INCH-POUND

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SUPERSEDING
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DETAIL SPECIFICATION SHEET

NUT: SQUARE, HEXAGON, CAP, SLOTTED, CASTLE, KNURLED, WELDING AND SINGLE BALL SEAT

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

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1. SCOPE AND CLASSIFICATION

1.1. Scope. This specification covers cap, castle, hexagon, knurled, slotted, square, welding, and single ball seat nuts (see 6.3).

1.2. Classification.

1.2.1. Types and styles. Nuts shall be of the following types and styles (see 6.2, fig 1)

Type I - Nuts, square (fig 1)

- Style 1 - Regular
- Style 2 - Heavy
- Style 3 - Machine Screw

Type II - Nuts, hexagon (fig 1)

- Style 4 - Plain
- Style 5 - Jam
- Style 6 - Thick
- Style 7 - Flat
- Style 8 - Flat jam
- Style 9 - Heavy flat
- Style 10 - Heavy flat jam
- Style 11 - Heavy
- Style 12 - Heavy jam
- Style 13 - Machine screw

Type III - Nuts, cap (fig 1)

- Style 14 - High crown
- Style 15 - Low crown

Type IV - Nuts, slotted (fig 1)

- Style 16 - Plain
- Style 17 - Thick
- Style 18 – Heavy

Type V - Nuts, plain, castle (fig 1)

Type VII - Nuts, plain, knurled (fig 1)

Type VIII - Nuts, welding (fig 1)

- Style 19 - Without pilot

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Style 20 - Pilot

Type IX - Nuts, plain, single ball seat, hexagon (fig 1)

1.2.2. Sizes. Nuts shall be of the sizes specified in ASME B18.2.2, except for weld, cap, knurled and slotted nuts, which shall be in accordance with the applicable Military standards (see 3.1.1.1 and 3.1.4). Single ball seat nuts shall be of the size specified (see 6.2).

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.

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 STANDARDS

QQ-N-281 – Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip Wire, Forgings, and Structural and Special Shaped Sections.

QQ-N-286 – Nickel-Copper Aluminum Alloy, Wrought

A-A-55628 – Nut, Plain, Cap, High Crown UNC-2B and UNF-2B

A-A-55629 – Nut, Plain, Cap, Low Crown UNC-2B and UNF-2B

MIL-F-495 – Finish, Chemical, Black, for Copper Alloys

MIL-HDBK-131 – Identification Markings for Fasteners (Handbook H-131)

MIL-PRF-8625 – Anodic Coatings for Aluminum and Aluminum Alloy

MIL-DTL-13924 – Coating, Oxide, Black, for Ferrous Metals

MIL-DTL-16232 – Phosphate Coating, Heavy, Manganese or Zinc Base

MIL-PRF-32647 – Zinc-Nickel Electroplating for Fasteners

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MS16994 – Nut, Plain, Knurled

MS27127 – Nut, Welding - Without Pilot

MS27128 – Nut, Welding – Pilot

MS35692 – Nut, Slotted, Hexagon, UNC-2B and UNF-2B

(Copies of these documents may be obtained electronically at https://quicksearch.dla.mil.)

2.3. Non-Government publications. The following documents 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.

AEROSPACE INDUSTRIES ASSOCIATION – NATIONAL AEROSPACE STANDARDS (AIA/NAS)

AIA/NAS NAS410 – NAS Certification and Qualification of Nondestructive Test Personnel

AIA/NAS NASM1312 – FASTENER TEST METHODS

AIA/NAS NASM1312-6 – FASTENER TEST METHODS, METHOD 6, HARDNESS

(Copies of this document are available for purchase online from https://www.aia-aerospace.org.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.1 – Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B18.2.2 – Nuts for General Applications: Machine Screw Nuts; and Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

ASME B18.18 – Quality Assurance for Fasteners

(Copies of these documents are available for purchase online from https://www.asme.org.)

