

INCH-POUND

MIL-DTL-12632E

25 April 2016

SUPERSEDING

MIL-L-12632D

10 June 1974

## DETAIL SPECIFICATION

LOUDSPEAKERS, PERMANENT MAGNET (ENCASED, 2-WATT, FUNGUS-,  
GUNBLAST-, AND IMMERSION-RESISTANT),  
GENERAL SPECIFICATION FOR

Inactive for new design after 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 the general requirements for 2-watt, 4-inch diameter, permanent magnet loudspeakers encased in metal cabinets. These loudspeakers are fungus-, gunblast-, and immersion-resistant.

1.2 Classification. Loudspeakers should be of the following types, as specified (see 3.1 and 6.1):

Type

LS-590( )/U

LS-166/U

LS-454/U

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 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 and 4 of this specification, whether or not they are listed.

Since Navy-EC is the Navy custodian for this document, all Navy review activities should forward their comments directly to DLA Land and Maritime. Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any data that may improve this document should be sent to: DLA-CC, DLA Land and Maritime, ATTN: VAI, P.O. Box 3990, Columbus, Ohio 43218-3990 or emailed to [sound@dsccl.dla.mil](mailto: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

FSC 5965



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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 SPECIFICATIONS

- |                |  |
|----------------|--|
| MIL-PRF-27     | - Transformers and Inductors (Audio, Power, and High-Power Pulse), General Specification For.  |
| MIL-T-152      | - Treatment, Moisture and Fungus-Resistant, of Communications, Electronic, and Associated Electrical Equipment.  |
| MIL-DTL-3786/5 | - Switch, Rotary, Open Construction, .200 Ampere, Style SR05.  |
| MIL-DTL-3885   | - Cable Assemblies and Cord Assemblies, Electrical.  |
| MIL-L-3891     | - Luminescent Material and Equipment (Nonradioactive).   |
| MIL-DTL-12606  | - Loudspeaker, Permanent Magnet (Unencased, 3-Inch and 4-Inch Diameter Cone, 2-Watt; Fungus-, and Immersion-Resistant), Type LS-445/U, M12606-01, and M12606-02. |
| MIL-DTL-14072  | - Finishes for Ground Based Electronic Equipment.  |

## DEPARTMENT OF DEFENSE STANDARDS

## FEDERAL

- |                   |  |
|-------------------|--|
| FED-STD-H28       | - Screw-Thread Standards for Federal Services. |
| FED-STD-595/24084 | - Green, Semigloss.                            |

## MILITARY

- |                 |   |
|-----------------|---|
| MIL-STD-130     | - Identification Marking of U.S. Military Property. |
| MIL-STD-202     | - Electronic and Electrical Component Parts.        |
| MIL-STD-202-101 | - Method 101, Salt Atmosphere (Corrosion).          |
| MS35426         | - Nut, Plain, Wing, UNF-2B.                         |

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

2.3 Non-Government publications. The following documents from 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.

## AEROSPACE INDUSTRIES ASSOCIATION (AIA)

- |                   |   |
|-------------------|---|
| AIA/NAS NASM35206 | - Screw, Machine, Pan Head, Cruciform Recess, Carbon Steel, UNC-2A. |
| AIA/NAS NASM35333 | - Washer, Lock, Flat, Internal Tooth.                               |
| AIA/NAS NASM35338 | - Washer, Lock-Spring, Helical, Regular (Medium) Series.            |
| AIA/NAS NASM91524 | - Knob, Control, Short Bar, Metal and Plastic                       |

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

## ASTM INTERNATIONAL

- |          |  |
|----------|--|
| A27/A27M | - Steel Castings, Carbon, for General Application. |
| A108     | - Steel Bars, Cold-Finished, Standard Quality.     |
| B85/B85M | - Aluminum-Alloy Die Casting.                      |

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

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## INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 10012 - Measurement Management Systems - Requirements for Measurement Processes and Measuring Equipment.

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

## IPC - ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES

- J-STD-004 - Requirements for Soldering Fluxes.  
 J-STD-005 - Requirements for Soldering Pastes-Replaces QQ-S-571  
 J-STD-006 - Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications.

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

## NCSL INTERNATIONAL

- NCSL Z540.3 - Requirements for the Calibration of Measuring and Test Equipment

(Copies of these documents are available from <http://www.ncsli.org> .

## SAE INTERNATIONAL

- AMS 3202M - Butadiene Acrylonitrile (NBR) Rubber Dry Heat Resistant 55 - 65.

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

2.4 Order of precedence. Unless otherwise noted herein or the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern (see 6.1).

3.2 First article. Loudspeakers furnished under this specification shall be products which have been tested and have passed the first article inspection specified (see 4.5).

3.3 Materials. Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the loudspeakers to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.3.1 Aluminum. Aluminum shall conform to alloy 413 of ASTM B85/B85M.

3.3.2 Solder. Solder shall be solid or rosin flux cored in accordance with composition Sn97Pb3 of J-STD-004, J-STD-005, and J-STD-006.

3.3.2.1 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of loudspeaker 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).

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3.3.3 Adhesives. Water soluble adhesives shall not be used.

3.3.4 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.

3.4 Design and construction.

3.4.1 Loudspeaker unit. The loudspeaker unit shall be type LS-445/U in accordance with MIL-DTL-12606.

3.4.2 Cabinet assembly. The cabinet assembly (see [figure 1](#)) shall be of the design, construction, and physical dimensions shown on figures 1A through 1G.

3.4.3 Cable and cord assemblies. Cable and cord assemblies shall conform to MIL-DTL-3885 (see [3.1](#)).

3.4.4 Audio transformers. Audio transformers shall be grade 4, class R, family 21, in accordance with MIL-PRF-27 (see [3.1](#)).

3.4.5 Rotary switch. The rotary switch shall conform to MIL-DTL-3786/5; type SR05 N 30 A1MCO; with 1 deck, 1 pole/deck, 2 positions; with stainless steel shaft tapped 6-32 UNC 2A .38 deep; and without marking plate (see [3.1](#)).

3.4.6 Knobs. Knobs shall conform to AIA/NAS NASM91524, part number MS91524-9AP3TOX, except after finish is applied, grooves shall be filled with type P, color green, luminescent compound conforming to MIL-L-3891 (see [3.1](#)).

3.4.7 Threaded parts. All threaded parts shall be in accordance with FED-STD-H28, as specified (see [3.1](#) and [figure 1A](#), [figure 1C](#), and [figure 1F](#)).

3.4.8 Wiring. Wiring shall conform to the applicable schematic diagram (see [3.1](#)).

3.4.9 Finish. Final finish shall be in accordance with MIL-DTL-14072, type I (exposed). Final color shall be Semigloss Green, in accordance with FED-STD-595/24084.

