The Engineering Society
For Advancing Mobility
Land Sea Air and Space
INTERNATIONAL

400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE STANDARD

AS7253 REV. A

Issued 1991-12
Revised 1996-10

Submitted for recognition as an American National Standard

Superseding AS7253

(R) NUTS, SELF-LOCKING, NICKEL ALLOY, UNS N07001 CLASSIFICATION: 180 ksi/1400°F PROCUREMENT SPECIFICATION

FSC 5310

1. SCOPE:

1.1 Type:

This procurement specification covers all metal, self-locking wrenching nuts, plate nuts, shank nuts, and gang channel nuts made of a corrosion and heat resistant nickel-base alloy of the type identified under the Unified Numbering System as UNS N07001.

1.1.1 Classification: 180 ksi minimum axial tensile strength at room temperature.
(R) 1400 °F maximum test temperature of parts.

1.2 Application:

For use up to approximately 1400 °F where high strength nuts with UNJ thread form are required for use with standard MIL-S-8879 external threads.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 (R) SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2410	Silver Plating, Nickel Strike, High Bake
AMS 2411	Silver Plating, High Temperature Application
AMS 5708	Alloy Bars and Forgings, Corrosion and Heat Resistant, 19.5Cr 13.5Co 4.3Mo 3.0Ti 1.4AI, Consumable Electrode or Vacuum Induction Melted, 1975°F (1080°C) Solution Heat Treated
AMS 5709	Nickel Alloy, Corrosion and Heat Resistant, Bars and Forgings, 58Ni 19.5Cr 13.5Co 4.3Mo 3.0Ti 1.4AI 0.05Zr 0.006B, Consumable Electrode or Vacuum Induction Melted, 1975°F (1079°C) Solution, Stabilization, and Precipitation Heat Treated
AS954	Design Data and Standardization of Thin Wall 12-Point Sockets and Box Wrenches for Aerospace Engine Use
AS1310	Fastener Torque for Threaded Applications, Definitions of
AS7471	Bolts and Screws, Nickel Alloy, Classification 165 ksi/1350°F, Procurement Specification For

2.1.2 (R) U.S. Government Publications: Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

GGG-W-636	Wrenches (Box, Open End, and Combinations)
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-S-8879	Screw Threads, Controlled Radius Root With Increased Minor Diameter; General Specification for
MIL-STD-1312-6	Fastener Test Methods, Method 6, Hardness

2.1.3 ANSI Publication: Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI/ASME B46.1	Surface Texture (Surface Roughness, Waviness, and Lay)

2.1.4 (R) ASTM Publications: Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 140	Standard Hardness Conversion Tables for Metals
ASTM D 3951	Commercial Packaging

2.2 Definitions:

Refer to AS1310 for definitions related to fastener torque.

BURR: A rough edge or ridge left on the metal due to a cutting, grinding, piercing, or blanking operation.

DEFECT: Any nonconformance of the unit of product with specified requirements.

DEFECTIVE: A unit of product which contains one or more defects.

PRODUCTION INSPECTION LOT: Shall be all finished parts of the same part number, made from a single heat of alloy, heat treated at the same time to the same specified condition, produced as one continuous run, and submitted for vendor's inspection at the same time.

ROOM TEMPERATURE: Ambient temperature (68°F approximately).

TIGHT BURR: A burr closely compacted and binding in the periphery of a part without any loose ends and is within the dimensional limits of the part.

2.3 Unit Symbols:

°	degree, angular
°C	degree, Celsius
°F	degree, Fahrenheit
%	percent (1% = 1/100)
HRC	hardness, Rockwell C scale
lbf	pound-force
lbf-in	pound-force inch, torque
psi	pound-force per square inch
ksi	kips (1000 pounds) per square inch
cpm	cycles per minute
in^2	square inch
µin Ra	microinch, roughness average

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be AMS 5708, unless otherwise specified on the part drawing.

3.2 Construction:

Each nut shall be a self-contained unit including the self-locking device. The locking device shall not operate by means of separate movement from the installation and shall not depend on pressure on the bearing surface for the locking action. The locking device shall be set to meet the locking torque requirements of 3.7.3 when used with either UN thread form, Class 3A, or UNJ thread form external threads. Tool marks resulting from producing the locking feature shall blend smoothly without abrupt change.

