

MIL-G-85613
5 October 1983

MILITARY SPECIFICATION

GROMMET, HARD SEAT, SWAGED, COUNTERSINK;
GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers swaged grommets for use in countersink holes of access panels.

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications, standards and handbooks. Unless otherwise specified, the following specifications, standards and handbooks 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

| | |
|------------|---|
| QQ-A-250/4 | Aluminum alloy 2024, plate and steel |
| PPP-H-1581 | Hardware (Fastener and Related Items) Packaging and Packing for Shipment and Storage of |
| PPP-T-76 | Tape, Packaging, Paper (For Carton Sealing) |

STANDARDS

MILITARY

| | |
|-------------|---|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |
| MIL-STD-129 | Marking for Shipment and Storage |

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

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

3. REQUIREMENTS

3.1 Specification sheets or standards. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets or standards. In the event of any conflict between requirements of this specification and the specification sheet or standard, the latter shall govern.

3.2 Design and Construction.

3.2.1 Construction. The grommets shall be of single or multiple-piece construction. The grommet shall consist of boss, retaining ring cavity and collar (see Figure 1) that shall be swaged into the fastener countersink hole of the access panel.

3.2.2 Dimensions. Dimensions and tolerances shall be as specified herein and in accordance with the applicable specification sheet.

3.2.3 Concentricity. Concentricity shall be as specified on the applicable specification sheet (see 4.5.2).

3.3. Materials. The grommets shall be fabricated from materials in accordance with the applicable specification sheet (see 4.3).

3.4 Discontinuities. All grommets shall be examined by fluorescent particle inspection (see 4.5.5). Any grommets having discontinuities equal to or exceeding 0.008-inch shall be rejected. Care must be exercised to avoid confusing cracks, as described in 3.4.1, with other discontinuities.

3.4.1 Cracks. Grommets shall be free of cracks in any direction or location. A crack is defined as a clean crystalline break passing through the grain or grain boundary without the inclusion of foreign elements.

3.5 Protective treatment. Protective treatment shall be in accordance with the applicable specification sheet.

3.6 Lubricant. Lubricant shall be as specified on the applicable specification sheet.

3.7 Marking. Marking shall be as specified on the applicable specification sheet.

3.8 Mechanical properties.

3.8.1 Installation. The grommet shall be installed by swaging the collar in to the fastener countersink hole of the access panel (see 4.5.3).

3.8.2 Grommet collar and boss durability. The grommet shall pass the durability test (see 4.5.4).

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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 as specified herein. Except as otherwise specified in the contract or purchase order, 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 inspection requirements specified herein shall be as classified as follows:

- a. Material inspection (see 4.3)
- b. Quality conformance inspection (see 4.4).

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials used in fabricating the grommets are in accordance with the applicable specification sheets and standards.

4.4 Quality conformance inspection. Quality conformance inspection shall be as specified in Table I.

TABLE I. Quality conformance inspections.

| Test | Requirement Paragraph | Inspection Paragraph | MIL-STD-105 Sampling Level | AQL % |
|------------------|-----------------------|----------------------|----------------------------|-------|
| 1. Examination | 3.2 | 4.5.1 | I | 1.0 |
| 2. Concentricity | 3.2.3 | 4.5.2 | I | 1.0 |
| 3. Installation | 3.7.1 | 4.5.3 | S-2 | 1.5 |
| 4. Durability | 3.7.2 | 4.5.4 | S-2 | 1.5 |

4.4.1 Sampling for examination. Test samples shall be selected at random in accordance with MIL-STD-105. Inspection level and acceptance quality level (AQL) shall be as specified in Table I. Identical sample items may be used for any of the tests, provided selection of random samples is maintained and known characteristics of the sample are not used to influence the integrity of test results.

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4.4.2 Sampling for tests. Test samples shall consist of grommets produced as a single lot of each type, class and diameter and made from one heat of material. The sample lot test data shall be provided to the procuring activity as indicated below:

Sample for Tests
Hard Seat Grommets
Part Number
Name of Manufacturer
Submitted by (name) (date) for acceptance tests in accordance
with MIL-G-85613

4.4.2.1 Lot. A lot shall consist of grommets made from the same lot of material and fabricated as a single continuous production run in which the forming machine set up remains unchanged except for head configuration. A lot shall be restricted to one material and diameter of grommet. A lot of material shall be defined as the quantity of sheet, strip or rod made from a single heat. It shall be controlled and shipped with appropriate mill certification or certificate of conformance.

4.4.3 Certified test report The manufacturer shall furnish certification that the product conforms to the specification. The manufacturer shall maintain, for a period of three years, a record of inspections by lot number. The certificate shall state that the required inspections were conducted and that the product met the requirements of this specification.