ASTM INTERNATIONAL

ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A276/276M – Standard Specification for Stainless Steel Bars and Shapes

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ASTM A484/A484M – Standard Specification for General Requirements for Stainless Steel Bars, Billet, and Forgings

ASTM A582/A582M – Standard Specification for Free-Machining Stainless Steel Bars

ASTM B16/B16M – Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines

ASTM B21/B21M – Standard Specification for Naval Brass Rod, Bar, and Shapes

ASTM B36/B36M – Standard Specification for Brass Plate, Sheet, Strip and Rolled Bar

ASTM B98/B98M – Standard Specification for Copper-Silicon Alloy Rod, Bar and Shapes

ASTM B99/B99M – Standard Specification for Copper-Silicon Alloy Wire for General Applications

ASTM B105 – Standard Specification for Hard-Drawn Copper Alloy Wires for Electric Conductors

ASTM B124/B124M – Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes

ASTM B138/B138M – Standard Specification for Manganese Bronze Rod, Bar, and Shapes

ASTM B154 – Standard Test Method for Mercurous Nitrate Test for Copper Alloys

ASTM B283/B283M – Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)

ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

ASTM D3951 – Standard Practice for Commercial Packaging

ASTM D4066 – Standard Classification System for Nylon Injection and Extrusion Materials (PA)

ASTM E1282 – Standard Guide for Specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative Analysis Methods for Metals, Ores, and Related Materials

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ASTM E1417/E1417M – Standard Practice for Liquid Penetrant Testing

ASTM E1444/E1444M – Standard Practice for Magnetic Particle Testing for Aerospace.

ASTM F606/F606M – 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 Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection

ASTM F2328 – Standard Test Method for Determining Decarburization and Carburization in Hardened and Tempered Threaded Steel Bolts, Screws, Studs, and Nuts

(Copies of these documents are available for purchase online from https://www.astm.org.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9000 – Quality management systems – Fundamentals and vocabulary

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

(Copies of these documents are available for purchase online from https://www.iso.org.)

SAE INTERNATIONAL

SAE AMS2770 – Heat Treatment of Wrought Aluminum Alloy Parts

SAE AMS-C-81562 – Coatings, Cadmium, Tin-Cadmium and Zinc (Mechanically Deposited)

SAE AMS-QQ-A-225/6 – Aluminum Alloy, 2024, Bar, Rod, and Wire; Rolled, Drawn, or Cold Finished

SAE AMS-QQ-N-290 – Nickel Plating (Electrodeposited)

SAE AMS-QQ-P-416 – (R) Plating, Cadmium (Electrodeposited)

SAE AMS-QQ-S-763 – Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings

SAE AMS2700 – Passivation of Corrosion Resistant Steels

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(Copies of these documents are available for purchase online from https://www.sae.org.)

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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1. Materials.

3.1.1. Steel, carbon or low alloy. Unless otherwise specified (see 6.2), material for carbon steel nuts shall conform in chemical composition to Table I. Unless otherwise specified (see 6.2), Grade A nuts shall be furnished. When specified (see 6.2), carbon steel nuts shall conform in chemical composition to Table II. For proof-load requirements, see 3.3.

3.1.1.1. Steel, carbon or low alloy (nuts, welding). Steel welding nuts, type VIII, styles 19 and 20 shall be made from steel which meets the material and proof-load requirements of MS27127 and MS27128 (see 6.2).

3.1.2. Corrosion-resistant steel. Corrosion-resisting steel nuts shall be made from materials of the 300 series (302, 303, 304, 305, 316, 321 and 347) and 400 series (410, 414 and 416) as specified (see 6.2), in conformance with the chemical composition requirements and the mechanical property requirements of SAE AMS-QQ-S-763, ASTM A276/276M, ASTM A484/A484M or ASTM A582/A582M, as applicable. The 300 series nuts shall be condition A and shall have an ultimate tensile strength of 75,000 psi min. The 400 series nuts shall be condition T or H and shall have an ultimate tensile strength of 100,000 psi min. For proof-load requirements see 3.3.