3.4.10 Moisture and fungus resistant treatment. Loudspeaker parts that are not fungus resistant shall be treated in accordance with MIL-T-152.

3.5 Schematic-diagram labels. The schematic diagram (see [3.1](#)) shall be reproduced in accordance with MIL-STD-130 on the inside of the cabinet cover (see [figure 1B](#)).

3.6 Performance characteristics.

3.6.1 Acoustic quality. When loudspeakers are tested as specified in [4.7.2](#), there shall be no buzzes, rattles, nor other spurious sounds that would impair the quality of reproduced audio signal in the output.

3.6.2 Frequency response. When tested as specified in [4.7.3](#), the response level of the loudspeaker shall be not less than 95 decibels (dB), above a reference level of 20 micro-Pascal ( $\mu\text{Pa}$ ), and at a frequency of 750 to 1,250 Hertz (Hz).

3.6.3 Strain relief. When tested as specified in [4.7.4](#), there shall be no slippage of the cord or cable assembly out of the cabinet and no mechanical strain transmitted to electrical connections or terminals.

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3.6.4 Salt spray (corrosion). When tested as specified in 4.7.5, the frequency response shall be as specified in 3.6.2, and there shall be no damage to the loudspeaker.

3.6.5 Bounce. When tested as specified in 4.7.6, the frequency response shall be as specified in 3.6.2, and there shall be no loose, broken, or deformed parts or other damage to the loudspeaker.

3.7 Marking. Loudspeakers shall be marked in accordance with MIL-STD-130, with the type number, Material Number, manufacturer's name or symbol, contract number, and U.S. as specified (see 3.1).

3.8 Workmanship. Loudspeakers shall be processed in such a manner as to be uniform in quality and shall be free from loose or deposited foreign materials, and other defects that will affect life, serviceability, or appearance.

#### 4. VERIFICATION

4.1 Test equipment and inspection facilities. The supplier shall establish and maintain a calibration system in accordance with ISO-10012 and NCSL Z540.3.

4.2 Classification of inspections. The inspections specified herein are classified as follows:

- (a) Components inspection (see 4.4).
- (b) First article inspection (see 4.5).
- (c) Conformance inspection (see 4.6).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.4 Components inspection. Components inspection shall consist of certification supported by verifying inspection and test data that the components listed in table I, used in fabricating the loudspeaker, are in accordance with the applicable referenced specification.

TABLE I. Components inspection.

Component	Requirement paragraph	Applicable specification
Loudspeaker unit LS-445/U - - - -	3.4.1	MIL-DTL-12606
Cable and cord assemblies - - - -	3.4.3	MIL-DTL-3885
Audio transformer - - - - - - - - - -	3.4.4	MIL-PRF-27
Rotary switch - - - - - - - - - - - - - -	3.4.5	MIL-DTL-3786/5

4.5 First article inspection. First article inspection shall be performed by the supplier, after award of contract and prior to production, at a location acceptable to the Government. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production. First article approval is valid only on the contract or purchase order under which it is granted, unless extended by the Government to other contracts or purchase orders.

4.5.1 Sample size. Six loudspeakers shall be subjected to first article inspection.

4.5.2 Inspection routine. The sample shall be subjected to the inspections specified in table II, in the order shown. All sample units shall be subjected to the inspections of group I. The sample shall then be divided equally into two groups and subjected to the inspections for their particular group.

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TABLE II. First article inspection.

Examination or test	Requirement paragraph	Method paragraph
<u>Group I</u>		
Visual and mechanical examination - -	3.1, 3.3, 3.4, 3.5, 3.7 and 3.8	4.7.1
Acoustic quality - - - - -	3.6.1	4.7.2
Frequency response - - - - -	3.6.2	4.7.3
<u>Group II</u>		
Strain relief - - - - -	3.6.3	4.7.4
<u>Group III</u>		
Salt spray (corrosion) - - - - -	3.6.4	4.7.5
Bounce - - - - -	3.6.5	4.7.6

4.5.3 Failures. More than one failure in group I and any failure in group II or III shall be cause for refusal to grant first article approval.

4.6 Conformance inspection.

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections. Except as specified in 4.6.1.4.4, delivery of products which have passed groups A and B inspection shall not be delayed pending the results of group C inspection.

4.6.1.1 Inspection lot. An inspection lot shall consist of all loudspeakers of the same type, produced under essentially the same conditions, and offered for inspection at one time.

4.6.1.2 Group A inspection. Group A inspection shall consist of the examination and test specified in table III, in the order shown.

4.6.1.2.1 Sampling plan. Accept on zero, for general inspection, a sample of parts shall be randomly selected in accordance with table IV. (Classification of major and minor defects for visual and mechanical examination is shown in table VII.)

TABLE III. Group A inspection.

Examination or test	Requirement paragraph	Method paragraph
Visual and mechanical examination - - -	3.1, 3.3, 3.4, 3.5, 3.7 and 3.8	4.7.1
Acoustic quality - - - - -	3.6.1	4.7.2

TABLE IV. Sampling plan.

Lot size	Sample size Group A	Sample size Group B
2 to 13	1/	3
14 to 25	13	3
26 to 50	13	5
51 to 90	13	6
91 to 150	13	7
151 to 280	20	10
281 to 500	29	11
501 to 1200	34	15
1201 to 3200	42	18

1/ Indicates entire lot must be inspected.

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4.6.1.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

4.6.1.3 Group B inspection. Group B inspection shall consist of the test specified in [table V](#) and shall be made on sample units which have been subjected to and have passed group A inspection.

4.6.1.3.1 Sampling plan. A sample of parts shall be randomly selected in accordance with [table IV](#). If one or more defects are found, the lot shall be rescreened and defects removed.

TABLE V. Group B inspection.

Test	Requirement paragraph	Method paragraph
Frequency response	<a href="#">3.6.2</a>	<a href="#">4.7.3</a>

4.6.1.3.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

4.6.1.3.3 Disposition of sample units. Sample units which have passed group B inspection may be delivered on the contract or purchase order, if the lot is accepted and the sample units are still within specified electrical tolerances.

4.6.1.4 Group C inspection. Group C inspection shall consist of the tests specified in [table VI](#), in the order shown. Group C inspection shall be made on sample units selected from inspection lots which have passed groups A and B inspections.

4.6.1.4.1 Sampling plan.

4.6.1.4.1.1 Initial sampling plan. Six samples of the complete equipment shall be selected at random, 3 samples for each subgroup 1 and subgroup 2 in [table VI](#). The samples shall be selected at the start of the contract from the first conformance inspection lot. These samples shall constitute the group C requirement for the first 1,000 units produced.