4.5 Methods of inspection.

4.5.1 Examination Each of the sample grommets selected at random in accordance with 4.4.1 shall be examined visually for conformance to the requirements for dimensions, protective treatment, and marking. Optical aids or special gages may be used to ensure compliance with this specification. Any dimensional characteristics are considered defective when out of tolerance.

4.5.2 Concentricity. The concentricity test shall be performed using the grommet I.D. as an axis. A dial indicator set against the test diameter and zeroed. The grommet shall be rotated 360°. The maximum dial variation shall meet the concentricity requirements. The test shall be conducted on all surfaces with concentricity requirements.

4.5.3 Installation. Six grommets shall be installed on 2024-T3 aluminum alloy test plates in accordance with QQ-A-250/4 (see Figures 2 through 4). Holes shall be in accordance with the applicable specification sheet. Fifty percent of the grommets shall be tested at the minimum grip and the other fifty percent at the maximum grip. After installation, the grommets shall be inspected for defects such as deformed boss or collar splits.

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4.5.4 Grommet collar and boss durability test. The grommets shall be installed into a test plate as shown in Figure 5. The grommets shall be subjected to 200 installation and removal cycles. The fastener shall be seated by torquing to the values specified in Table II. The test shall be run at a rate slow enough to limit temperature increase of grommet to 75°F above room ambient. The following defects shall constitute failure:

- a. Splits in collar or other areas.
- b. Deformation that reduces depth of retaining ring cavity by 0.005-inch due to collar material flowing into retaining ring cavity.
- c. Deformation of boss outside of dimensional limits.

TABLE II. Seating torques.

| Grommet Size | Torque (in. lb) |
|--------------|-----------------|
| .250 | 150 |
| .312 | 200 |
| .375 | 250 |

4.5.5 Discontinuities. The presence of cracks and discontinuities in grommets shall be determined by fluorescent particle inspection. Particle indications of themselves shall not be cause for rejection. If, in the opinion of the inspector, the indications are cause for rejection, the grommets shall be examined by microexamination to determine if the discontinuities are within the limits specified herein.

4.6 Inspection of packaging. The sampling and inspection of packaging shall be in accordance with Section 5.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with PPP-H-1581. All seams of shipping containers shall be sealed with water-resistant tape conforming to PPP-T-76.

5.2 Marking of shipments. In addition to any special marking required by the contract or purchase order (see 6.2), unit and intermediate packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The grommets are intended for use in access panels. The function of the grommet is to reduce wear and elongation in the hole for the fastener used to attach the access panel. The grommet's boss, which extends beyond the surface of the back (under) side of the access panel, will prevent the total preload on the bolt from being transferred to the adjacent seal (preventing seal crushing). The grommet will prevent warping of the access panel at the fastener hole.

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6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Specification sheet part number.
- (c) Quantity.
- (d) Levels of packaging (see 5.1)
- (e) Special marking (if required).

Custodians:

Navy - AS
Air Force - 11
Army - AV

Preparing Activity:

Navy - AS
(DoD Project No. 5325-0217)

Review Activities:

DLA-IS
Air Force - 99
Army - AR, MI

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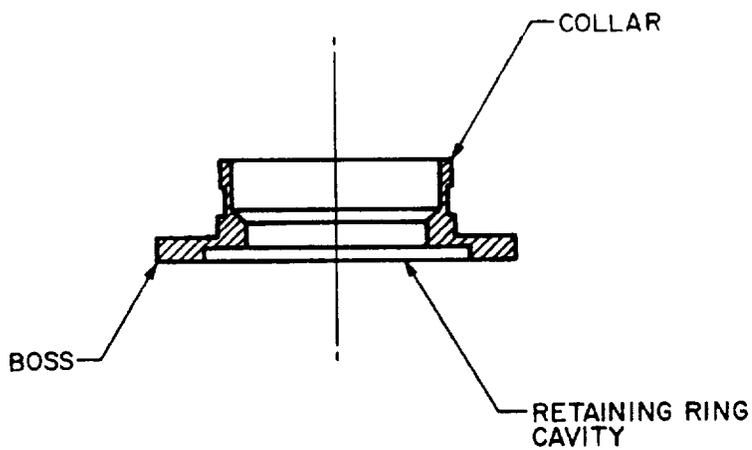


FIGURE 1. Hard Seat Grommet.