3.1.3. Non-ferrous materials. When specified (see 6.2), nuts shall be made from the following non-ferrous materials.

3.1.3.1. Brass. Naval brass shall be in accordance with ASTM B21/B21M, ASTM B124/B124M, or ASTM B283/B283M, alloy no 464, half-hard or alloy no 462, hard, and shall have an ultimate tensile strength of 60,000 psi min. Leaded and non-leaded brass shall be in accordance with ASTM B36/B36M, alloy no 260, half-hard, and shall have an ultimate tensile strength of 60,000 psi min or alloy no 360, half-hard in accordance with ASTM B16/B16M and shall have an ultimate tensile strength of 58,000 psi min.

3.1.3.2. Aluminum Alloy. Aluminum alloy shall be in accordance with SAE AMS-QQ-A-225/6, T6 temper when heat-treated in accordance with SAE AMS2770, and shall have an ultimate tensile strength of 62,000 psi min.

3.1.3.3. Nickel-copper alloy. Nickel-copper alloy shall be in accordance with QQ-N-281, class A or class B, and shall have an ultimate tensile strength of 80,000 psi min.

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3.1.3.4. Silicon bronze. Silicon bronze shall be in accordance with ASTM B98/B98M, ASTM B99/B99M, ASTM B105 or ASTM B124/B124M, alloy no 651, hard or alloy no 655, half-hard, and shall have an ultimate tensile strength of 60,000 psi min.

3.1.3.5. Manganese bronze. Manganese bronze shall be in accordance with ASTM B138/B138M, alloy no 675, soft, and shall have an ultimate tensile strength of 55,000 psi min.

3.1.3.6. Nickel-copper aluminum alloy. Nickel-copper aluminum alloy shall be in accordance with QQ-N-286, class A or class B, age hardened, and shall have an ultimate tensile strength of 130,000 psi min.

3.1.4. Plastic (nylon). Plastic (nylon) nuts shall be made from material in accordance with ASTM D4066, group 1, class 1, grades 1 or 2, natural color.

3.1.5. Material for cap, knurled, and slotted nuts. Cap, knurled and slotted nuts procured under this specification (see 6.2), shall meet the requirements of this specification, A-A-55629 and A-A-55628 for cap nuts, MS16994 for knurled nuts and MS35692 for slotted nuts.

3.2. Stress relief of brass and bronze nuts. Cold-worked brass and bronze nuts shall be stress relieved by heating the part to a temperature of 600 °F, and holding at that temperature for a minimum of one hour per inch diameter of thickness. Cold-worked brass or bronze nuts shall pass the mercurous nitrate test of 4.5.5 without evidence of cracks. Stress relief of nuts made of extruded or soft temper brass or bronze will not be required.

3.3. Proof loads. Carbon or low alloy steel and corrosion-resisting steel nuts shall pass their respective proof-loads specified in Tables III and IV and MS sheet form standards as applicable, without evidence of stripped threads or ruptured metal. These requirements are based on the principle that the nut shall be capable of withstanding a stripping load equal to the minimum tensile strength requirements of the bolt grade with which it is used.

3.4. Dimensions. Dimensions, including thickness, width across flats and corners, chamfer, diameter and depth of washer face and perpendicularity of bearing surface with axis of thread shall conform to the applicable tables of ASME B18.2.2 except welding, cap, slotted and knurled nuts which shall agree with the applicable MS (see 3.1.1.1 and 3.1.5). Dimensions of single ball seat nuts shall be as specified (see 6.2).

3.4.1. Slot tolerance. Opposite slots of slotted and castle nuts shall coincide within 0.005 inch and the slot axis shall be within 0.005 inch of the pitch diameter axis.

3.5. Threads.

3.5.1. Series and class. Thread series, class, dimensions and tolerances, shall be in accordance with ASME B1.1 and the applicable specification sheet(s).

