

INCH-POUND

MIL-DTL-45913D

14 JUNE 2011

SUPERSEDING

MIL-DTL-45913C

30 APRIL 1998

DETAIL SPECIFICATION

NUTS, SELF-LOCKING, HEXAGON, PREVAILING TORQUE

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

1. SCOPE

1.1 This specification establishes mechanical and performance requirements for prevailing-torque hexagon locknuts.

1.2 Classification Locknuts should be of the following types, grades and series (see 6.2).

1.2.1 Types

Type I Nut, self-locking, hexagon, UNC/UNF-2B (see MIL-DTL-45913/1 and /2).

Type II Nut, self-locking, hexagon, UNC/UNF-3B (see MIL-DTL-45913/3 and /4).

Type III Nut, self-locking, flanged, prevailing-torque.

1.2.2 Grades Three grades of carbon and alloy steel locknuts are designated as Grade 2, 5, and Grade 8 in accordance with SAE J995 and two groups of corrosion resistant steels, designated as 300 series alloy, group 1 or 316 series alloy, group 2, as noted in ASTM F594. Nonferrous materials as specified herein may be used for locknuts, but tensile strengths specified below do not apply (see 6.2).

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Philadelphia (DSCP), ATTN: DSCP-NASA, 700 Robbins Avenue, Philadelphia, PA 19111-5096 or e-mail to dscpg&ispeccomments@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.daps.dla.mil>.

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1.2.3 Series Locknuts covered by this specification are intended to be of the following series.

Hex locknut (regular)
 Hex thin locknut (jam)
 Hex thick locknut
 Hex heavy locknut
 Hex flanged locknut

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 documents cited in sections 3 and 4 of this specification, whether or not they are listed.

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 listed in the issue of the Department of Defense Index Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys.

MIL-DTL-45913/1 - Nut, Self-Locking, Hexagon, Non-Metallic Locking Feature, 250°F, UNC/UNF-2B.

MIL-DTL-45913/2 - Nut, Self-Locking, Hexagon, All-Metal Locking Feature, 250°F, UNC/UNF-2B.

MIL-DTL-45913/3 - Nut, Self-Locking, Hexagon, Non-Metallic Locking Feature, 250°F, UNC/UNF-3B.

MIL-DTL-45913/4 - Nut, Self-Locking, Hexagon, All-Metal Locking Feature, 250°F, UNC/UNF-3B.

(Copies of these documents are available online at <https://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD-Adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

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American Society of Mechanical Engineers (ASME):

- ASME B1.1 - Unified Inch Screw Thread
- ASME B1.3M - Screw Thread Gaging Systems for Dimensional Acceptability
Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)
- ASME B1.15 - Unified Inch Screw Thread (UNJ Thread Form)
- ASME B18.2.1 - Square and Hex Bolts and Screws
- ASME B18.18.2M - Inspection and Quality Assurance for High Volume Machine
Assembly Fasteners.
- ASME B46.1 - Surface Texture

(Copies of this document are available from www.asme.org or the American Society of Mechanical Engineers International, Three Park Avenue, M/S 10E New York, NY 10016-5990.)

American Society for Testing and Materials Standards (ASTM):

- ASTM A342/A342M - Standard Test Methods for Permeability of Magnetic Materials
- ASTM A967 - Standard Specification for Chemical Passivation Treatments for Stainless Steel
Parts.
- ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and
Steel
- ASTM F467 - Standard Specification for Nonferrous Nuts for General Use
- ASTM F594 - Standard Specification for Stainless Steel Nuts
- ASTM F606 - Standard Test Methods for Determining the Mechanical Properties
of Externally and Internally Threaded Fasteners, Washers, Direct
Tension Indicators and Rivets
- ASTM F812 - Standard Specification for Surface Discontinuities of Nuts, Inch and Metric
Series
- ASTM F1470 - Standard Guide for Specified Mechanical Properties and
Performance
Inspection
- ASTM D3951 - Standard Practice for Commercial Packaging

(Copies of these documents are available from www.astm.org or the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

Society of Automotive Engineers (SAE)

- SAE J429 - Mechanical and Quality Requirements for Threaded
Fasteners.
- SAE J995 - Mechanical and Material Requirements for Steel Nuts.
- SAE-AMS-QQ-A-225/5 - Aluminum Alloy 2017, Bar, Rod and Wire, Rolled, Drawn or
Cold Finished
- SAE-AMS-QQ-A-225/6 - Aluminum Alloy 2024, Bar, Rod and Wire, Rolled, Drawn or
Cold Finished
- SAE-AMS-QQ-A-225/8 - Aluminum Alloy 6061, Bar, Rod, Wire, and Special Shapes;
Rolled, Drawn or Cold Finished
- SAE-AMS-QQ-A-225/10 - Aluminum Alloy 6262 Bar, Rod and Wire, Rolled, Drawn or
Cold Finished
- SAE-AMS-QQ-N-290 - Nickel Plating (Electrodeposited)
- SAE-AMS-QQ-P-416 - Plating, Cadmium (Electrodeposited).

