

**MIL-N-3336A**17 JUNE 1964  
SUPERSEDING  
MIL-N-3336  
28 NOVEMBER 1950**MILITARY SPECIFICATION****NUTS, SELF-LOCKING, CLIP-IN  
TYPE, INSTRUMENT MOUNTING**

*This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.*

**1. SCOPE**

**1.1 Scope.** This specification covers certain design and all performance Requirements for the procurement of clip-in, self-locking nuts for installing flange-mounted instruments.

**1.2 Classification.** The nuts shall be furnished in accordance with the MS33737 part numbers specified (see 6.2).

**2. APPLICABLE DOCUMENTS**

**2.1** The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

**SPECIFICATIONS****FEDERAL**

- QQ-P-416 —Plating, Cadmium (Electrodeposited)
- QQ-Z-325 —Zinc Coating, Electrodeposited, Requirements for

**MILITARY**

- MIL-P-116 —Preservation, Methods of
- MIL-H-3982 —Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage of
- MIL-E-5272 —Environmental Testing,

Aeronautical and Associated Equipment, General Specification for

- MIL-C-5541 —Chemical Films for Aluminum and Aluminum Alloys
- MIL-A-8625 —Anodic Coatings, for Aluminum and Aluminum Alloys
- MIL-D-70327—Drawings, Engineering and Associated Lists

**STANDARDS****MILITARY**

- MIL-STD-105—Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-143—Specifications and Standards, Order of Precedence for the Selection of
- MS33737 —Nut, Instrument Mounting, Self Locking, Clip-in Type

**AIR FORCE-NAVY AERONAUTICAL**

- AN 515—Screw, Machine, Round Head, Coarse Thread

**PUBLICATION****NATIONAL BUREAU OF STANDARDS**

- Handbook H28,—Screw-Thread Standards for Federal Services
- Part I

FSC 5310

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

**3. REQUIREMENTS**

**3.1 Qualification.** The spring nut furnished under this specification shall be a product which has been subjected to and which has passed the qualification tests specified herein, and which has been listed on or approved for listing on the applicable Qualified Products List.

**3.2 Data.** Unless otherwise specified in the contract or order, no data (other than reports and drawings accompanying qualification samples) are required by this specification or any of the documents referenced in section 2 herein (see 6.2).

**3.3 Selection of Government documents.** Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

**3.4 Materials.** Materials shall conform to applicable specifications and shall be as specified herein. Materials for which there are no applicable specifications, or which are not specifically described herein, shall be of the best quality, of the lightest practicable weight and suitable for the purposes intended. Each nut shall be made entirely of nonmagnetic materials which are not nutrients for fungi.

**3.4.1 Metals.** Metals shall be corrosion resistant, or shall be suitably protected as specified herein to resist corrosion due to fuels, salt spray or atmospheric conditions to which the instrument may be subject when in storage or during normal service life.

**3.5 Design.** The outline and dimensions of the instrument mounting nuts shall conform to MS33737. The nut shall consist of the nut proper and a holding device or cage to maintain the nut in position while inserting and tightening the screw. The mounting nut assembly shall be so designed that it may be

set in place in holes of specified diameter, without the use of special tools and shall hold in place against insertion of the screw.

**3.5.1 Screw threads.** Each nut shall be designed to be used with screws having threads conforming to Handbook H28, part I, class 2A for the size and pitch specified in MS33737. Each nut shall be so designed that an unlimited length of screw can be threaded completely through it.

**3.5.2 Panel thickness.** Each nut shall be designed to be used as shown on figure 1 in a hole in instrument panels of the thicknesses specified in MS33737.

**3.5.3 Installation and removal.** Each nut shall be so designed that it can be easily installed in and removed from a hole in an instrument flange or instrument panel conforming to figure 1 without the use of any tool.

**3.6 Torque.**

**3.6.1 Prevailing torque.** The prevailing torque for the first removal shall be:

Screw threads size and pitch	First removal prevailing torque, inch-pounds
4-40	0.375 ± 0.125
6-32	0.5 ± .375
8-32	0.75 ± .375
10-24	1.00 ± .5

The prevailing torque for the fifteenth removal shall be at least:

Screw threads size and pitch	Fifteenth removal minimum prevailing torque, inch-pounds
4-40	0.1875
6-32	.25
8-32	.375
10-24	.5

**3.6.2 Position torque.** The nut shall withstand the following torque, without turning, when installed in a 5052 half-hard, aluminum alloy panel. This torque shall be measured without a screw installed in the nut.