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3.5.2. Overtapping of nuts. Hot-dip galvanized nuts shall be tapped after galvanizing and shall be tapped oversize by the following minimum diametral amounts:

.4375 inch diameter and smaller	0.010 inch
Over .4375 inch to 1.000 inch diameter	0.015 inch
Over 1.000 inch diameter	0.020 inch

3.6. Protective finishes. Nuts shall be furnished uncoated, passivated or coated, as specified (see 6.2). When cadmium, zinc, nickel, black oxide, zinc-nickel, anodic or passivation coatings are specified, they shall be coated in accordance with 3.6.1 thru 3.6.8, as applicable.

3.6.1. Cadmium finish. Cadmium finish shall conform to type II, class 2 of SAE AMS-QQ-P-416. Cadmium is not recommended for use. For Army and Marine Corps ground applications, Zinc-Nickel per MIL-PRF-32647, Type K16 is a suitable replacement with design authority approval.

3.6.2. Zinc finishes.

3.6.2.1. Zinc, electrodeposited. Electrodeposited zinc coating shall be in accordance with ASTM B633, Fe/Zn 8, Type II. Electrodeposited finish shall be used only on .500 inch (nominal size) and smaller.

3.6.2.2. Zinc, electrodeposited hex-chrome free. Electrodeposited zinc coating shall be in accordance with ASTM B633, Fe/Zn 8, Type VI. Electrodeposited finish shall be used only on .500 inch (nominal size) and smaller.

3.6.2.3. Zinc, hot dipped. Zinc hot-dipped (galvanizing) shall conform to ASTM A153/A153M.

3.6.2.4. Zinc, mechanically deposited. Mechanically deposited zinc shall conform to SAE AMS-C-81562 as specified on applicable specification sheet(s).

3.6.2.4.1. Zinc, mechanically deposited hex-chrome free. Mechanically deposited zinc shall conform to ASTM B695, Type II, except conversion treatment shall not contain hexavalent chromium as specified on the applicable specification sheet(s).

3.6.3. Phosphate coating. Phosphate coating shall conform to type Z, class 2 of MIL-DTL-16232.

3.6.4. Anodic coating. Anodic coating shall conform to type II of MIL-PRF-8625.

3.6.4.1. Anodic coating hex-chrome free. Anodic coating shall conform to type II of MIL-PRF-8625, except sealers shall not contain hexavalent chromium.

3.6.5. Nickel plating. Nickel plating shall conform to class 2 of SAE AMS-QQ-N-290.

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3.6.6. Black oxide coating. Black oxide coating for carbon and low alloy steel shall conform to class 1 of MIL-DTL-13924, for copper alloys the finish shall conform to MIL-F-495 and for 300 series corrosion-resisting steel the coating shall conform to class 4 of MIL-DTL-13924.

3.6.6.1. Black oxide coating hex-chrome free. Black oxide coating for carbon and low alloy steel shall conform to class 1 of MIL-DTL-13924, for copper alloys the finish shall conform to MIL-F-495, except hexavalent chromium shall be prohibited, and for 300 series corrosion-resisting steel the coating shall conform to class 4 of MIL-DTL-13924.

3.6.7. Passivation. Passivation treatments shall conform to SAE AMS2700.

3.6.7.1. Passivation hex-chrome free. Passivation treatments shall conform to SAE AMS2700, Method 1, Type 6, 7, or 8, or Method 2. Passivation treatments containing hexavalent chromium shall be prohibited.

3.6.8. Zinc-nickel hex-chrome free electrodeposited with controlled torque coefficient for threaded fasteners.

3.6.8.1. Zinc-Nickel torque coefficient of 0.16. Zinc-Nickel plating shall conform to Type K16 per MIL-PRF-32647.

3.6.8.2. Zinc-Nickel torque coefficient of 0.20. Zinc-Nickel plating shall conform to Type K20 per MIL-PRF-32647.

3.7. Identification markings. When specified (see 6.2), nuts shall be marked in accordance with MIL-HDBK-131.

3.8. Discontinuities. Discontinuities shall meet the requirements of ASTM F812.

3.9. Decarburization. Decarburization examination shall be made in accordance with ASTM F2328, class 4.

3.10. Workmanship. The workmanship shall be compatible with the type of product, class of fit, and finish specified. The nuts shall be free from pipes, fissures, gas cavities, sponginess, segregation, scale, fins, seams, or any other defects which might 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 in the contract or order, the supplier may use their own or any other facility 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 that supplies and services conform to prescribed requirements.