3.3 Threads:
(R)

UNJ thread form and dimensions in accordance with MIL-S-8879.

3.3.1 Bearing Surface Squareness: The bearing surface shall be square with the thread pitch cylinder axis
(R) within the limits specified on the part drawing. Bearing surface shall not be convex. Bearing surface squareness shall be tested using a table squareness gage and feeler gage. The squareness requirement shall apply to the complete bearing surface of the nut except that, for nonfloating plate nuts having a bearing surface exceeding 1.5 times the thread major diameter, the squareness requirement shall, unless otherwise specified on the part drawing, apply only to the portion of the bearing surface of the nut contained within a diameter equal to 1.5 times the thread major diameter. The nuts to be inspected shall permit at least three complete turns of engagement on the thread arbor of the squareness gage; plating or coating may be stripped, if necessary, to meet this requirement. Multi-piece floating plate nuts shall have the nut element removed from the retainer for checking thread squareness.

3.3.2 Plating or Coating Allowance: Internal thread plating or coating allowance shall be as specified in
(R) MIL-S-8879, unless otherwise specified on the part drawing.

3.4 Heat Treatment:
(R)

The formed and machined nuts shall be solution, stabilization, and precipitation heat treated in accordance with the heat treating procedure specified in the material specification, except that the time for stabilization heat treatment may be extended up to 24 hours, in order to meet the hardness in 3.4.1 and performance as in 3.7.

3.4.1 Hardness: Unless otherwise specified on the part drawing, the hardness after heat treatment as in
(R) 3.4 shall be no greater than 44 HRC (see 8.1), determined in accordance with MIL-STD-1312-6. The minimum limit is controlled by the axial tensile strength requirement in 3.7.1.

3.5 Plating:

Nuts shall be silver plated in accordance with AMS 2411, unless otherwise specified on the part drawing. On nuts with thread sizes 0.250 inch and larger, the plating thickness shall be not less than 0.0002 inch when measured on the thread pitch diameter. Microscopic measurement on a sectioned nut shall be used as a referee method. Nuts with thread sizes 0.190 inch and smaller shall show complete plate coverage on the thread. Plating on other surfaces shall be 0.0003 to 0.0006 inch thick.

3.6 Lubrication:

(R)

The nuts may be provided with a wax type coating (cetyl alcohol) which will prevent nut-bolt seizure at initial installation provided such treatment is applicable to all production nuts of the same part number.

3.7 Performance:

Unless otherwise specified on the part drawing, nuts shall conform to the performance requirements in 3.7.1, 3.7.2, 3.7.3, 3.7.4, 3.7.5, 3.7.6, 3.7.7, 3.7.8, and 3.7.9. All tests shall be conducted on representative nuts assembled on bolts of any convenient length and on which the nuts will assemble freely, with the fingers, up to the self-locking device.

3.7.1 Axial Tensile Strength: Not less than four nuts in the as-received condition and four nuts which have been heated to 1400°F ± 15°F, held at heat for 6 hours ± 0.25 hour and cooled to room temperature, shall be assembled on alloy steel bolts hardened and tempered to not lower than 40 HRC, and having threads in accordance with 3.8. Each nut-bolt assembly shall be tested at room temperature in axial tension, using a bearing plate to grip the nut. The bearing plate hole diameter shall be 0.010 to 0.034 inch greater than the bolt thread basic major diameter. Bearing plate hole edges shall be broken 0.010 to 0.015 inch. Axial tensile strength of the nut shall be not lower than the load values specified in Table 1 and the nuts shall not crack during test; tests need not be run to failure. The axial tensile load shall be applied to the nut slowly at a maximum rate equivalent to:

$$\text{Load, lbf/minute} = 78\,000 \times D^2 \qquad \text{(Eq. 1)}$$

where:

D = nominal major diameter of thread

3.7.1.1 Shank Nuts: Nuts with shanks designed to be flared at assembly (see Figure 1) shall be tested as in 3.7.1 except that the bearing plate hole shall be 0.004 to 0.008 inch greater than the maximum allowable shank diameter. It is not necessary to flare the shank for this test. The bearing plate hole shall be chamfered sufficiently to clear the shank nut bearing surface-to-shank maximum fillet.