(Copies of these documents are available from www.sae.org or the American Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001..)

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AEROSPACE INDUSTRIES ASSOCIATION (AIA)

NASM 1312	- Fastener Test Methods
NASM1312-1	- Fastener Test Methods; Method 1 Salt Spray
NASM1312-6	- Fastener Test Methods; Method 6 Hardness
NASM25027	- Nut, Self-Locking, 250° F, 450° F and 800° F

(Copies of this document are available from <http://www.aia-aerospace.org> or the Aerospace Industries Association, 1250 Eye Street NW, Washington DC 20005.)

2.4 Order of Precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the test of this document takes precedence. Nothing in this document, however, supercedes 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 sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Material.

3.2.1 Carbon and alloy steel. Regular hexagon and flanged hexagon locknuts shall be manufactured from carbon or alloy steel of such a quality that the locknuts shall meet the mechanical properties (proof loads and prevailing torque) specified in SAE J995 or TABLE 1.

3.2.2 Corrosion-resistant steel. Regular hexagon and flanged hexagon 300 series stainless steel locknuts shall meet the chemical requirements of group 1 in ASTM F594. 316 series locknuts shall meet the chemical requirements of group 2 in ASTM F594.

3.2.3 Brass. Regular hexagon and flanged hexagon locknuts shall meet the chemical requirements of Naval Brass (Alloy 462 or 464) in ASTM F467.

3.2.4 Aluminum alloy. Regular hexagon and flanged hexagon locknuts shall be manufactured from SAE-AMS-QQ-A-225/5, SAE-AMS-QQ-A-225/6, SAE-AMS-QQ-A-225/8 or SAE-AMS-QQ-A-225/10. Aluminum alloy shall have a minimum tensile strength 62,000 psi.

3.3 Protective and surface finishes.

3.3.1 Carbon and alloy steel. Plating and protective finishes shall be as specified on the appropriate specification sheet.

3.3.1.1 Cadmium plating. Cadmium plating shall be in accordance with SAE-AMS-QQ-P-416, Type II, Class 3.

3.3.1.2 Zinc plating. Zinc plating shall be in accordance with ASTM B633, Type II, FE/ZN 5. A minimum of twenty-three hours baking post plating shall be required to minimize the possibility of hydrogen embrittlement on all zinc plated parts.

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3.3.2. Corrosion-resistant steel. Corrosion-resisting steel locknuts shall be passivated in accordance with ASTM A967.

3.3.3. Brass. Brass locknuts shall be uncoated plain.

3.3.4. Aluminum alloy. Aluminum alloy locknuts shall be anodized in accordance with MIL-A-8625, Type II, Class 1.

3.4. Heat treatment. Heat treatment of all materials shall be as specified on the appropriate specification sheet.

3.4.1. Heat treatment for carbon and alloy steels shall be in accordance with SAE J995 (steel locknuts).

3.4.2. Solution annealing of stainless steels shall be in accordance with ASTM F594.

3.4.3. Heat treatment of brass shall be in accordance with ASTM F467.

3.5. Dimensions. Locknuts shall conform to the dimensions specified on the applicable specification sheet. The portion of the locknut containing the locking feature may have a special contour within the maximum permitted width across flats and thickness. Bearing surfaces shall be flat and perpendicular to the axis of the thread hole within a tolerance of 2°. Bearing surface roughness shall not exceed 125 Ra microinches in accordance with ASME B46.1.

3.6. Threads.

3.6.1. Thread Series and Class. Thread series, class, and tolerances shall be called out on the applicable specification sheet and be in accordance with ASME B1.1, except minor diameters where ASME B1.15 may apply. Thread inspection and acceptability shall be in accordance with ASME B1.3M, System 21. Threads shall be inspected prior to installation of locking feature.