4.6.1.4.1.2 Secondary sampling plan. Thereafter, 3 samples of the complete equipment shall be selected at random for subgroup 1 in [table VI](#). These samples shall be selected once each month, or every 1,000 units, whichever occurs first.

TABLE VI. Group C inspection.

Test	Requirement paragraph	Method paragraph
<u>Subgroup 1 (3 sample units)</u>		
Strain relief - - - - -	<a href="#">3.6.3</a>	<a href="#">4.7.4</a>
Bounce - - - - -	<a href="#">3.6.5</a>	<a href="#">4.7.6</a>
<u>Subgroup 2 (3 sample units)</u>		
Salt spray (corrosion) - - - - -	<a href="#">3.6.4</a>	<a href="#">4.7.5</a>

4.6.1.4.2 Failures. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed.

4.6.1.4.3 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or purchase order.

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4.6.1.4.4 Noncompliance. If a sample fails to pass group C inspection, the supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Groups A and B inspections may be reinstated; however, final acceptance shall be withheld until the group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the responsible inspection activity.

4.7 Methods of examination and test.

4.7.1 Visual and mechanical examination. Loudspeakers shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see [3.1](#), [3.3](#), [3.4](#), [3.5](#), [3.7](#), and [3.8](#)). Defects shall be classified as specified in [table VII](#).



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TABLE VII. Classification of defects for visual and mechanical examination.

Defect type	Classification	
	Major	Minor
Dimensions	Dimensions not as specified	---
Materials and finish	Materials not as specified. Wrong or incomplete finish. Large amount of flaking, peeling, or chipping of finish	Scratches, cuts, abrasions, etc., causing exposure of base metal, or relatively small amounts of flaking, peeling or chipping.
Parts	Missing parts. Inoperative, improperly assembled, or defective parts which could cause the loudspeaker to fail in service. Wrong parts.	Defective parts which would reduce efficiency of use, but not cause failure in service. Cracks or chipped surfaces having no effect on the functioning, assembly, maintenance, or life of the loudspeaker.
Marking	Marking missing, illegible, or incorrect.	Markings dirty or smudged, but legible.
Foreign objects	Any metallic foreign object, not firmly attached <sup>1/</sup> , which could cause a short circuit, or acoustical Malfunctioning of the loudspeaker. Any nonmetallic foreign object such as insulation, dirt, or phenolic chips which could cause acoustical Malfunctioning of the loudspeaker.	Any metallic or nonmetallic foreign object which affects appearance but which could not cause acoustical malfunctioning of the loudspeaker.
Soldering	Improper wrap – Less than 1/2 turn. Unsoldered joint – Solder not applied where intended. Insufficient solder – Minimum dimension of solder bridge less than twice the diameter of the wire or less than 3/32 inch, whichever is greater. Entire area of contact between wire and terminal not joined by solder bridge. Cold solder joint – Chalky appearance, lacks metallic luster, presents rough “pile-up” appearance; movement of wire or solder upon pick application. Rosin joint – Presence of excess rosin; relative movement of wire or solder upon pick application. Insulation in terminal hole – Solder over insulation; no appearance of visible wire contour.	Improper wrap – 1/2 turn or more, but less than one turn. Excess solder – Build-up solder on joint greater than necessary for good soldering, usually resulting in obliteration of wire contour. Cold solder joint – Chalky appearance, lacks metallic luster, presents rough “pile-up” appearance; no relative action between wire and solder upon pick application.
Wiring	Wiring not in accordance with schematic diagram. Broken strands – More than 20 percent; except in a 7-strand conductor, more than 2 broken strands. Insulation burned, abraded, pinched, or deteriorated between two or more conductors, resulting in a potential short circuit. Taut wire – Wire exhibits no slack and subsequent Breakage may occur due to stress on terminal or part. Insulation frayed to the extent that a potential short circuit exists.	Broken strands – 20 percent or less. In a 7-strand conductor, 2 broken strands. Insulation burned, abraded, pinched, or deteriorated, with exposure of bare wire, but short circuit not possible. Taut wire – Slight stress on conductor, but no possibility of subsequent breakage.

<sup>1/</sup> Foreign objects that cannot be dislodged by the moderate application of pressure with a pick or spudger shall be considered to be firmly attached.

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4.7.2 Acoustic quality (see 3.6.1). A constant voltage having a root mean square (rms) value of  $4.00 \pm 0.1$  volts shall be applied to the voice coil terminals and the frequency varied continuously from 300 to 7,000 Hz and back to 300 Hz.

4.7.3 Frequency response (see 3.6.2). The loudspeaker shall be placed at a distance of 3 feet from a calibrated microphone. A constant rms voltage of the value specified (see 3.1) with the frequency varied continuously from 300 to 7,000 Hz shall be applied to the applicable plug contacts of the cord or cable assembly of the loudspeaker. The acoustic output at 750 to 1,250 Hz shall be recorded.

4.7.4 Strain relief (see 3.6.3). The jacket of the cord or cable assembly inside the loudspeaker cabinet shall be suitably marked adjacent to the clamp and its position relative to the clamp noted. A force shall be applied to the cord or cable assembly tending to withdraw it out of the cabinet in a direction perpendicular to the cable-entry side. The force shall be increased gradually to 10 pounds and held at that value for 1 minute. A change in position of the jacket marking relative to the clamp shall be considered as evidence of slippage of the cord or cable assembly out of the cabinet.

4.7.5 Salt spray (corrosion) (see 3.6.4). The loudspeaker shall be tested in accordance with MIL-STD-202-101. The following details shall apply:

- (a) Applicable salt solution – 5 percent.
- (b) Test-condition letter – B.
- (c) Measurements after exposure – The loudspeaker shall be subjected to the frequency response test specified in 4.7.3.

At the completion of the test, the loudspeaker shall be visually examined for damage.

4.7.6 Bounce (see 3.6.5). The loudspeaker shall be rigidly mounted on a suitable fixture, without shock mounts, and placed on the table of a package tester as made by the L. A. B. Corporation, L. A. B. Equipment, Inc., Phone (630) 595-4288, Itasca, IL. 60143, Model 100V-Series.® transportation simulator (or equal). The package tester, shafts in phase, shall be operated at a speed of  $285 \pm 3$  rpm, for a total of 3 hours. The fixture shall be placed on a different side for each 1/2 hour of test. At the completion of the test, the loudspeaker shall be subjected to the frequency response test specified in 4.7.3, and examined for loose, broken, or deformed parts, and other damage.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD or in-house contactor 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 that may be helpful, but is not mandatory.)

