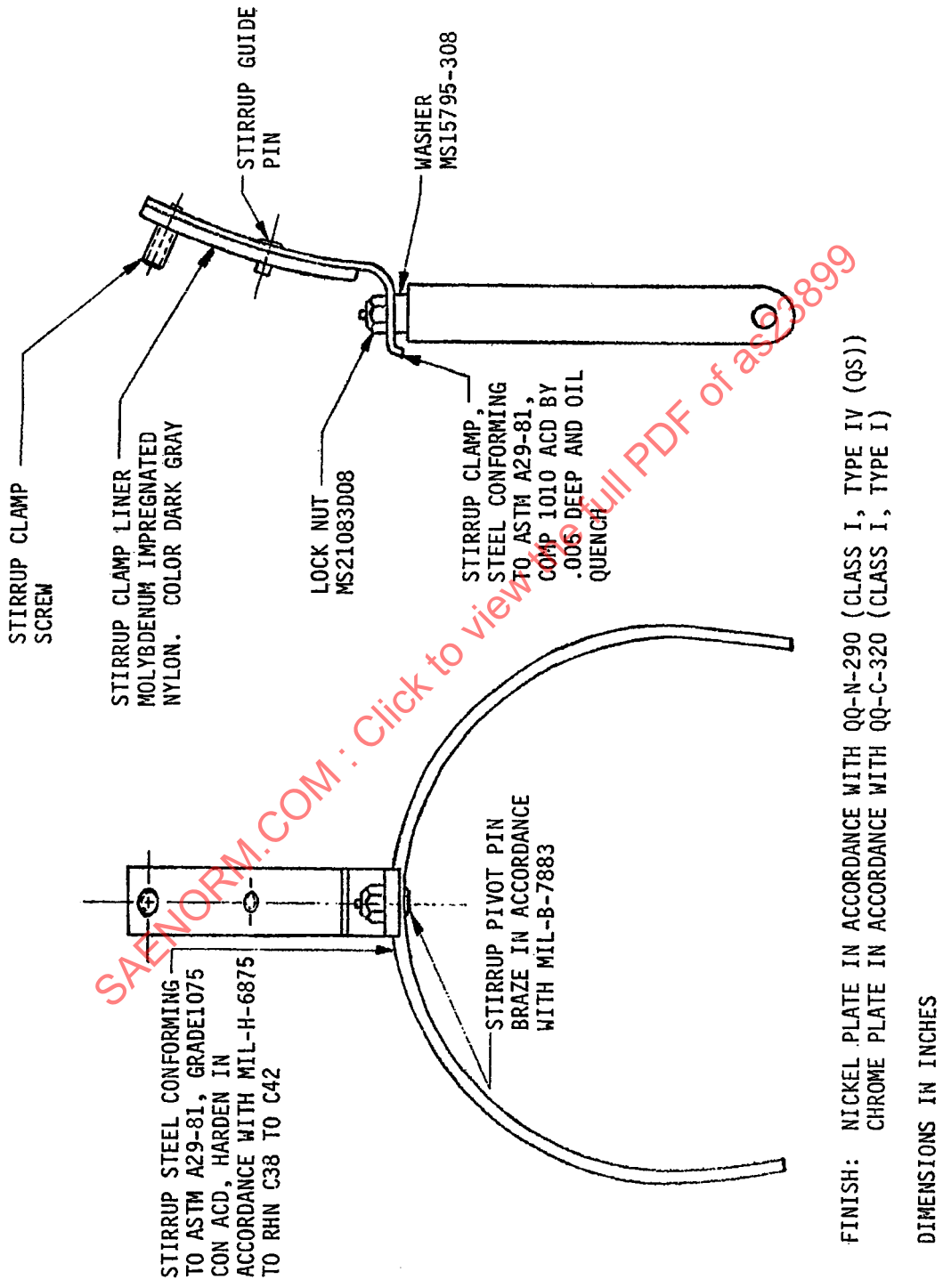


FIGURE 5. Stirrup assembly.