3.6.2. Locking feature. Locknuts shall be checked after installation of the locking feature, and shall allow the "GO" gage to enter not less than a half turn with a basic GO thread plug gage to ensure that the locknut is functionable.

3.7. Mechanical requirements.

3.7.1. Hardness. Carbon and alloy steel locknut hardness shall be in accordance with SAE J995.

3.7.2. Magnetic permeability. The magnetic permeability of the corrosion resistant steel locknuts shall be less than 2.0 (air = 1.0) in a field strength of H= 200 oersteds.

3.8. Construction. The locknut shall be a self-contained unit or assembly, including the locking feature. The locking feature shall not operate by means of separate movement from the installation and shall not depend upon pressure on the bearing surface for locking action.

3.9. Marking. All nuts of .250 nominal thread size and larger shall be marked with equally spaced identical symbols (notch, dot, letter or number) as indicated in Figure 1 or SAE J995, for Grade 5 and 8 locknuts. All locknuts shall be marked to identify the manufacturer. Such markings may be additional to the grade markings or an alteration of one or more of the three or six grade marking symbols. Marks shall be raised or depressed, at the manufacturer's option. Raised marks shall not project beyond the specified maximum height or width of the locknut. The color of the non-metallic locking element may be used to identify the manufacturer if the color has been established as the manufacturer's legitimate trademark or symbol. The shape of the all metal locking feature may also be used if it has been established as the manufacturer's legitimate trademark.

3.10. Discontinuities. Limits on presence of discontinuities shall be in accordance with ASTM F812.

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4. VERIFICATION

4.1 Classification of inspections. Inspections shall be classified as quality conformance inspection (see 4.2).

4.1.1 Inspection lot. All locknuts of the same type, material, protective finish, thread series, and size produced under essentially the same conditions and offered for acceptance at one time shall be considered a lot for the inspection purposes.

4.2 Quality conformance inspection.

4.2.1 Sampling. Sampling for conformance inspection shall be in accordance with ASME B18.18.2M unless otherwise specified.

4.3.3 Proof load and prevailing torque testing (steel nuts).

4.3.3.1 Carbon and alloy steel locknuts shall be subjected to the proof loads and prevailing torque specified in SAE J995 or TABLE 1 of this specification.

4.3.3.2 CRES locknuts shall be subjected to the proof loads and prevailing torque specified in ASTM F594.

4.3.4 Protective finish test. Nuts shall be tested in accordance with the applicable protective finish or plating specification. Each lot shall be tested for protective finish thickness and, when specified, salt spray testing.

4.3.5 Hardness test. When a hardness test is to be conducted in lieu of a proof load test, it shall be conducted in accordance with NASM1312-6. Hardness tests may not be substituted for proof tests on nuts that require a proof load over 120,000 pounds.

4.3.6 Magnetic permeability. Magnetic permeability shall be determined by the use of an indicator in accordance with ASTM A342. Magnetic permeability sampling shall be in accordance with ASTM F1470.

4.3.7. Discontinuities. The acceptance of locknuts shall in accordance with the requirements contained in sampling for discontinuities, ASTM F812.

4.4 Test Methods.

4.4.1 Proof load test. Steel locknuts shall be tested in accordance with ASTM F606. Proof load values shall be per Table 1 or SAE 995 or ASTM F594.

4.4.2 Prevailing torque test. Steel locknuts shall be subjected to the prevailing torque test as specified in National Aerospace Standard specification NASM25027.

4.4.3 Test equipment. A hardened threaded mandrel or bolt shall be used in conjunction with a tension testing machine for conducting the proof load test. The mandrel or bolt shall be threaded to the unified thread series and class of the locknut being tested. The mandrel or bolt shall have sufficient strength to ensure failure of the locknut.

4.4.4 Test Procedures. Locknuts shall be assembled and mounted in a tension testing machine and subjected to a load equal to the proof load specified in SAE J995 or TABLE 1. To meet the requirements of this test, the locknut shall resist the load without stripping or rupture.

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4.4.5 Test bolt. The test bolt used in the prevailing-torque test of steel locknuts shall have a zinc phosphate or cadmium plated and oil finish (dry to the touch) meeting a 72 hour salt spray test when tested in accordance with Test 1 of NASM1312-1. Corrosion-resisting steel locknuts shall be torque tested on corrosion-resisting steel test bolts. Aluminum alloy locknuts shall be torque tested on anodized aluminum alloy test bolts. Brass locknuts shall be torque tested on plain brass test bolts.