6.1 Acquisition requirements. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.

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(b) Title, number, and date of the applicable specification sheet, and the applicable type number (see [1.2](#) and [3.1](#)).

(c) Levels of preservation-packaging and packing required (see [5.1](#)).

6.2 First article inspection. Information pertaining to first article inspection of products covered by this specification should be obtained from the procuring activity for the specific contracts involved.

6.3 Compatible metals. Compatibility of intermetallic contacting surfaces is defined as specified in MIL-DTL-14072.

6.4 Replacement. Type LS-590( )/U is a replacement item for loudspeaker types LS-11-A and LS-203/U.

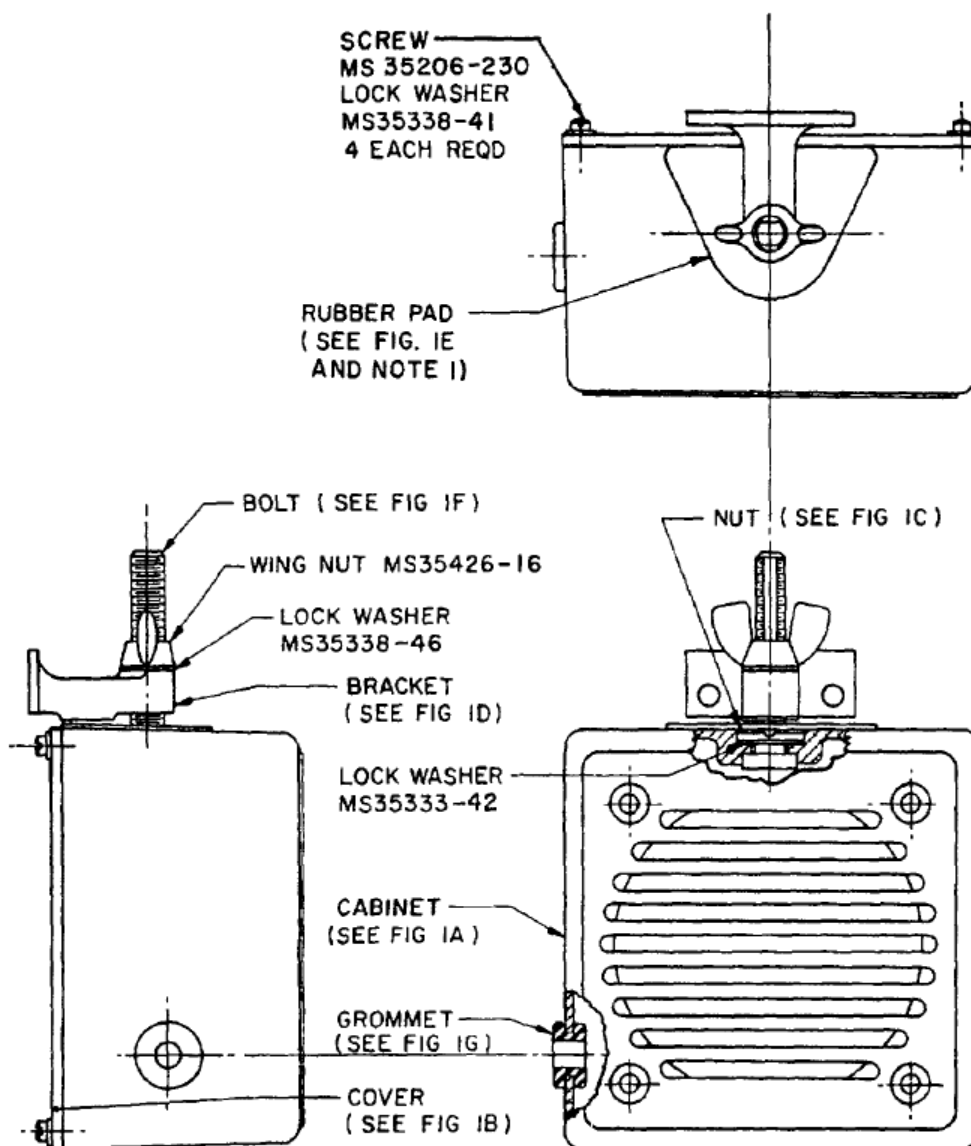
6.5 Tin whisker growth (see [3.3.2.1](#)). The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products 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).

6.6 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes 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 upon the entire content, regardless of the marginal notations and relationship to the last previous issue.

6.7 Subject term (key word) listing.

Acoustic quality  
Audio  
Frequency response

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## NOTES:

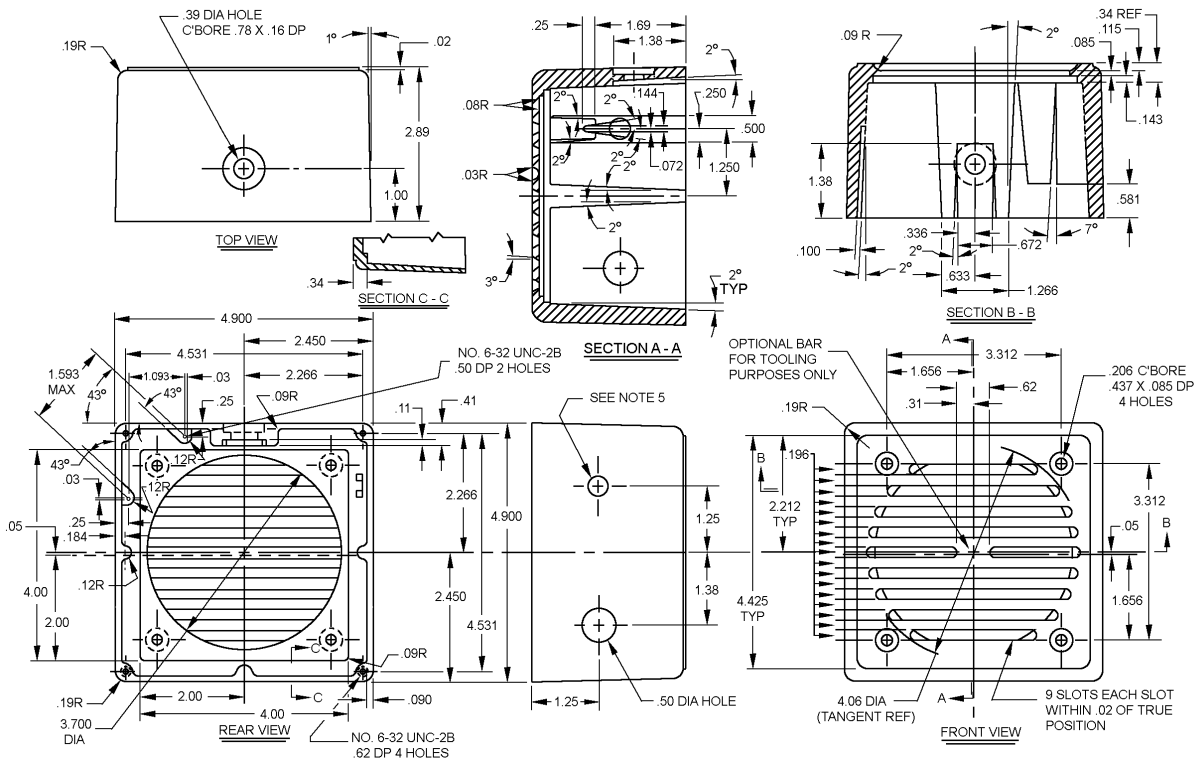
1. Rubber pad bonded to finished surface with cement.
2. Cabinet shown without switch mounting hold (see [figure 1A](#)).