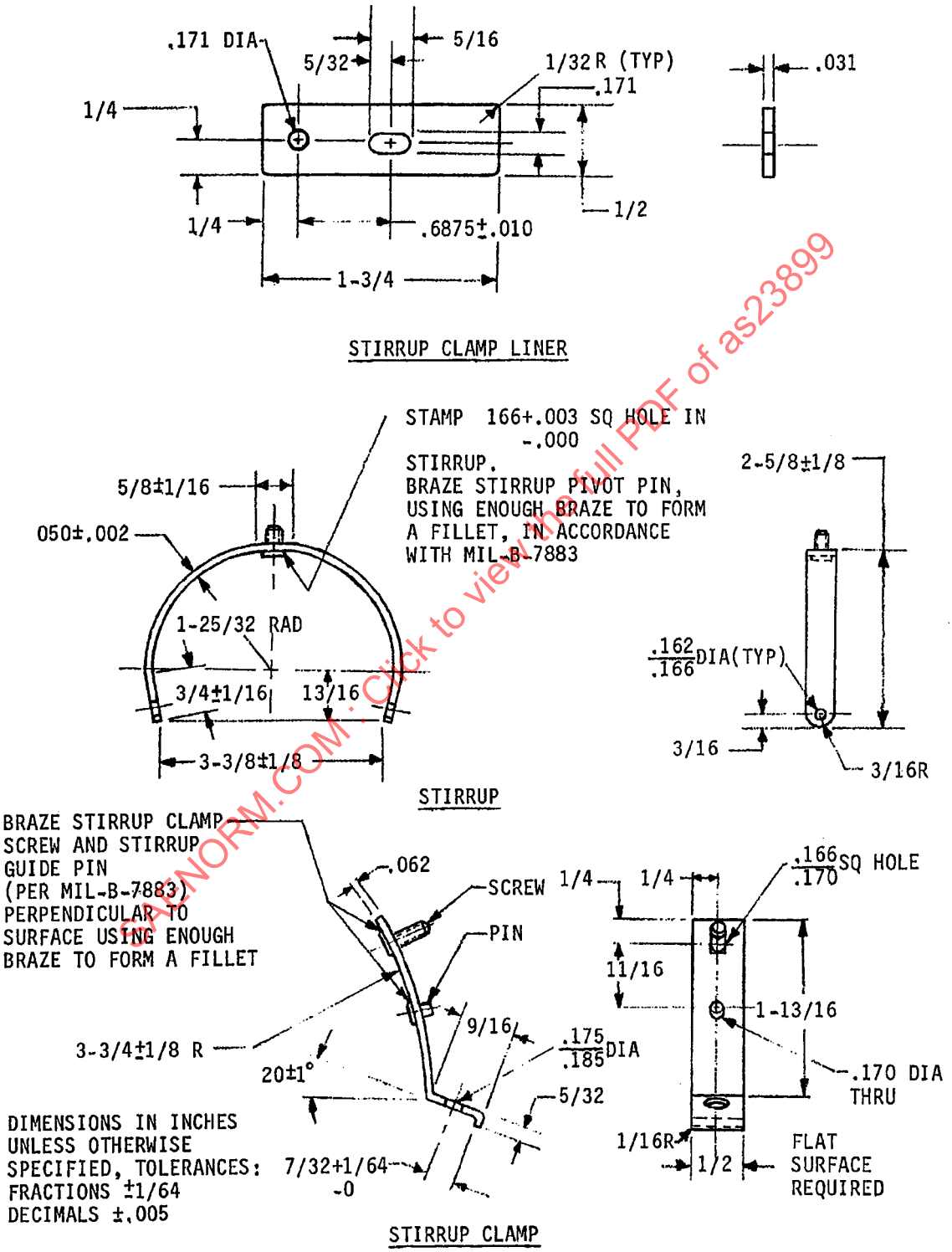
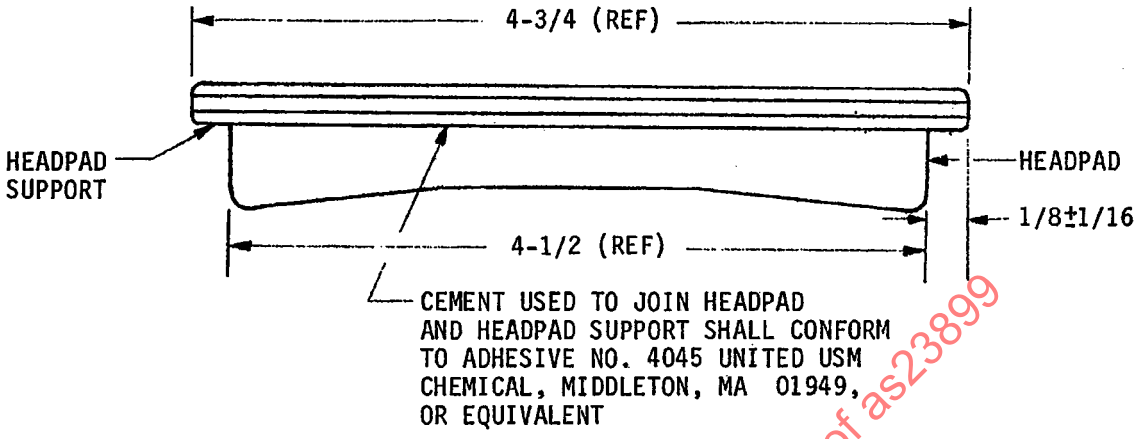
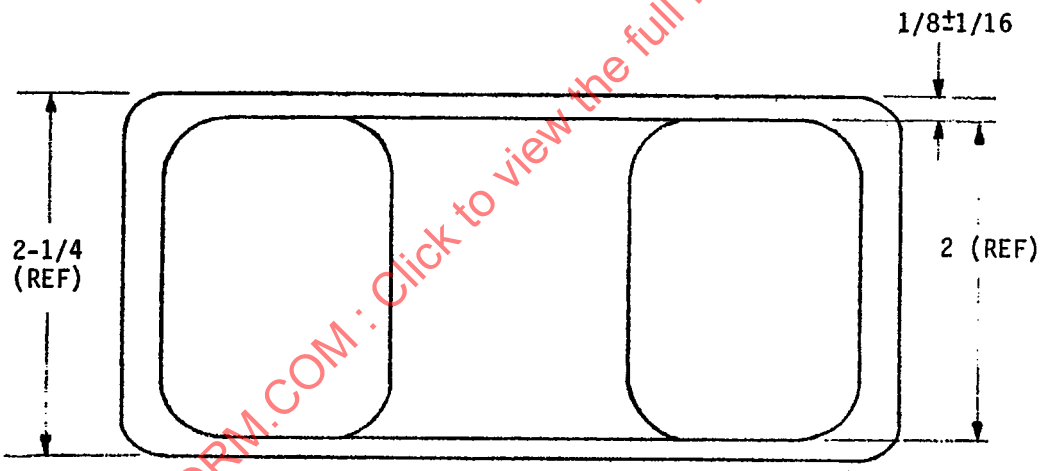