TABLE 1 - Axial Tensile Load

Nut Thread Size	Axial Tensile Load at Room Temp. lbf minimum /1/
0.112 -40UNJC-3B	894
0.112 -48UNJF-3B	1 020
0.138 -32UNJC-3B	1 340
0.138 -40UNJF-3B	1 574
0.164 -32UNJC-3B	2 153
0.164 -36UNJF-3B	2 313
0.190 -32UNJF-3B	3 156
0.250 -28UNJF-3B	5 861
0.3125-24UNJF-3B	9 438
0.375 -24UNJF-3B	14 556
0.4375-20UNJF-3B	19 621
0.500 -20UNJF-3B	26 757
0.5625-18UNJF-3B	33 989
0.625 -18UNJF-3B	43 206

/1/ Requirements above apply to companion bolts with UNJ threads to Class 3A tolerance. Area upon which stress for axial tensile load requirements is based on the area at 0.75H thread depth and calculated as follows:

$$A = 0.7854\ [D - (1.5H)]^2 = 0.7854\ [D - (1.2990/n)]^2 \qquad \text{(Eq.2)}$$

where:

A = Area at 0.75H thread depth, in^2
H = Height of sharp V-thread = (cos 30°)/n, inch
n = Number of thread pitches per inch
D = Major diameter, maximum, inch

Load requirements for axial strength load is based on 180 000 psi stress.

$$\text{Axial tensile load} = 180\,000 \text{ psi} \times A, \text{ lbf} \qquad \text{(Eq.3)}$$

For sizes not shown, axial tensile strength loads for nuts shall be based upon the respective bolt stress area using the above equation and 180 000 psi stress.

3.7.2 (R) Wrench Torque: This test is applicable to wrenching nuts with hexagon or double hexagon wrenching feature. For this test only, all nuts shall be cleaned to remove all trace of any lubricant, wax, or antiseize coating or compound. At least three nuts shall be tested at room temperature for wrench torque by assembling a nut on an alloy steel bolt having sufficient strength. The nut shall be tightened against a bushing with a hole diameter as in 3.7.1 and having hardness not lower than 40 HRC, and surface roughness of 63 µin Ra. Nuts shall withstand 12 successive applications of the torque specified in Table 2 without destroying the wrenchability of the nut. Wrenches used for this test shall be the open-end type conforming to GGG-W-636, Type IV, for hexagon nuts, and socket type conforming to AS954 for double hexagon nuts.

(R) TABLE 2 - Wrench Torque

Nominal Dimension Across Flats inch	Double Hexagon Wrenching Feature Wrench Torque min lbf-in	Hexagon Wrenching Feature Wrench Torque min lbf-in
0.188	--	30
0.218	40	40
0.250	82	60
0.281	145	90
0.312	205	125
0.375	450	250
0.438	730	370
0.500	930	495
0.562	1130	690
0.625	1565	990
0.688	2000	1235
0.750	2375	1485
0.781	2750	1730
0.812	3180	1980

3.7.3 Locking Feature Torques: The locking feature torques shall be measured and recorded for not less than 10 new nuts, selected at random from the lot, for each of the tests required in 3.7.5. Loading, and conditioning for the five-cycle test of 3.7.5.2, shall be in accordance with 3.7.3.1. Test bolts shall conform to 3.8 or equivalent threaded parts. Test fixtures shall conform to 3.7.3.1.2. Tests shall be conducted at room temperature. The end of the bolt shall extend a minimum of 1.5 thread turns through the top of the nut at the start of the test. Test shall be run in such a manner that a dependable measure of torque will be obtained. The increase in temperature of the nuts during the test shall not exceed 74 °F. The maximum prevailing torque and minimum breakaway torque (see AS1310) shall not exceed the values specified in Table 3 as required by the reusability tests in 3.7.5.