FIGURE 1. Cabinet assembly.

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Component name	Applicable document	Part number
Screw	AIA/NAS NASM35206	MS35206-230
Lock Washer	AIA/NAS NASM35333	MS35333-42
Lock Washer	AIA/NAS NASM35338	MS35338-41
Lock Washer	AIA/NAS NASM35338	MS35338-46
Wing nut	MS35426	MS35426-16

FIGURE 1. Cabinet assembly - Continued.



Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.005	.13	.12	3.05	.336	8.53	.78	19.81	2.266	57.56
.02	.51	.143	3.63	.34	8.64	1.00	25.40	2.450	62.23
.03	.76	.144	3.66	.39	9.91	1.093	27.76	2.89	73.41
.05	1.27	.16	4.06	.391	9.93	1.25	31.75	3.312	84.12
.072	1.83	.184	4.67	.41	10.41	1.266	32.16	3.700	93.98
.08	2.03	.19	4.83	.437	11.10	1.38	35.05	4.00	101.60
.085	2.16	.196	4.98	.50	12.70	1.593	40.46	4.06	103.12
.090	2.29	.206	5.23	.581	14.76	1.656	42.06	4.425	112.40
.100	2.54	.25	6.35	.62	15.75	1.69	42.93	4.531	115.09
.11	2.79	.289	7.34	.633	16.08	2.00	50.80	4.900	124.46
.115	2.92	.31	7.87	.672	17.07	2.212	56.18		

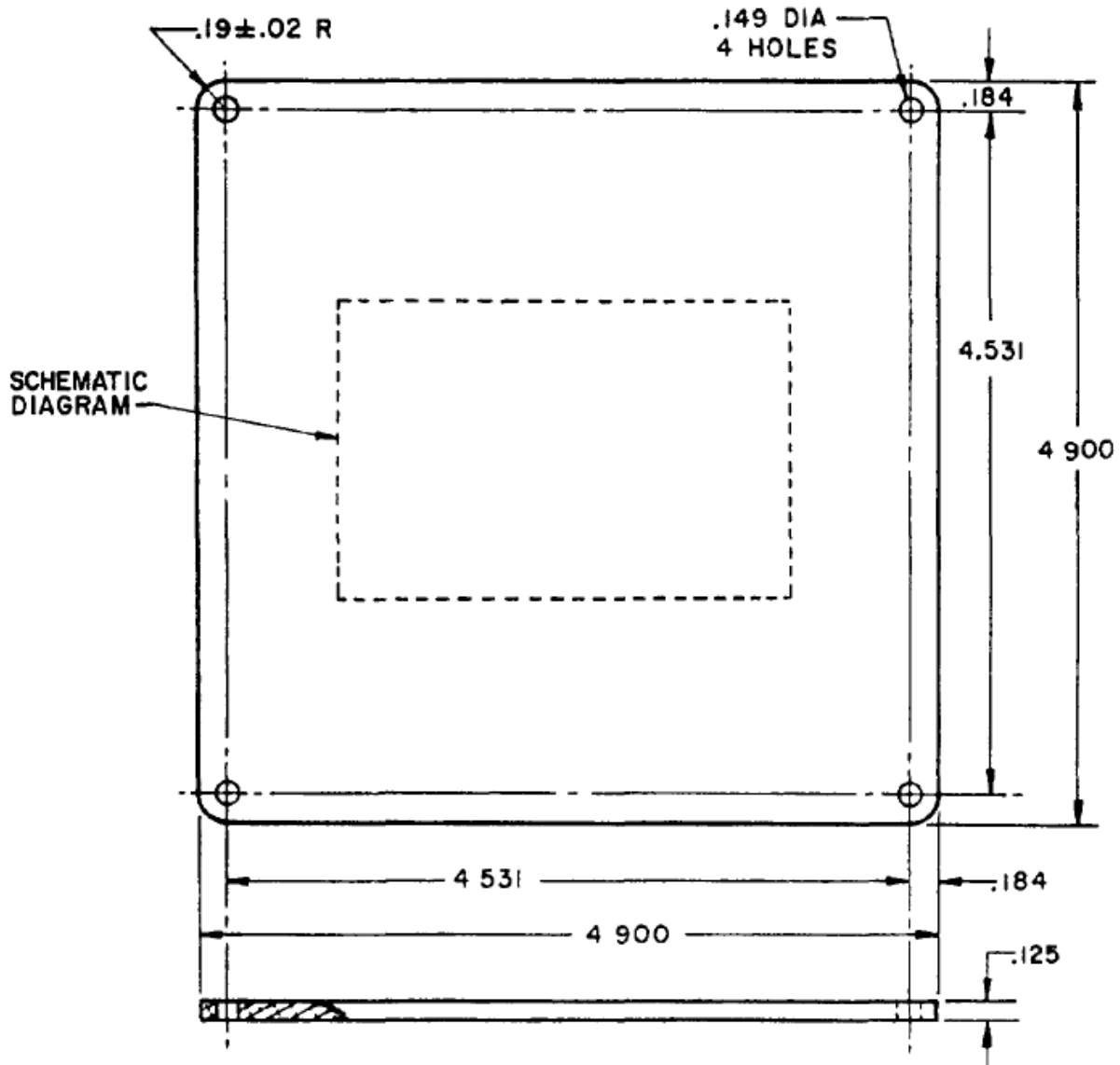
FIGURE 1A. Cabinet.

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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general Information only and are based upon 1 inch = 25.4 mm.
3. Unless otherwise specified, tolerances are  $\pm .02$ ,  $\pm .005$  and  $\pm 1/2^\circ$ .
4. Cabinet material shall be aluminum.
5. .391 hole for rotary switch only when specified (see 3.1).