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4.2. Inspection terms. Inspection terms and definitions used herein are in accordance with ISO 9000.

4.2.1. Inspection equipment and facilities. Gaging and equipment used for inspection shall conform in all respects to ISO 10012.

4.3. Inspection lot. All nuts 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 purpose inspection.

4.4. Sampling for examination. Statistical sampling and inspection shall be I/A/W the criteria called out in ASTM F1470 and ASME B18.18.

4.4.1. Sampling for proof load testing (steel nuts). A random sample of nuts shall be taken from each lot in accordance with ASTM F1470, tables 1 and 2.

4.4.2. Sampling for protective finish test. Sampling for tests of protective finishes shall be in accordance with the applicable specifications in 3.6.1 thru 3.6.8.

4.4.3. Sampling for mercurous-nitrate test. A random sample shall be taken from each lot of cold-worked brass or bronze nuts in accordance with ASTM F1470, table 1 sample size A.

4.4.4. Sampling for packaging and packing. Sampling for preservation, packaging, packing and marking shall be in accordance with ASTM F1470.

4.4.5. Sampling for chemical analysis. When chemical analysis is specified (see 6.2), sampling shall be in accordance with ASTM E1282 for the test in 4.5.3.

4.4.6. Sampling for hardness test. Sampling for hardness of nuts excluded from the proof load test in 4.5.1 shall be in accordance with ASTM F1470, tables 1 and 2.

4.4.7. Discontinuities. Sampling for discontinuities by means of magnetic particle inspection or penetrant inspection shall be in accordance with ASTM F1470, tables 1 and 2. The acceptance and rejection numbers of this sampling plan shall apply to those nuts which are judged defective or are in non-conformance with the requirements contained herein after micro-examination has been performed on those samples revealing indications. These inspection requirements shall not apply to nuts of less than .250 inch thread size.

4.4.8. Sampling for slot alignment test. Sampling for slot alignment of slotted and castle nuts shall be in accordance with ASME B18.18.

4.5. Test methods.

4.5.1. Proof load. Proof load tests on nuts shall be performed in accordance with ASTM F606/F606M. Each nut of the sample taken in accordance with 4.4.1 shall be subjected to the proof-load test and tables III, IV, as applicable. Jam, slotted, castle and machine-screw nuts, nuts

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under standard thickness, plated nuts tapped oversize, or nuts with specified proof-loads beyond the capacity of commercially available testing equipment shall not be subjected to the proof load test but shall meet the hardness test in 4.5.2.

4.5.2. Hardness test. When a hardness test is to be conducted in lieu of a proof-load test (see 4.5.1), it shall be conducted in accordance with Test No. 6 of AIA/NAS NASM1312 to determine conformance to Tables I and II of this specification.

4.5.3. Chemical analysis. When chemical analysis is specified (see 6.2), conformance to chemical composition requirements shall be in accordance with ASTM E1282.

4.5.4. Protective finish test. Tests of protective finishes shall be conducted in accordance with the applicable specifications in 3.6.1 through 3.6.8.

4.5.5. Mercurous-nitrate test (stress relieved nuts). The mercurous nitrate test of stress relieved brass and bronze nuts shall be conducted in accordance with ASTM B154 to determine conformance to 3.2.

4.5.6. Examination and tests of packaging and packing. Examination and tests of preservation, packaging, packing and marking shall be in accordance with ASTM D3951.

4.5.7. Discontinuities. This test is not applicable to nuts of less than .250 inch thread size. The presence of discontinuities in nuts shall be determined by magnetic particle inspection or penetrant inspection, depending upon the material, unless visual inspection discloses discontinuities which would preclude the necessity for such inspection.