TABLE 3 - Locking Feature Torques

Nominal Thread Size	Minimum Breakaway Torque lbf-in /1/	Minimum Breakaway Torque lbf-in /2/	Maximum Prevailing Torque lbf-in /3/	Maximum Prevailing Torque lbf-in /4/
0.112 -40	0.5	1	4	8
0.112 -48	0.5	1	4	8
0.138 -32	1	2	7	14
0.138 -40	1	2	7	14
0.164 -32	1.5	3	11	22
0.164 -36	1.5	3	11	22
0.190 -32	2	4	15	30
0.250 -28	3.5	7	30	60
0.3125-24	6.5	13	60	120
0.375 -24	9.5	19	80	160
0.4375-20	14	28	100	200
0.500 -20	18	36	150	300
0.5625-18	24	48	200	400
0.625 -18	32	64	300	600

/1/ Minimum breakaway torque for 12-cycle, room temperature, as received test; 5-cycle, loaded and conditioned test; permanent set test.

/2/ Minimum breakaway torque for single-cycle, loaded, room temperature test.

/3/ Maximum prevailing torque for 12-cycle, room temperature, as received test; single-cycle, loaded, room temperature test; permanent set test.

(R) NOTE: At initial installation, values may be exceeded when bolt first enters locking feature, provided all parts are within the specified limits after a minimum of 1.5 thread pitches, including chamfer, protrudes through the top of nut.

/4/ Maximum prevailing torque at removal for 5-cycle, loaded and conditioned test.

3.7.3.1 Loading and Conditioning: Nut-bolt assemblies shall be lubricated in accordance with 3.10 and loaded in axial tension to 85 ksi at room temperature on a spacer-type fixture in accordance with 3.7.3.1.2, measuring and recording the maximum prevailing torque achieved. Loading shall be determined by elongation measurement of the bolt at room temperature. For reference, minimum bolt lengths are given in 3.8. Allow assembly to remain stressed at room temperature for not less than 1 hour, remeasured, and loading adjusted to 85 ksi. The loaded assemblies shall then be heated in a furnace to 1400 °F ± 15 °F, held at heat for 6 hours ± 0.25 hour, removed from furnace, cooled to room temperature, and unloaded by loosening nut one-half turn and record unseating torque. Breakaway and prevailing torques shall be measured and recorded as the nut is removed from the bolt. In case of wrenchable nuts, the nut shall be turned relative to the fixture; in the case of anchor or channel nuts, the bolt head shall be turned. The wrenchability of the tested nuts shall not be destroyed by the test.

3.7.3.1.1 Loading: The bolt elongation used to load the nut-bolt assembly to induce 85 000 psi axial tensile stress in the bolted assembly is based on a modulus of elasticity of 31 000 000 psi and the following equations:

$$e = s/E, \text{ unit elongation, inch/inch} \quad \text{(Eq.4)}$$

$$eL = \text{bolt elongation, inch} \quad \text{(Eq.5)}$$

where:

e = unit strain of bolt loaded shank, inch/inch
s = 85 000 psi bolt stress at area of max (root) dia
E = 31 000 000 psi modulus of elasticity
L = bushing length (see Figure 2) in loaded nut-bolt assembly

The elongation of bolts for nut sizes not listed herein shall be 0.002742L, where L = bushing length as in Figure 2.

3.7.3.1.2 Fixture: The spacer-type fixture shall be made of AMS 5709 nickel alloy. The diameter of the bolt hole in the fixture shall be 0.030 to 0.034 inch greater than the maximum major diameter of the bolt thread (see Figure 2). Fixture may be counter-bored 0.004 to 0.008 inch greater than the maximum allowable shank diameter of shank nuts to permit the spacer to seat onto the bearing surface of the nut. Length of fixture shall be as specified in Table 7.

3.7.4 Permanent Set: At least three nuts shall be assembled on a maximum mandrel (see Figure 3) so that the mandrel protrudes through the nut not less than three thread turns. Nuts shall then be removed from the maximum mandrel and assembled on a minimum mandrel (see Figure 4) in the same manner. Tests shall be conducted at room temperature with no axial stress; breakaway and prevailing torques shall be measured and recorded. The nuts shall not exceed the maximum prevailing torque of Table 3, Column /3/, during the installation or removal cycle on the maximum mandrel and shall not be less than the minimum breakaway torque of Table 3, Column /1/, at the start of the removal cycle on the minimum mandrel.