FIGURE 1A. Cabinet - Continued.



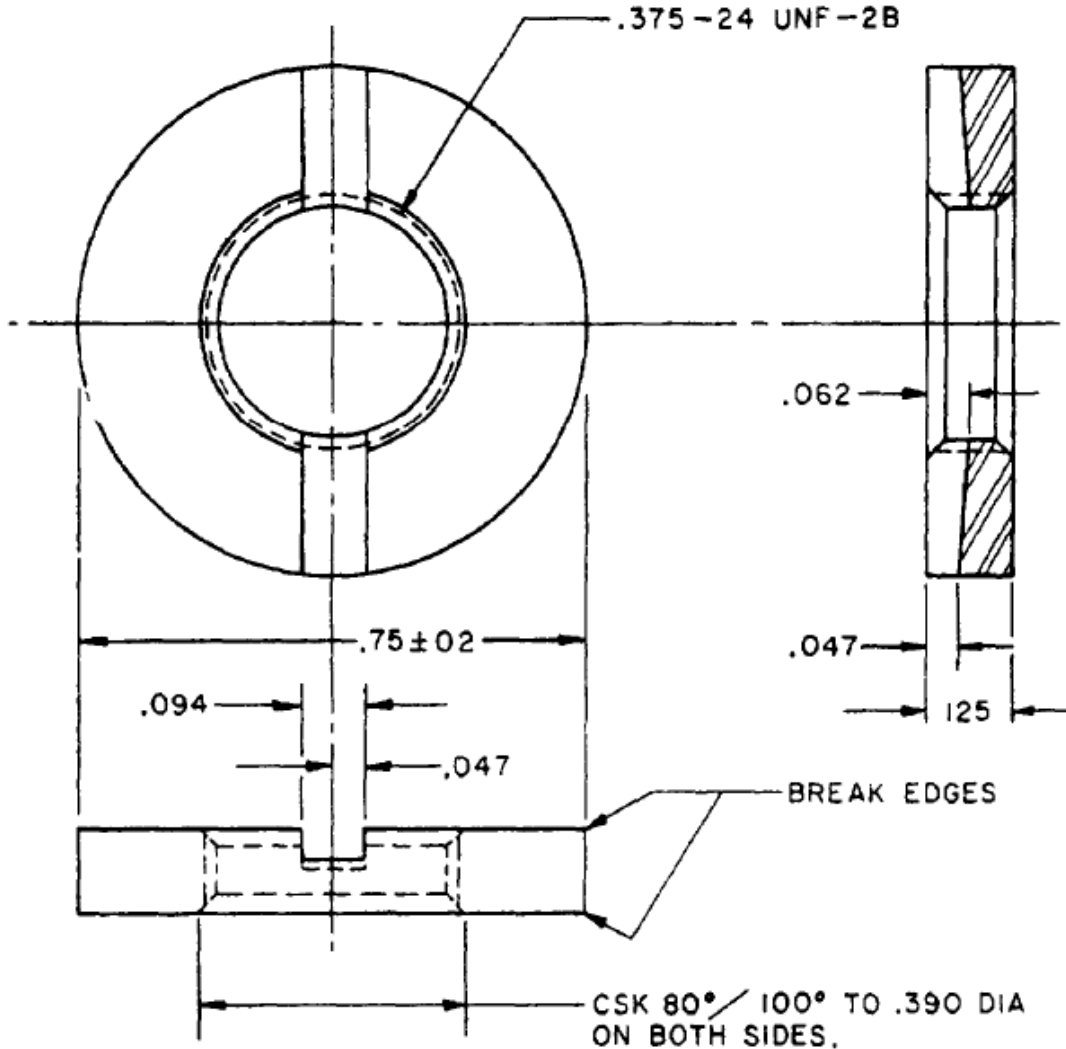
Inches	mm	Inches	mm
.02	.51	.19	4.83
.125	3.18	4.531	115.09
.149	3.78	4.900	124.46
.184	4.67		

FIGURE 1B. Cabinet cover.

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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Unless otherwise specified, tolerance is  $\pm .005$  (.13 mm).
4. Material shall be aluminum conforming to ASTM B85/B85M.
5. Schematic diagram shall be bonded to inside of cover, or at the option of the contractor schematic may be permanently stamped.

FIGURE 1B. Cabinet cover - Continued.

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Unless otherwise specified, tolerance is  $\pm .005$  (.13 mm).
4. Material shall be steel conforming to ASTM A108.

FIGURE 1C. Nut.

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INCHES	MM
.02	.51
.047	1.19
.062	1.57
.094	2.39
.125	3.18
.390	9.91
.75	19.05

FIGURE 1C. Nut - Continued.