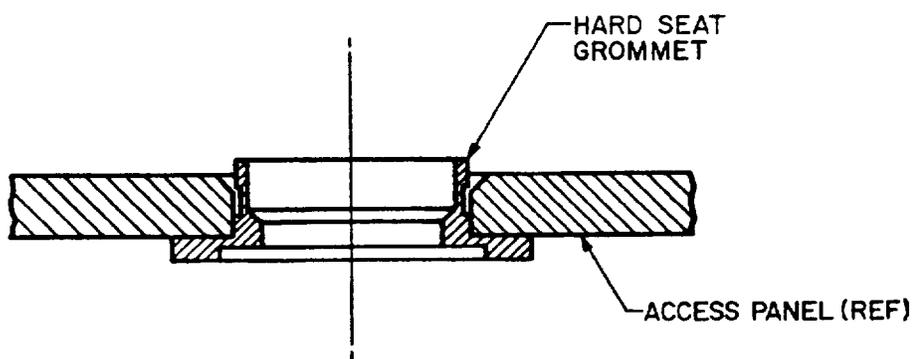


FIGURE 2. Grommet before swaging.

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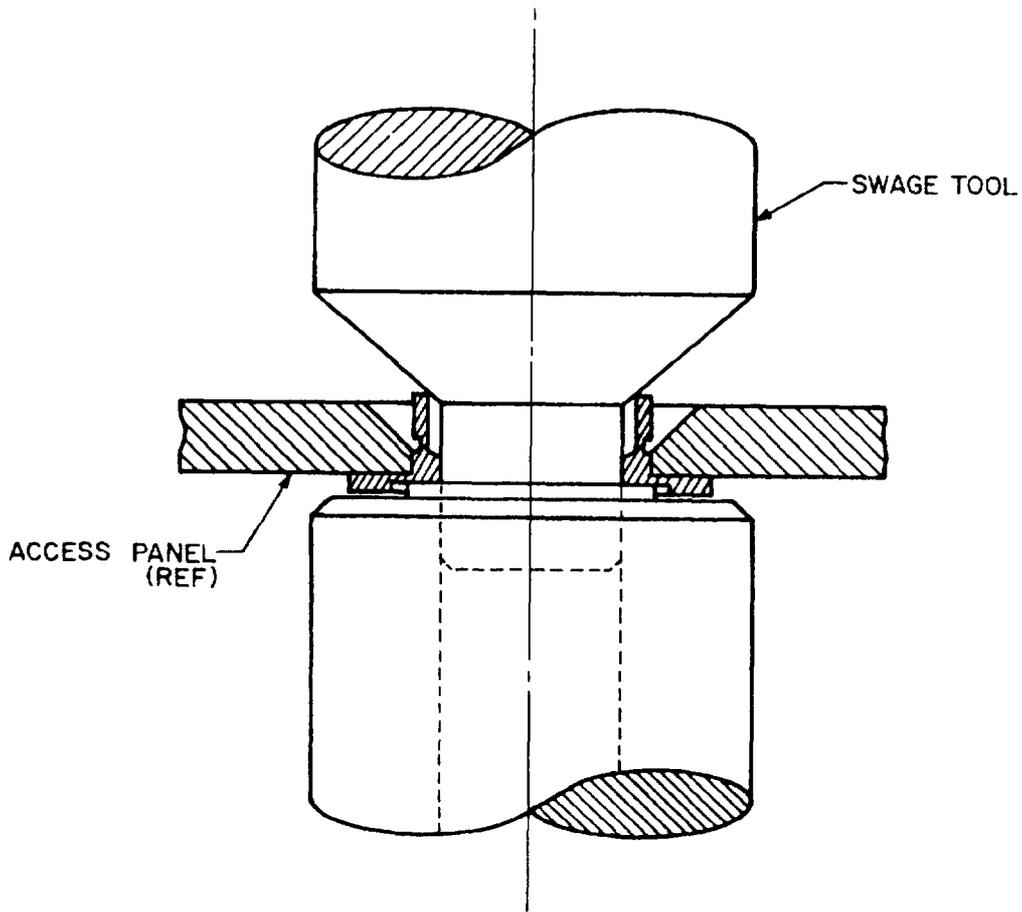


FIGURE 3. Swaging.