3.7.5 Reusability: Nuts shall be assembled on test bolts conforming to 3.8 and tested in accordance with 3.7.3 as modified below. After testing, nut threads shall show no distortion, galling, or scratches of such depth as to prevent reassembly of nut freely, with the fingers, up to the self-locking device. Bolt threads shall remain serviceable and permit a new nut to assemble freely, with the fingers, up to the self-locking device.

3.7.5.1 (R) Twelve-Cycle, Room Temperature, As Received Test: The nuts shall be installed and removed from the bolts 12 consecutive times, using the same nut and bolt; breakaway and prevailing torques shall be measured and recorded. The nuts shall not exceed the maximum prevailing torque of Table 3, Column /3/, during the installation or removal cycle and shall not be less than the minimum breakaway torque of Table 3, Column /1/.

3.7.5.2 (R) Five-Cycle, Loaded and Conditioned Test: Conditioning cycles shall be performed in accordance with 3.7.3.1. The nuts shall be completely removed from the bolt after each cycle of conditioning. The conditioning test shall be run five consecutive cycles, using the same nut, bolt and spacer; breakaway and prevailing torques shall be measured and recorded. The maximum prevailing torque and the minimum breakaway torque for each cycle shall not exceed the limits specified in Table 3, Columns /4/ and /1/, respectively.

3.7.5.3 Single-Cycle, Loaded, Room Temperature Test: Nuts shall be assembled and loaded to one-half (50%) of the torques listed in Table 2. The nut shall be completely removed from the bolt; breakaway and prevailing torques shall be measured and recorded; and the nuts shall not exceed the maximum prevailing torque of Table 3, Column /3/, during the installation or removal cycle and shall not be less than the minimum breakaway torque of Table 3, Column /2/.

3.7.6 (R) Vibration Test: Ten nuts of the type to be tested, for the sizes listed in Table 4, shall be installed on a test bolt conforming to 3.8 and on a test fixture as in 3.7.3.1.2. The assembly torque values shall be as specified in Table 4. For sizes not shown, the torque shall be as agreed upon by purchaser and vendor. Testing of nuts other than hexagon or double hexagon wrenching types shall be as agreed upon by purchaser and vendor. Five nuts shall be removed from the test bolts and reinstalled four additional times to the torque values specified for the thread size. The other five assembled nuts shall be baked at 1400 °F ± 15 °F for 6 hours ± 0.25 hour and cooled to room temperature; these nuts shall then be removed and reinstalled four additional times to the torque values specified for the thread size. The five baked nuts and five unbaked nuts shall be assembled on the vibration test fixture (see Figure 5) on test bolts and vibration tested at room temperature. Assemblies of nuts having Class 3B threads shall be vibrated 30 000 cycles at a frequency of 1750 to 1800 cpm and an amplitude of 0.435 to 0.465 inch. The assembly shall traverse the entire length of the slots in the test fixture. Reference lines shall be scribed, or other suitable markings made, to determine the amount the nut turns on the test bolt during vibration test. The relative rotation between any nut and bolt shall be not greater than 360°. The nuts shall not have developed any cracks or broken segments, as shown by examination at 10X magnification. Multipiece floating plate nuts shall have the nut element removed from the retainer for this test. Fixed anchor nuts may have the lugs removed. Vibration testing is not required for nuts of nominal thread diameter less than 0.164 inch.

TABLE 4 - Assembly Torque for Vibration Test

Nominal Thread Size	Assembly Torque lbf-in
0.164 -32	22
0.164 -36	22
0.190 -32	30
0.250 -28	60
0.3125-24	120
0.375 -24	160
0.4375-20	200
0.500 -20	300
0.5625-18	400
0.625 -18	600

3.7.7 Flarability: At least three shank nuts shall be tested for flarability. The shank of shank nuts shall not crack when flared with a 60º included angle conical tool to a diameter equal to 115% of the maximum allowable shank diameter, unless otherwise specified on the part drawing.