4.5.7.1. Magnetic particle inspection. The nuts shall be subjected to magnetic particle inspection in accordance with ASTM E1444/E1444M. Personnel conducting magnetic particle inspection shall be certified in accordance with NAS410.

4.5.7.2. Penetrant inspection. Penetrant inspection shall be performed in accordance with ASTM E1417/E1417M. Personnel conducting penetrant inspection shall be certified in accordance with NAS410.

4.5.8. Decarburization. For heat treated carbon or low alloy steel nuts, inspect in accordance with ASTM F2328, class 4. All decarburization examinations shall be preformed after the final heat treatment.

4.5.9. Slot alignment. Samples taken as specified in 4.4.8 shall be tested to determine conformance to 3.4.1. To check the slot alignment, use a threaded plug having the same basic pitch diameter as the nut being tested. The plug shall have a slot in one end in accordance with Table VI. The plug shall be screwed into the nut and the three slots aligned so that the pin will pass through.

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5. PACKAGING

5.1. Preservation, packaging, packing, and marking. Preservation, packaging, packing and marking shall be in accordance with ASTM D3951 (see 6.2).

5.2. Methods. Methods of preservation, packaging and packing shall be in accordance with ASTM D3951, unless otherwise specified by the procuring activity (see 6.2).

6. NOTES

6.1. Intended use. This specification covers various types of nuts (1.2.1) which are designed for assembly with bolts and screws for application at normal atmospheric temperatures.

6.2. Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

a. Title, number and date of this specification
b. Type, style, size and thread series of nut (1.2.1, 1.2.2 and 3.5.1)
c. Material, type and grade, if applicable (3.1). If grade is not specified, carbon or low alloy steel nuts will be Grade A (3.1.1)
d. Dimensions of single ball seat nuts (3.4)
e. Type of protective finish, if required (3.6)
f. Marking when required (3.7)
g. Chemical analysis, if required (4.5.3)
h. Method of packings (if required)

6.3. Military procurement. Items produced under this specification for Military use are to be limited to the variety shown on the applicable Military standard. Personnel of the Military departments are requested to refer to these documents for guidance.

6.4. Cross reference data. Supersession data cross references between the types and styles of nuts covered by this specification and the group types and styles of the preceding FF-N-836, dated September 16, 1955, FF-N-836A, dated January 18, 1961, FF-N-836B, dated January 26, 1965, FF-N-836C, dated September 5, 1968 and FF-N-836D, dated April 24, 1972 are shown in table VI.

6.5. Supersession data. This specification includes the requirements of FF-N-836D, dated April 24, 1972, FF-B-571A, dated January 9, 1934 in part, MIL-B-857A (Ships), dated 1 June 1956 in part and MIL-N-6034B, dated 7 October 1965 (see Table V).

6.6. Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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TABLE I. Mechanical and chemical properties of carbon and alloy steel nuts.

Grade	Nominal Size	Analysis	Chemical Composition			Ultimate Tensile Strength PSI MIN				Rockwell Hardness
			Carbon Max %	Phos-Phorus Max %	Sulfur Max %	Hex and Square Nuts		Hex Thick and Heavy Nuts		Max
						UNC	UNF	UNC	UNF	
A(1)	.250-4.000	Ladle	.55	.12	.15	90,000	80,000	100,000	90,000	C32
		Check	.58	.13	--					
B(2)	.250-1.000	Ladle	.55	.12	.15	120,000	109,000	133,000	120,000	C32
		Check	.58	.13	--					
B(2)	1.125-3.000	Ladle	.55	.12	.15	105,000	94,000	116,000	105,000	C32
		Check	.58	.13	--					
C	.250-3.000	Ladle	.55	.12	.15	144,000	130,000	160,000	144,000	C38
		Check	.58	.13	--					
D	.250-1.500	Ladle	.55	.04	.05	150,000	135,000	165,000	150,000	C38
		Check	.58	.048	.058					

Notes:
1/ Optional material – Steel, grade 121.14 (UNS G12144) per ASTM A108
2/ Optional material – Steel, grade 111.37 (UNS G11374) per ASTM A108

TABLE II. Mechanical and chemical properties of carbon and alloy steel nuts (for Navy Use).