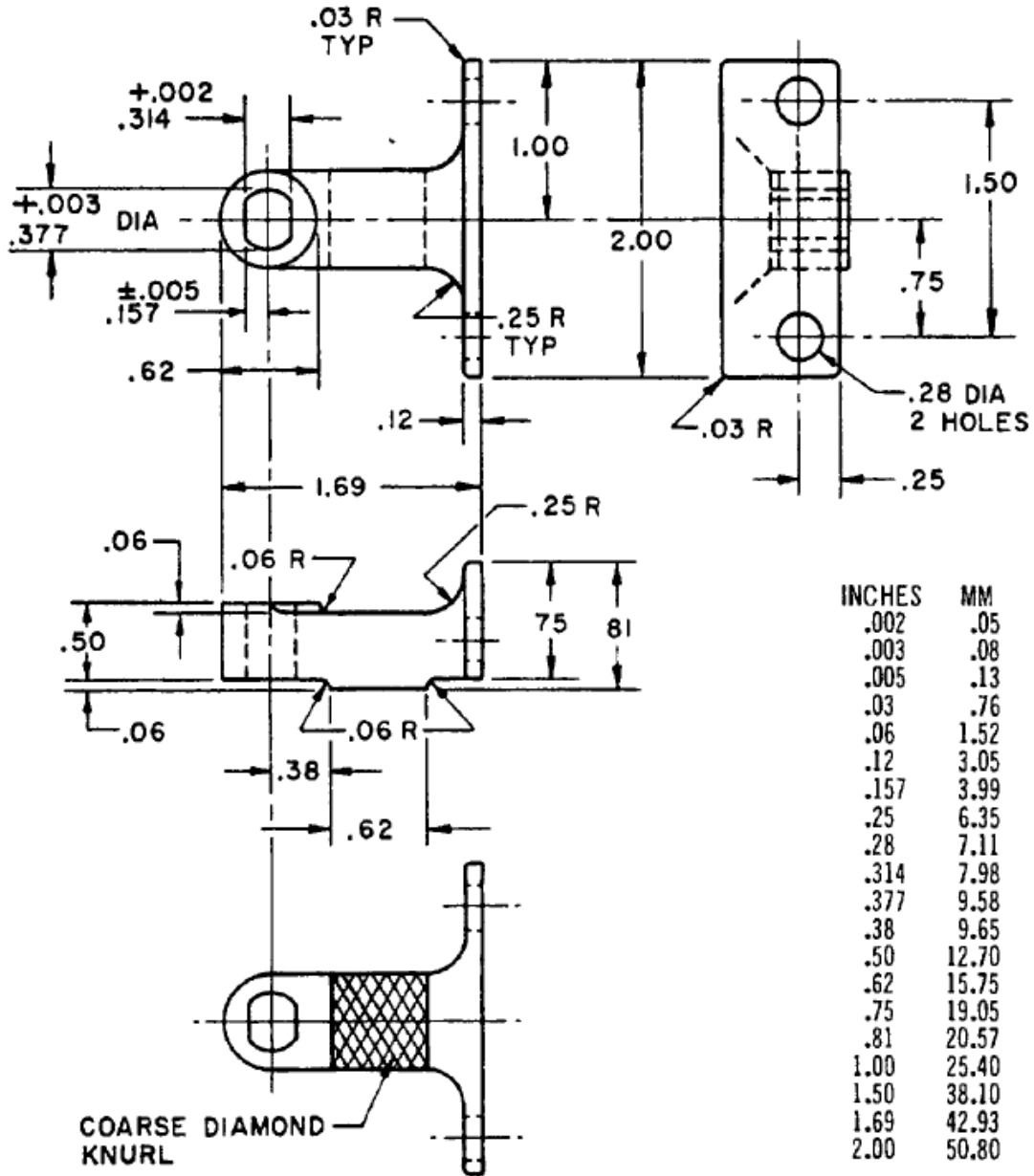


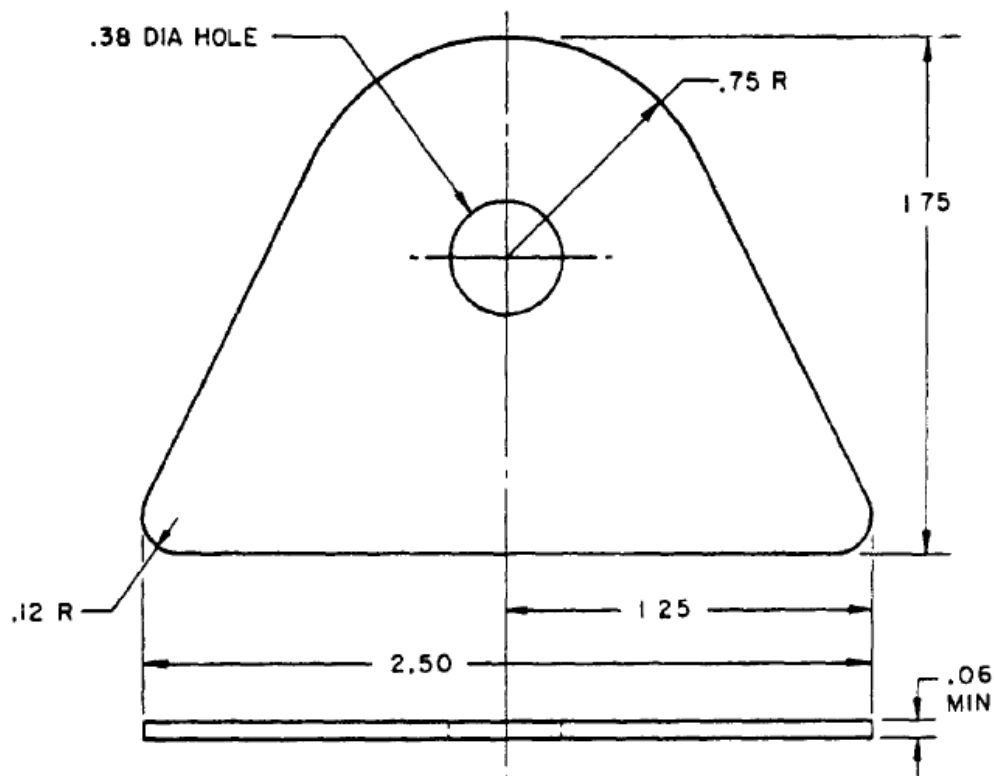
FIGURE 1D. Bracket.



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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Unless otherwise specified, tolerance is  $\pm .02$  (.51 mm).
4. Material shall be steel conforming to class 65-35 of ASTM A27/A27M.

FIGURE 1D. Bracket - Continued.