4.4.6 Load Measuring device. The load measuring device used in the prevailing-torque test shall be an instrument capable of measuring the actual tension induced in the test bolt as the locknut is tightened. The device shall be accurate within plus or minus 5 percent of the test load.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract order or order (see 6.2) When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's 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 which may be helpful, but is not mandatory.)

6.1 Intended use. A prevailing-torque type locknut is a nut which is frictionally resistant to rotation due to a self-contained prevailing-torque (locking) feature, and not because of a compressive load developed against the bearing surface of the locknut.

Each grade of carbon and alloy steel locknuts identified in this document is intended for use with bolts having specified minimum tensile strengths within the following values:

<u>Grade of Locknut</u>	<u>Specified Minimum Ultimate Tensile Strength of Bolt, P.S.I.</u>	
Grade 2 (formerly Grade A)	not greater than	90,000
Grade 5 (formerly Grade B and F)	not greater than	120,000
Grade 8 (formerly Grade C and G)	not less than	105,000
	or greater than	150,000

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Type, grade and series (1.2.1, 1.2.2 and 1.2.3).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1)
- d. Material (3).
- e. Protective finish, when required (3.2).
- f. Thread form, series and class (3.5.1).
- g. Grade marking, if required (3.8).
- h. Packaging requirements (5.1).
- i. Domestic manufacturing source only unless otherwise specified.

6.3 Non-metallic insert. Locknuts with non-metallic inserts should not be used in installations where temperatures exceed 250°F.

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6.4 Subject term (key words) listing.

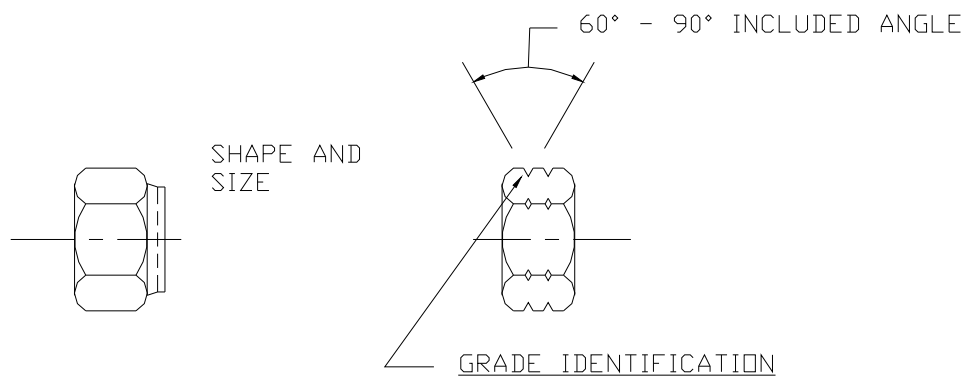
Acceptability
Brass
Grade
Stainless steel
Temper

6.5 Information deleted from previous issue. Information deleted as follows:

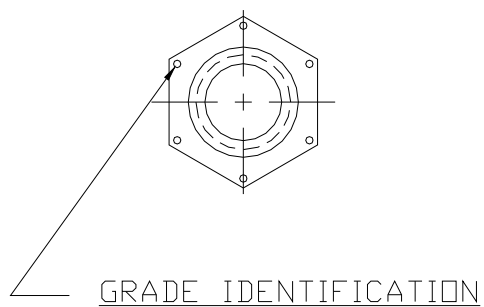
MIL-N-45913B, Type II, Nut, Self-locking, Critical Installations has been renamed.
MIL-N-45913B, Type IV, Nut, Self-locking, Cap, General Purpose has been deleted.
MIL-N-45913B, Type V, Nut, Self-locking, Spline, General Purpose has been deleted,
see MIL-DTL-25027 for locking torque.

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 on the entire content irrespective of the marginal notations and relationship to the last previous issue.