Screw threads size and pitch	Position torque, inch-pounds
4-40	1
6-32	1.5
8-32	2
10-24	3

**3.6.3 Maximum torque.** The nut when properly installed in a panel shall withstand,

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without turning or being damaged, the following torque applied to the screw in the tightening direction:

Screw threads size and pitch	Maximum torque, inch-pounds
4-40	6
6-32	8
8-32	12
10-24	16

**3.7 Tension strength.** The nut shall withstand the following tension load, applied to the screw head and parallel to the axis of the screw, when the nut and screw are properly installed in a panel.

Screw threads size and pitch	Maximum tension strength, pounds
4-40	100
6-32	150
8-32	200
10-24	300

**3.8 Weight.** The weight of the nuts shall be expressed as the weight of 1,000 nuts of each MS33737 part number. The weight shall not exceed that specified on MS33737 for each part number.

**3.9 Vibration.** The nut shall withstand vibration for 20 hours at frequencies varied slowly between 500 and 3,000 cycles per second and at an amplitude of 0.018 to 0.020 inch, without loosening of the screw or other evidence of nut failure.

**3.10 Finish.** Copper, brass, or bronze parts which may be in contact with aluminum shall be cadmium plated in accordance with QQ-P-416, type I, class 2 or zinc plated in accordance with QQ-Z-325. Aluminum alloy parts or assemblies shall be anodized in accordance with MIL-A-8625. Aluminum alloys which do not anodize satisfactorily shall be coated with chemical film in accordance with MIL-C-5541. The finishes shall not corrode when the nuts are subjected to the salt spray test.

**3.11 Interchangeability.** All nuts having the same MS part number shall be completely interchangeable with each other with respect to installation and performance regardless of differences in manufacturers and aircraft in which installed. Changes in manufacturer's part numbers shall be governed by the

drawing number requirements of MIL-D-70327.

**3.12 Identification.** The MS33737 part number of the nut and the manufacturer's trademark or other means of identifying the manufacturer shall be stamped on each nut.

**3.13 Workmanship.** All details of workmanship shall be such as to assure compliance with this specification. The nuts shall be free from tool marks, burrs, flaws, and all other defects which may affect their serviceability.

#### 4. QUALITY ASSURANCE PROVISIONS

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 tests.** The inspection and testing of the clip-in nuts shall be classified as:

- (a) Qualification tests (4.3)
- (b) Quality conformance tests (4.4)

**4.3 Qualification tests.** The qualification tests of the clip-in nuts shall consist of all of the examinations and tests specified under 4.6 and 4.7.

**4.3.1 Qualification samples.** Qualification test samples shall consist of 100 nuts, of each MS33737 part number on which qualification is desired. Samples shall be marked and shipped as directed by the activity responsible for qualification in the letter of authorization therefrom (see 6.4).

**4.4 Quality conformance tests.**

**4.4.1 Sampling.** Samples shall be selected in accordance with inspection level II of MIL-STD-105 with an acceptable quality

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level of 1.5. Samples for preparation for delivery shall be selected at random and the containers shall be fully prepared for delivery, except that the container need not be sealed.

4.4.2 *Tests.* The quality conformance tests shall consist of the following tests conducted in the order listed, on each nut selected as specified in 4.4.1:

- |                            |         |
|----------------------------|---------|
| (a) Examination of product | (4.6.1) |
| (b) Prevailing torque      | (4.7.1) |
| (c) Position torque        | (4.7.2) |
| (d) Maximum torque         | (4.7.3) |
| (e) Tension strength       | (4.7.4) |

4.4.2.1 Samples for preparation for delivery, selected in accordance with 4.4.1, shall be examined in accordance with 4.6.2.

4.4.3 *Rejection and retest.* The instructions on reworking, refurbishing or resubmitting rejected items shall be as specified in the general provisions of the contract or order.

#### 4.5 Test conditions.

4.5.1 *Ambient temperature.* Unless otherwise specified, all tests of this specification shall be performed at room temperature. If a nut fails a test for which no ambient temperature other than room temperature is specified, and in the opinion of the inspector the nut might pass the test in an ambient temperature of 70° F, the test shall be reformed with the nut in the ambient temperature of 70° ± 1° F.