Material	Nominal Size	Proof Load (PSI)						Hardness		Composition	
		Hexagon Nuts		Hexagon Jam Nuts		Hexagon Slotted Nuts		Brinell	Rockwell	Phos-Phorus % Max	Sulfur % Max
		UNC	UNF	UNC	UNF	UNC	UNF				
Grade 1	All sizes	55,000	55,000	---	---	---	---	207 max	95B max	.05	.06
Grade 2	Up to .500 incl	69,000	69,000	41,000	41,000	55,000	55,000	--	--	.04	.05
	Over .500 to .750 incl	64,000	64,000	38,000	38,000	51,000	51,000	--	--	.04	.05
	Over .750	55,000	55,000	33,000	33,000	44,000	44,000	--	--	.04	.05
Grade 5	Up to .750 incl	120,000	109,000	72,000	65,000	96,000	87,000	187 min	90B min	.04	.05
	Over .750 to 1.000 incl	115,000	104,000	69,000	62,000	92,000	83,000	175 min	88B min	.04	.05
	Over 1.000 to 1.500 incl	105,000	94,000	63,000	57,000	84,000	75,000	156 min	83B min	.04	.05
	Over 1.500	90,000	79,000	54,000	47,000	72,000	63,000	121 min	69B min	.04	.05
Grade 8	.250 to 1.500 incl	150,000	150,000	90,000	90,000	120,000	120,000	248-302	24-32C 1/	.04	.05

Notes
1/ Rockwell 37C maximum permissible on sizes 1.250 inches and larger

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TABLE III. Minimum proof loads of steel and corrosion resisting steel nuts – coarse thread.

Nom Size Dia Of Thd (In)	Threads Per Inch UNC	Area of Mating External Threads (Sq In)	Proof Loads Pounds Min 1/ 2/									
			Grade A		Grade B		Grade C		Grade D		300 Series All Nuts	400 Series All Nuts
			Hex & Square	Heavy and Thick	Hex & Square	Heavy and Thick	Hex & Square	Heavy and Thick	Hex & Heavy	Heavy and Thick		
.250	20	.0318	2,862	3,180	3,800	4,229	4,575	5,085	4,770	5,250	2,400	3,175
.3125	18	.0524	4,716	5,240	6,288	6,969	7,545	8,380	7,860	8,650	3,950	5,250
.375	16	.0775	6,975	7,750	9,300	10,308	11,160	12,400	11,625	12,800	5,800	7,750
.4375	14	.1063	9,567	10,650	12,756	14,138	15,300	17,000	15,945	17,540	7,975	10,650
.500	13	.1419	12,771	14,200	17,028	18,872	20,433	22,700	21,285	23,400	10,650	14,200
.5625	12	.182	16,380	18,200	21,840	24,200	26,208	29,120	27,300	30,000	13,650	18,200
.625	11	.226	20,340	22,600	27,120	30,058	32,540	36,160	33,900	37,300	16,950	22,600
.750	10	.334	30,060	33,400	40,080	44,422	48,100	53,440	50,100	55,100	25,050	33,400
.875	9	.462	41,580	46,200	55,440	61,446	66,528	73,920	69,300	76,230	34,650	46,200
1.000	8	.606	54,540	60,600	72,720	80,600	87,264	96,960	90,900	100,000	45,450	60,600
1.125	7	.763	68,670	76,300	80,100	88,500	109,872	122,000	114,450	125.900	57,225	76,300
1.250	7	.969	87,210	96,900	101,750	112,400	139,536	155,000	145,350	259.900	72,675	96,900
1.375	6	1.155	103,950	115,500	121,300	134,000	166,320	184,800	173,250	190.600	86,625	115,500
1.500	6	1.405	126,450	140,500	147,500	162,980	202,320	224,800	210,750	231.800	105,375	140,500
1.750	5	1.900	171,000	190,000	199,500	220,400	273,600	304,000			142,500	190,000
2.000	4-1/2	2.500	225,000	250,000	262,500	290,000	360,000	400,000			187,500	250,000
2.250	4-1/2	3.250	292,500	325,000	341,850	377,000	468,000	520,000			243,750	325,000
2.500	4	4.000	360,000	400,000	420,000	464,000	576,000	640,000			300,000	400,000
2.750	4	4.930	443,700	493,000	517,650	571,880	690,200	788,800			367,750	493,000
3.000	4	5.970	537,300	597,000	626,850	692,520	859,680	955,200			447,750	597,000
3.250	4	7.100	639,000	710,000							532,500	710,000
3.500	4	8.330	749,700	833,000							622,500	833,000
3.750	4	9.660	869.400	966,000							724,500	966,000
4.000	4	11.080	997,200	1,108,000							831,000	1,108,000