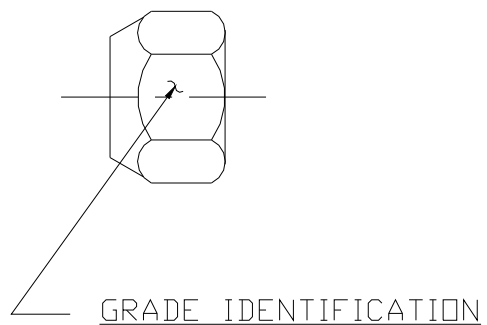
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GRADE 2 NO NOTCHES
 GRADE 5 ONE CIRCUMFERENTIAL NOTCH
 GRADE 8 TWO CIRCUMFERENTIAL NOTCH



GRADE 2 NO MARKS
 GRADE 5 THREE MARKS
 GRADE 8 SIX MARKS



GRADE 2 NO NUMBER
 GRADE 5 NUMBER 5
 GRADE 8 NUMBER 8

TABLE 1

Locknut Nominal Size and Threads Per Inch	Grade 2 Nuts							Grade 5 Nuts							Grade 8 Nuts						
	Proof Load Lb.	Clamp Load Lb.	Prevailing Torque				Proof Load Lb.	Clamp Load Lb.	Prevailing Torque				Proof Load Lb.	Clamp Load Lb.	Prevailing Torque						
			First Install In. Lb. Max	First Removal		Fifth Removal			First Install In. Lb. Max	First Removal		Fifth Removal			First Install In. Lb. Max	First Removal		Fifth Removal			
				Highest Read- ing Min In. Lb.	Lowest Read- ing Min In. Lb.	Highest Read- ing Min In. Lb.				Lowest Read- ing Min In. Lb.	Highest Read- ing Min In. Lb.	Lowest Read- ing Min In. Lb.				Highest Read- ing Min In. Lb.	Lowest Read- ing Min In. Lb.	Highest Read- ing Min In. Lb.	Lowest Read- ing Min In. Lb.		
Coarse Thread Series																					
.0730-64 .0860-56 .0990-48 .1120-40 .1250-40 .1380-32 .1640-32 .1900-24 .2160-24	540 820 1,250 1,550 2,200	250 370 580 720 1,000	3.0 6.0 9.0 13 20	1.0 1.5 2.0 2.5 3.5	.5 .5 1.0 1.0 1.5	.5 1.0 1.5 2.0 2.5	.2 .5 .5 1.0 1.0	720 1,100 1,700 2,100 2,900	380 580 900 1,100 1,550	3.0 8.0 12.0 13 20	1.0 1.5 2.0 2.5 3.5	.5 .5 1.0 1.0 1.5	.5 1.0 1.5 2.0 2.5	.2 .5 .5 1.0 1.0	910 1,350 2,100 2,600 3,650	550 810 1,250 1,550 2,200	4.0 8.0 12 17 27	1.0 2.0 2.5 3.5 4.5	.5 1.0 1.0 1.5 2	.5 1.5 2.0 2.5 3.0	.2 .5 1.0 1.0 1.5
.2500-20 .3125-18 .3750-16 .4375-14 .5000-13	2,900 4,700 7,000 9,550 12,800	1,300 2,150 3,200 4,400 5,850	30 60 80 100 150	5.0 8.0 12 17 22	2.5 4 5 7.5 10	3.5 5.5 8.5 12 15	1.5 2.5 4 5 7.5	3,800 6,300 9,300 12,800 17,000	2,000 3,350 4,950 6,800 9,050	30 60 80 100 150	5.0 8.0 12 17 22	2.5 4 5 7.5 10	3.5 5.5 8.5 12 15	1.5 2.5 4 5 7.5	4,750 7,850 11,600 15,900 21,300	2,850 4,700 6,950 9,600 12,800	40 80 110 135 17	6.0 10.5 16 23 30	3 5 7.5 10 15	4.5 7.5 11.5 16 20	2 3 5 7.5 10
.5625-12 .6250-11 .7500-10 .8750-9 1.000-8	16,400 20,300 30,000 41,600 54,500	7,550 9,300 13,800 11,400 15,000	*ft lb. 17* 25* 35* 50* 70*	30 39 58 88 120	15 17.5 25 40 60	21 27 41 62 84	10 12.5 20 30 40	21,800 27,200 40,100 55,400 72,700	11,600 14,500 21,300 29,500 38,700	17* 25* 35* 50* 70*	30 39 58 88 120	15 17.5 25 40 60	21 27 41 62 84	10 12.5 20 30 40	27,300 33,900 50,100 69,300 90,900	16,400 20,300 30,100 41,600 54,600	25* 35* 45* 70* 90*	40 52 78 117 160	20 25 35 50 80	28 36 54 82 112	12.5 15 25 40 50