4.5.2 *Test plate.* Whenever a test plate is specified, it shall be fabricated from 5052 half-hard, aluminum alloy of the thickness specified in MS33737. Each nut shall be installed in a hole in the test plate which shall conform to figure 1 for the screw thread size and pitch specified in MS33737. The holes shall be far enough apart that no two nuts or washers (see 4.7.5) can touch each other for any position of rotation of the nuts.

4.5.3 *Screws.* All screws used in the tests shall be brass conforming to AN515 and of the smallest length which will engage all of the threads of the nut.

#### 4.6 Examinations.

4.6.1 *Examination of product.* The nut shall be examined, measured, weighed, etc., as necessary to determine conformance to all requirements of this specification for which there are no specific tests.

4.6.2 *Preparation for delivery.* The preservation, packaging, packing, and marking shall be examined to determine conformance to section 5.

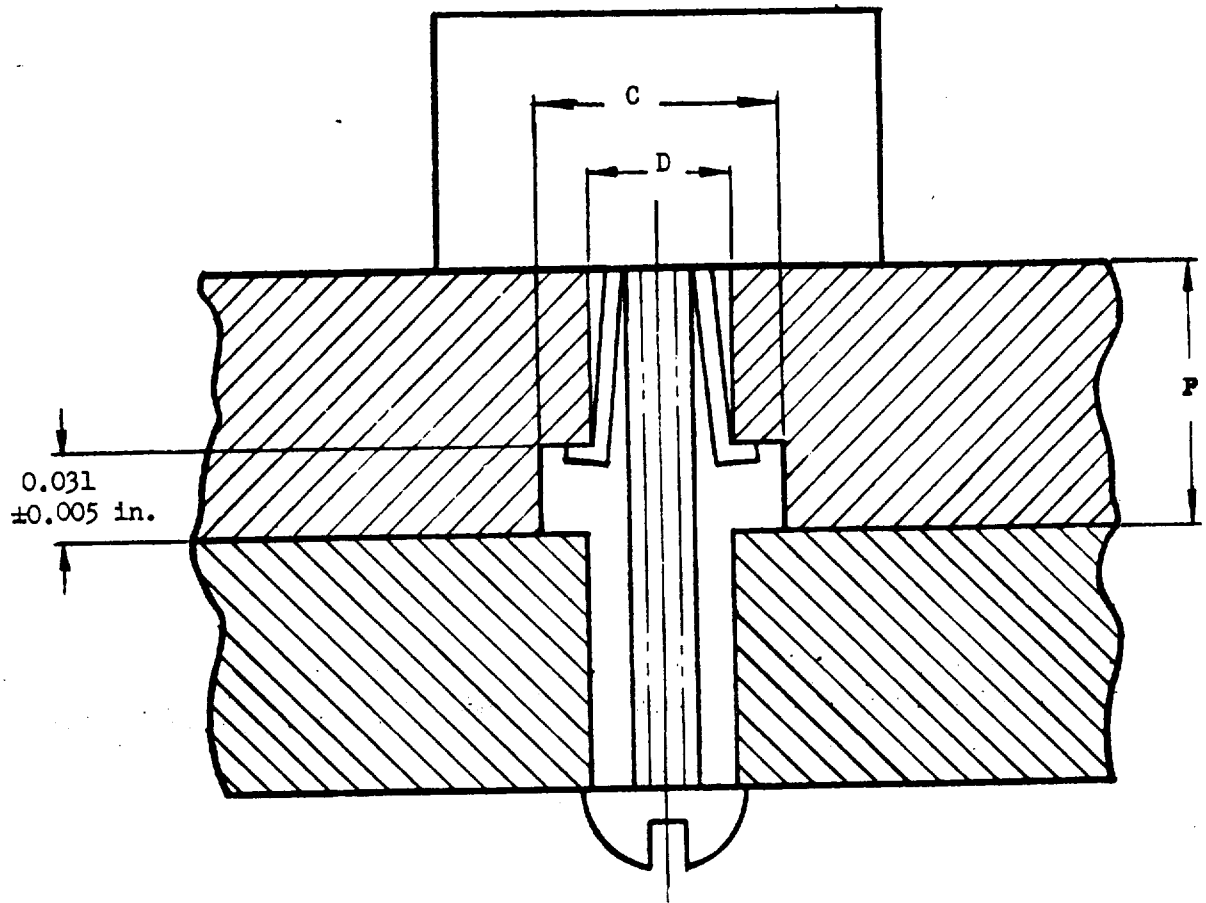
#### 4.7 Test methods.