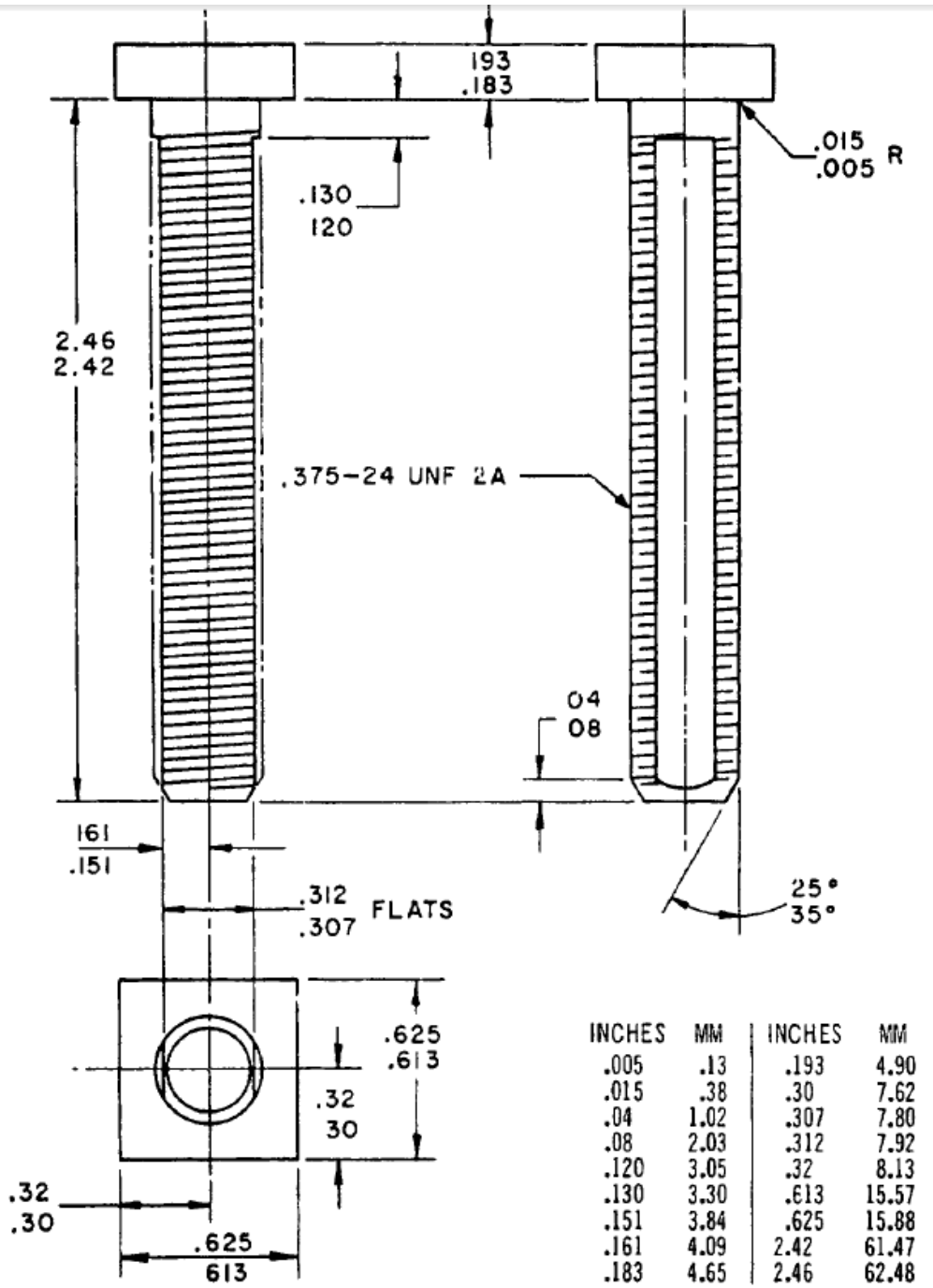
Inches	mm
.06	1.52
.12	3.05
.38	9.65
.75	19.05
1.25	31.75
1.75	44.45
2.50	63.50

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Tolerance is  $\pm .03$  (.76 mm).
4. Material shall be rubber conforming to AMS 3202M.

FIGURE 1E. Pad.

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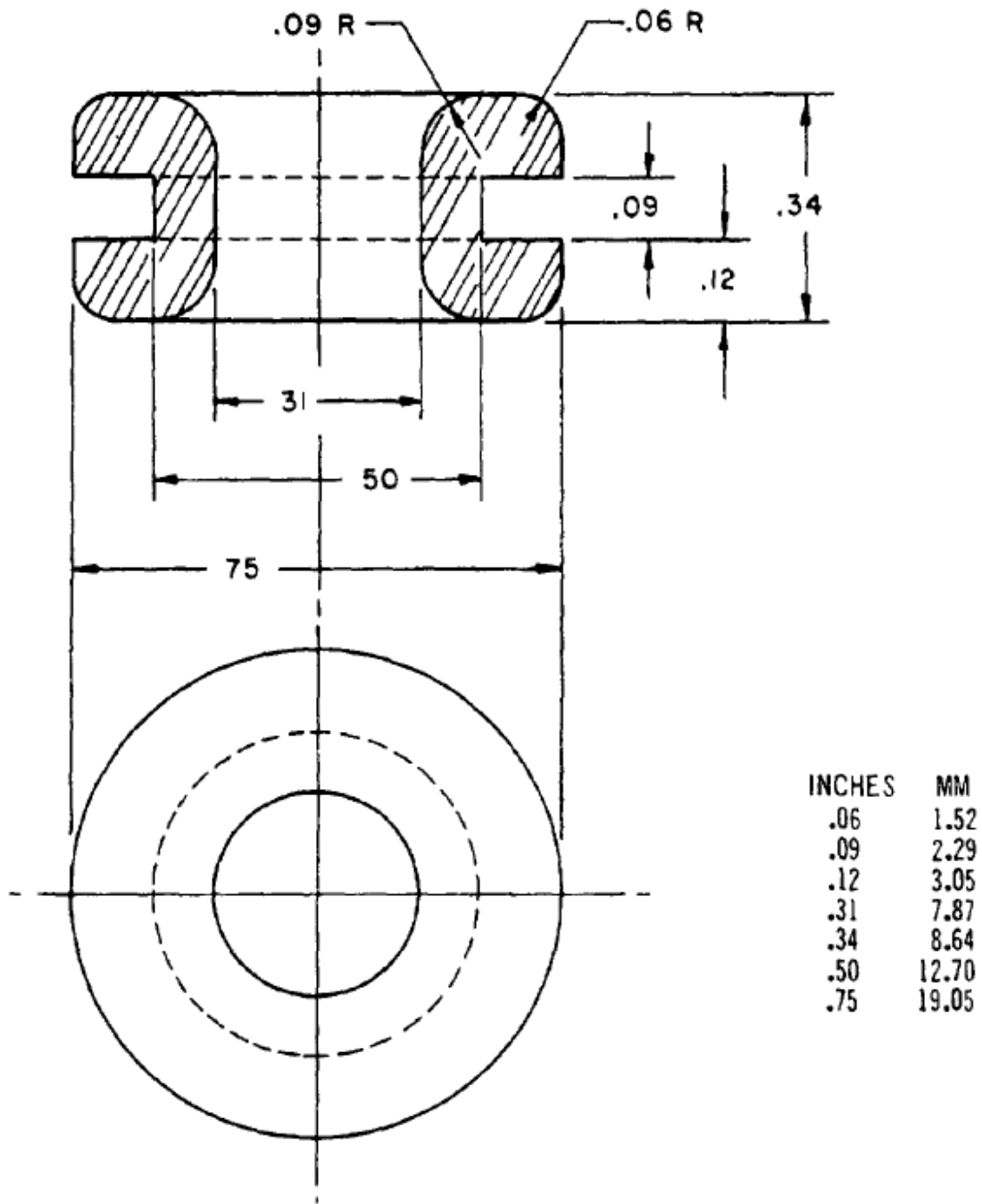


NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Material shall be steel conforming to ASTM A108.

FIGURE 1F. Bolt.

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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Tolerance is  $\pm .02$  (.51 mm).
4. Material shall be rubber conforming to grade AMS 3202M.
5. A strain relief bushing (e.g. Heyco) is a suitable substitute for the grommet/clamp combination.

FIGURE 1G. Grommet.

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CONCLUDING MATERIAL

Custodians:

Army – CR  
Navy – EC  
Air Force – 85  
DLA – CC

Preparing activity:

DLA - CC

(Project 5965-2016-002)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.