3.7.8 Push-Out: This requirement is applicable only to gang channel nuts, floating plate nuts, and nonfloating plate nuts. At least five nuts shall be screwed or clamped to a steel plate or plates of a thickness equal to or greater than the nominal major diameter of the nut thread. The plate bolt hole at maximum material condition (MMC) shall be positioned within 0.010 inch radius relative to the nut thread minor diameter at MMC. The screw or clamping head diameter shall not exceed 1.5 times the rivet hole diameter and shall employ the rivet holes or be centered over same. The rivet hole size and its location from the thread axis of the nut in gang channel nut assemblies shall be as shown in Table 5, unless otherwise specified on the part drawing. With the push-out stud or device hemispherical end inserted against the base of the nut thread, the push-out load specified in Table 5 shall be applied evenly to the nut on a line perpendicular to the mounting plane of the nut. When subjected to the push-out load, the nut shall not be pushed out of the retainer of any type of plate nut or gang channel nut, or effect a permanent deformation axially with the threaded element of more than 0.030 inch when measured at the thread centerline between the steel plate and the base of the nut retainer. Any deformation that will prevent a bolt from being assembled freely with the fingers is not permitted.

TABLE 5 - Push-Out Load and Rivet Hole Size and Location

Nominal Thread Diameter Inch	Rivet Hole Diameter Inch	Hole Location (Distance From Nut Thread Axis) Inch	Push-Out Load, Minimum lbf
0.112	0.093 - 0.103	0.334 - 0.354	40
0.138	0.093 - 0.103	0.334 - 0.354	60
0.164	0.093 - 0.103	0.334 - 0.354	80
0.190	0.093 - 0.103	0.334 - 0.354	100
0.250	0.093 - 0.103	0.490 - 0.510	125
0.3125	0.125 - 0.135	0.490 - 0.510	125
0.375	0.125 - 0.135	0.490 - 0.510	125
0.4375	0.125 - 0.135	0.552 - 0.572	125
0.500	0.125 - 0.135	0.615 - 0.635	125
0.5625	0.125 - 0.135	0.678 - 0.698	125
0.625	0.125 - 0.135	0.740 - 0.760	125

3.7.9 Torque-Out: This requirement is applicable only to gang channel nut assemblies, floating plate nuts, and nonfloating nuts. At least five nuts shall be prepared as in 3.7.8 and subjected to the torque-out loads in Table 6, first in the clockwise direction and then in the counterclockwise direction. The diameter of the torque stud shall have 0.010 inch maximum diametral clearance in the test plate. The torque stud shall be provided with a shoulder to seat against the base of the nut element and may incorporate a suitable bushing. Reverse loading may be accomplished by use of a check nut assembled onto the stud threads that protrude through the top of the nut. This test shall be performed with no axial load on the bearing surface of the nut retainer plate. The nut assembly shall withstand the applied torque without cracking, rupture, or being deformed sufficiently to prevent normal use of the nut. Nuts used in push-out test shall be used for this test.

TABLE 6 - Torque-Out Load

Nominal Thread Diameter Inch	Torque-Out Load, Minimum lbf-in
0.112	20
0.138	30
0.164	45
0.190	60
0.250	100
0.3125	160
0.375	240
0.4375	350
0.500	450
0.5625	600
0.625	900

3.8 Test Bolts:

(R)

Except as specified in 3.7.1 and 3.7.2, bolts shall conform to AS7471 and shall have threads conforming to MIL-S-8879. For reference information, table in Figure 5 and Table 7 provides minimum bolt lengths.

(R) TABLE 7 - Test Bolts and Fixture Lengths

Nominal Thread Diameter Inch	Fixture Length Inch	Required Bolt Elongation Inch	Reference Bolt Length /1/ Inch
0.112	0.735 - 0.765	0.0021	1.000
0.138	1.109 - 1.139	0.0031	1.438
0.164	1.252 - 1.270	0.0035	1.625
0.190	1.252 - 1.270	0.0035	1.719
0.250	1.332 - 1.350	0.0037	1.875
0.3125	1.332 - 1.350	0.0037	1.969
0.375	1.332 - 1.350	0.0037	2.000
0.4375	1.382 - 1.400	0.0038	2.094
0.500	1.382 - 1.400	0.0038	2.094
0.5625	1.432 - 1.450	0.0040	2.250
0.625	1.432 - 1.450	0.0040	2.312

/1/ Minimum bolt length calculated to provide 3 pitches protruding through AS3291 nut for maximum grip of fixture length and then rounded to .031 increment.