4.7.1 *Prevailing torque.* The nut shall be tested for prevailing torque by screwing a screw into and out of the nut without axial load on the screw other than that required to keep the screwdriver in the screw slot. Each installation and removal of the screw shall consist of four turns of the screw after it has first made contact with the threads of the nut. The test shall be run slowly enough to obtain a dependable measure of the torque. The torque shall be measured while the screw is being removed during the first and fifteenth removals and shall conform to 3.6.1.

4.7.2 *Position torque.* The nut shall be installed in a test plate and the torque required to turn the nut in the hole, without any screw installed in the nut or any linear force applied to the nut, shall be measured and shall conform to 3.6.2.

4.7.3 *Maximum torque.* The nut shall be installed in a test plate and a screw shall be installed in the nut and tightened to the torque specified in 3.6.3, ± 10 percent. The nut shall not rotate or be damaged in any way by this test.

4.7.4 *Tension strength.* The nut shall be installed in a test plate, and a screw passed through a suitable yoke or brass stud having threads conforming to 3.5.1, and a collar simulating a screw head shall be screwed into the nut and tightened to the torque specified in 3.6.3, ± 10 percent. The load specified in 3.7, ± 10 percent, shall then be applied axially to the screw or stud. The screw or stud shall not come out of the nut, nor shall the nut



SCREW THREADS SIZE AND PITCH	D $\pm 0.010$ in.	C $\pm 0.010$ in.
4-40	0.150	0.237
6-32	.170	.281
8-32	.209	.375
10-24	.240	.440

FIGURE 1. Flange or panel hole



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fail or be damaged in any way as a result of this test.

**4.7.5 Vibration.** The nut shall be installed in a test plate and a flat circular washer having a diameter of  $1 \pm 0.05$  inch and a hole of a size appropriate for the screw shall be clamped to the test plate by a screw installed in the nut. The washer shall be of 5052 half-hard aluminum alloy of the following thickness:

Screw threads size and pitch	Vibration test washer thickness (inch)
4-40	0.125
6-32	.1875
8-32	.25
10-24	.375

The screws shall be tightened to the torque specified in 3.6.3 and the test plate shall be mounted in a vertical plane on a vibration stand and shall be vibrated as specified in 3.9. Neither the nut, the screw, nor the washer shall turn, shift, or loosen as a result of this test.

**4.7.6 Salt spray.** The nuts, installed in a test plate with screws installed in them, shall withstand salt spray tests in accordance with Procedure II of MIL-E-5272, except that the time period shall be 192 hours without indications of corrosion which cannot be wiped off with a damp cloth.

## 5. PREPARATION FOR DELIVERY

**5.1 Preservation.** Preservation shall be in accordance with Method IA of MIL-P-116, without the use of contact preservative.

**5.2 Packaging, packing, and marking.** Packaging and packing shall be level A, B, or C, as specified (see 6.2), and marking shall be in accordance with MIL-H-3982. Packaged quantities shall be as specified.

## 6. NOTES

**6.1 Intended use.** The nuts are intended for use in installing flange-mounted instruments on aircraft instrument panels.

**6.2 Ordering data.** Procurement documents should specify:

- (a) Title, number, and date of this specification.
- (b) The quantity, and MS part number of the nut desired (see 1.2).
- (c) The level of packaging and packing desired (see 5.2).
- (d) Data requirements (see 3.2).

## 6.3 Definitions.

**6.3.1 Maximum torque.** Maximum torque as used in this specification, will mean the torque applied, in the tightening direction, to a screw which is installed in the nut when the nut is properly installed in a panel.

**6.3.2 Position torque.** Position torque as used in this specification, will mean the torque applied to the nut when it is properly installed in a panel without any screw installed in it or any linear force applied to it.

**6.3.3 Prevailing torque.** Prevailing torque as used in this specification, will mean the torque obtained while the screw is in motion, being turned out of the nut without axial load on the screw other than that required to keep the screwdriver in the screw slot.

**6.4 Qualification.** With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved 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 suppliers 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 Bureau of Naval Weapons, Department of the Navy, Washington, D.C. 20360, and information pertaining to qualification of products may be obtained from that activity.

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**Reviewer activity:**

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Navy—Weps

**User activity:**

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**Preparing activity:**

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