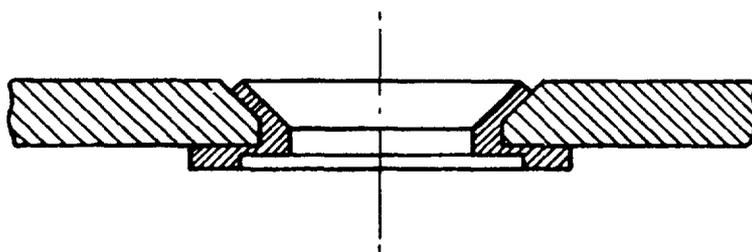
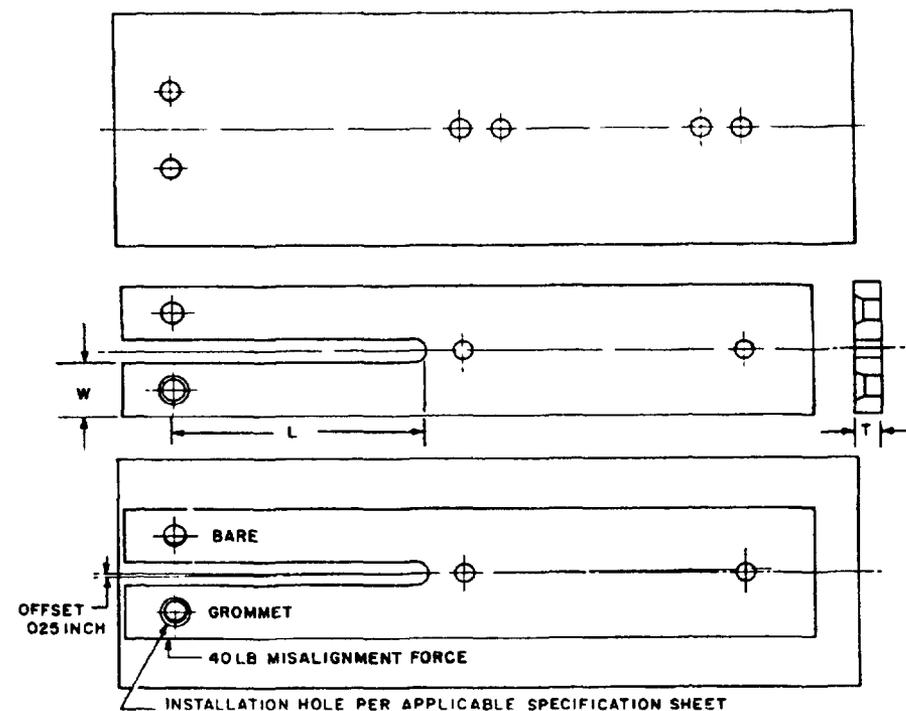


FIGURE 4. Grommet after installation.

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| Size | L* inch | T inch | W inch |
|------|------------|-----------|-----------|
| .250 | 2.7 | .080 | .625 |
| .312 | 3.6 | .080 | .750 |
| .375 | 4.4 | .080 | .937 |

*L dimension may require modification to obtain 40 lb misalignment force.

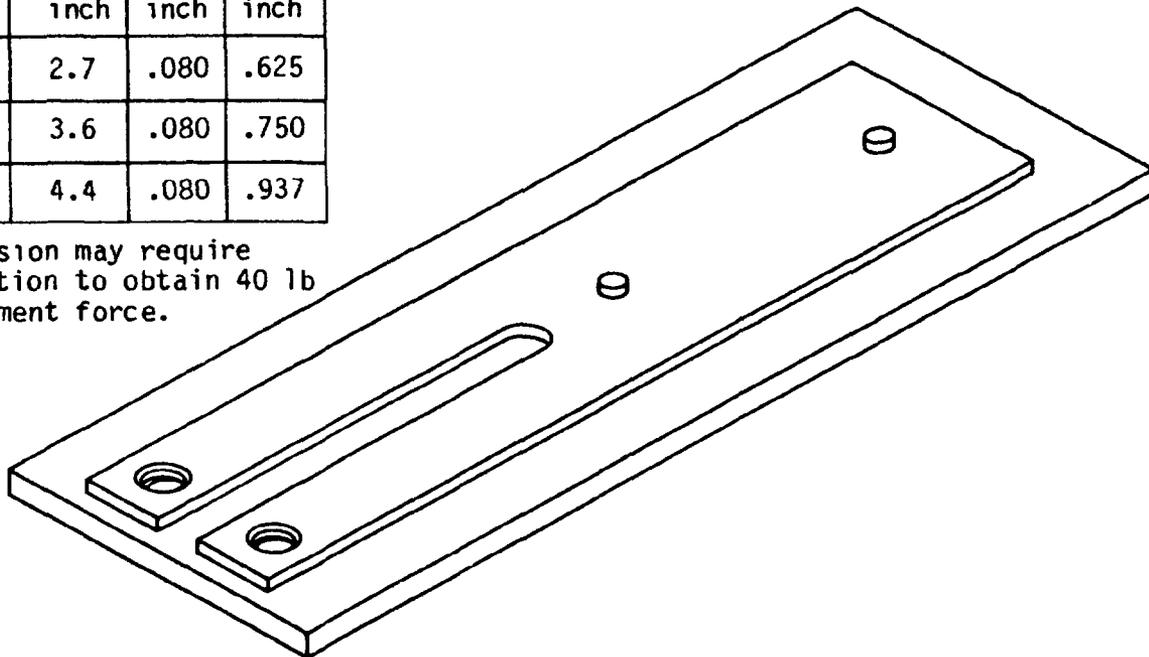


FIGURE 5. Durability and compression test fixture.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

| | |
|--|---|
| DOCUMENT NUMBER MIL-G-85613 | DOCUMENT TITLE Grommet, Hard Seat, Swaged, Countersink, General Spec for |
| 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) |