3.9 Uncoated Nuts:

Uncoated nuts that have threads with an allowance for coating at assembly shall be plated for test purposes as in 3.5. Uncoated nuts permanently attached to brackets or other similar parts shall be tested with bolts plated in accordance with AMS 2410 or AMS 2411 to a thickness of 0.0003 to 0.0006 inch. Plated bolts shall meet the requirements of 3.8 before plating.

3.10 Test Lubrication:

Bolt threads shall be lubricated with MIL-L-7808 oil before each installation of the nut.

3.11 Quality:

(R)

Parts shall be uniform in quality and condition, free from loose burrs (tight burrs may be acceptable if part performance is not affected), foreign materials, and from imperfections detrimental to the usage of the part.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of parts shall supply all parts for vendor tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that parts conform to the requirements of this document.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for material (3.1), threads (3.3), plating (3.5), single-cycle, loaded, room temperature test (3.7.5.3), flarability (3.7.7), and dimensions per part drawing are classified as acceptance tests and shall be performed on each production inspection lot.

4.2.2 Preproduction Tests: Tests for all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the first-article shipment of a type and size of part desired by purchaser, and also, when purchaser deems confirmatory preproduction testing to be required.

4.3 Sampling:

Shall be as follows:

4.3.1 For Acceptance Tests:

4.3.1.1 Material: Per material specification.

4.3.1.2 Single-Cycle, Loaded, Room Temperature Test: 10 parts selected at random from production inspection lot.

4.3.1.3 Flarability: 3 parts selected at random from production inspection lot.

4.3.1.4 Plating: 3 parts selected at random from production inspection lot.

4.3.1.5 Threads and Dimensions: All parts selected for single-cycle, loaded, room temperature test shall be subjected to and have passed dimensional and thread inspection prior to the single-cycle test.

4.3.2 Sampling for Preproduction Tests: As specified herein or as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor shall furnish with, or prior to, the first shipment of parts of each part number a report of test data showing that the parts conform to all technical requirements of this specification and the part drawing.

4.4.2 The vendor of parts shall furnish with each production inspection lot shipment a report stating that the chemical composition of the parts conform to the applicable material specification, and showing the results of tests to determine conformance to the acceptance tests, and where applicable the flarability requirements of this specification. This report shall include the purchase order number, production lot number, AS7253, contractor or direct supplier of material, part number, nominal size, and quantity.

4.5 Rejected Lots:
(R)

If a production inspection lot is rejected, the vendor of parts shall perform corrective action to screen out or rework the defective parts, resubmit for acceptance tests inspection as in 4.2.16, or scrap the entire lot. Resubmitted lots shall be clearly identified as reinspected lots.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Packaging shall be in accordance with ASTM D 3951.
(R)

5.1.2 Parts having different part numbers shall be packed in separate containers.

5.1.3 Each container of parts shall be marked to show not less than the following information:

a. NUTS, SELF-LOCKING, NICKEL ALLOY, CORROSION AND HEAT RESISTANT
b. AS7253
c. PART NUMBER
d. LOT NUMBER
e. PURCHASE ORDER NUMBER
f. QUANTITY
g. MANUFACTURER'S IDENTIFICATION

6. ACKNOWLEDGMENT:

A vendor shall mention AS7253 in all quotations and when acknowledging purchase orders.

7. REJECTIONS:

Parts not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

8.1 (R) Hardness Conversion Tables:

Hardness conversion tables for metals are presented in ASTM E 140.

8.2 Key Words:

Nuts, Self-Locking Nuts, Procurement Specification

8.3 The (R) is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document.

PREPARED BY SAE COMMITTEE E-25,
GENERAL STANDARDS FOR AEROSPACE PROPULSION SYSTEMS