FIGURE 6. Stirrup details.

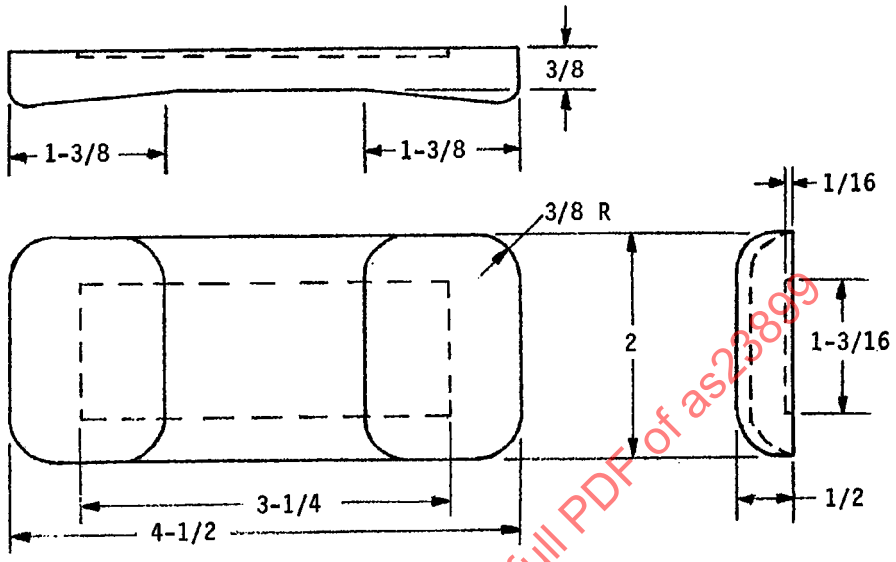




DIMENSIONS IN INCHES

NOTE: SEE FIGURE 9 FOR ALTERNATE METHOD OF MANUFACTURE

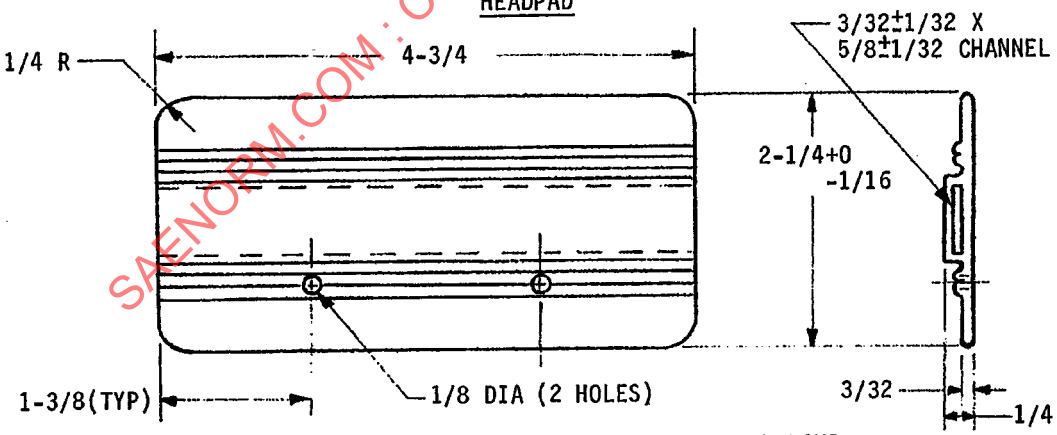
FIGURE 7. Headpad assembly.