1.1250-7 1.2500-7 1.3750-6 1.5000-6	68,700 87,200 104,000 126,000	18,900 24,000 28,700 34,800	75* 85* 100* 110*	150 188 220 260	70 90 110 130	105 132 154 182	50 60 70 90	80,100 101,700 121,300 147,500	42,100 53,500 63,800 77,600	75* 85* 100* 110*	150 188 220 260	70 90 110 130	105 132 154 182	50 60 70 90	115,000 145,000 173,000 211,000	69,000 87,000 104,000 127,000	100* 110* 135* 150*	200 250 293 346	100 120 140 170	140 176 205 242	70 80 100 120
Fine Thread Series																					
.0600-80 .0730-72 .0860-64 .0990-56 .1120-48 .1250-44 .1380-40 .1640-36 .1900-32 .2160-28	600 900 1,350 1,800 2,300	270 420 580 840 1,050	3.0 6.0 9.0 13 20	1.0 1.5 2.0 2.5 3.5	.5 .5 1.0 1.0 1.5	.5 1.0 1.5 2.0 2.5	.2 .5 .5 1.0 1.0	790 1,200 1,750 2,400 3,100	420 640 930 1,300 1,650	3.0 8.0 12 13 20	1.0 1.5 2.0 2.5 3.5	.5 .5 1.0 1.5 2.0 2.5	.5 1.0 1.5 2.0 2.5	.2 .5 .5 1.0 1.0	990 1,500 2,200 3,000 3,900	600 900 1,300 1,800 2,350	4.0 8.0 12 17 27	1.0 2.0 2.5 3.5 4.5	.5 1.0 1.0 1.5 2	.5 1.0 2.0 2.5 3.0	.2 .5 1.0 1.0 1.5
.2500-28 .3125-24 .3750-24 .4375-20 .5000-20	3,300 5,200 7,900 10,700 14,400	1,500 2,400 3,600 4,900 6,550	30 60 80 100 150	5 8 12 17 22	2.5 4 5 7.5 10	3.5 5.5 8.5 12 15	1.5 2.5 4 5 7.5	4,350 6,950 10,500 14,200 19,200	2,300 3,700 5,600 7,550 10,200	30 60 80 100 150	5.0 8.0 12 17 22	2.5 4 5 7.5 10	3.5 5.5 8.5 12 15	1.5 2.5 4 5 7.5	5,450 8,700 13,200 17,800 24,000	3,250 5,200 7,900 10,700 14,400	40 80 110 135 17	6.0 10.5 16 23 30	3 5 7.5 10 15	4.5 7.5 11.5 16 20	2 3 5 7.5 10
.5625-18 .6250-18 .7500-16 .8750-14 1.0000-14	18,300 22,900 33,600 45,800 61,100	8,350 10,500 15,400 12,600 16,800	*ft lb. 17* 25* 35* 50* 70*	30 39 58 88 120	15 17.5 25 40 60	21 27 41 62 84	10 12.5 20 30 40	24,400 30,700 44,800 61,100 81,500	13,000 16,300 23,800 32,400 43,300	17* 25* 35* 50* 70*	30 39 58 88 120	15 17.5 25 40 60	21 27 41 62 84	10 12.5 20 30 40	30,400 38,400 56,000 76,400 101,900	18,300 23,000 33,600 45,800 61,100	25* 35* 45* 70* 90*	40 52 78 117 160	20 25 35 50 80	28 36 54 82 112	12.5 15 25 40 50
1.0000-12 1.1250-12 1.2500-12 1.3750-12 1.5000-12	59,700 76,900 96,600 118,000 142,000	16,400 21,200 26,600 32,500 39,100	70* 75* 85* 100* 110*	120 150 188 220 260	60 70 90 110 130	84 105 132 154 182	40 50 60 70 90	79,600 89,900 113,000 138,000 166,000	42,300 47,500 59,700 72,900 87,700	70* 75* 85* 100* 110*	120 150 188 220 260	60 70 90 110 130	84 105 132 154 182	40 50 60 70 90	99,500 128,000 161,000 197,000 237,000	59,700 76,800 96,600 118,000 142,000	90* 100* 110* 135* 150*	160 200 250 293 346	80 100 120 140 170	112 140 176 205 242	50 70 80 100 120

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Custodian:

Army - AR
Navy - OS
Air Force - 99

Preparing activity
DLA-IS

Project No. 5310-2011-014

Reviewer:

Army - AT, AV, CR, MI,
Navy - MC, SH
Air Force - 71

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