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 ±1/8

HEADPAD



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 ±1/16

HEADPAD SUPPORT

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

FIGURE 8. Headpad details.

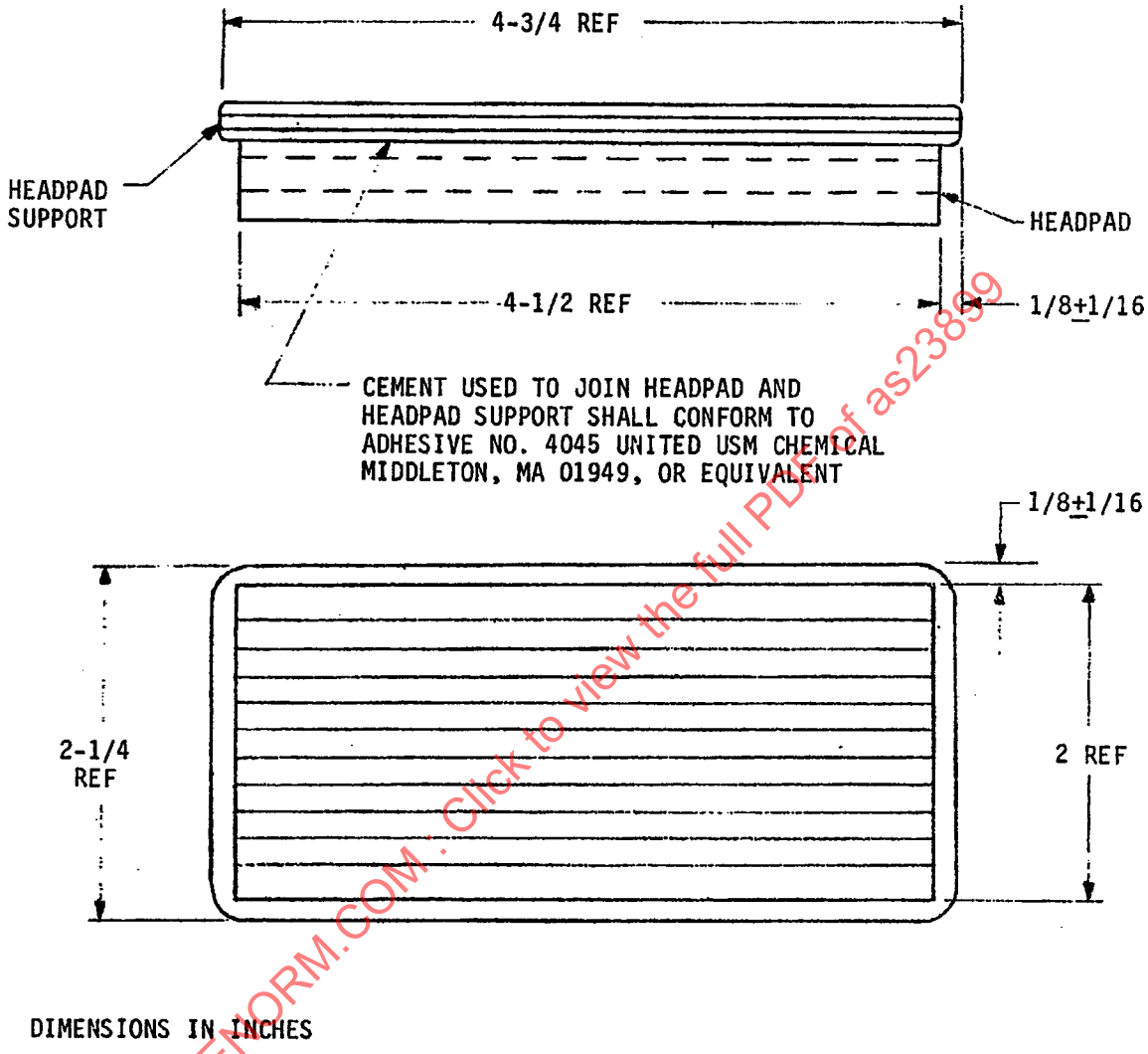


FIGURE 9. Headpad assembly (alternate method of manufacture).