Notes:

1/ Strengths of slotted and castle nuts shall be assumed as 67 percent of the tabulated loads Strengths of jam nuts shall be assumed as 50 percent of the tabulated loads

2/ Proof-loads shown above are based on stress areas shown and minimum tensile strengths specified (see Table IV for carbon steel nuts and 3 l 2 for cres nuts)

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TABLE IV. Minimum proof loads of steel and corrosion resisting steel nuts – fine thread.

Nom Size Dia Of Thd (In)	Threads Per Inch UNF	Area of Mating External Threads (Sq In)	Proof Loads Pounds Min 1/ 2/									
			Grade A		Grade B		Grade C		Grade D			
			Hex & Square	Heavy and Thick	Hex & Square	Heavy and Thick	Hex & Square	Heavy and Thick	Hex & Square	Heavy and Thick	300 Series All Nuts	400 Series All nuts
.250	28	.0364	2,912	3,280	3,970	4,368	4,730	5,240	4,914	5,460	2,750	3,650
.3125	24	.0580	4,460	5,220	6,322	6,960	7,540	8,350	7,830	8,700	4,350	5,800
.375	24	.0878	7,024	7,900	9,570	10,356	11,410	12,640	11,853	13,170	6,590	8,780
.4375	20	.1187	9,500	10,680	12,940	14,244	15,430	17,090	16,025	17,800	8,900	11,870
.500	20	.1599	12,792	14,390	17,430	19,188	20,790	23,000	21,586	23,980	12,000	15,900
.5625	18	.203	16,240	18,270	22,130	24,360	26,400	29,232	27,450	30,450	15,250	20,300
.625	18	.256	20,480	23,040	27,900	30,720	33,300	36,900	34,560	38,400	19,200	25,600
.750	16	.373	29,840	33,510	40,660	44,760	48,500	53,700	50,355	55,950	27,980	37,300
.875	14	.509	40,720	45,810	55,480	61,080	66,200	73,300	68,715	76,350	38,180	50,900
1.000	12	.663	53,040	59,670	72,267	79,560	86,200	95,500	89,505	99,450	49,725	66,300
1.125	12	.856	68,480	77,040	80,464	89,900	111,300	123,300	115,560	128,400	64,200	85,600
1.250	12	1.073	85,840	96,570	100,862	112,665	139,500	154,500	144,885	160,950	80,480	107,300
1.375	12	1.315	105,200	118,350	123,610	138,075	171,000	189,400	177,525	197,250	98,650	131,500
1.500	12	1.581	126,480	142,300	148,614	166,000	205,500	227,700	213,435	237,150	118,580	158,100
1.750	12	2.190	175,200	219,000	205,860	229,950	284,700	315,400			164,250	219,000
2.000	12	2.890	231,200	289,000	271,660	303,450	375,700	416,200			216,750	289,000
2.250	12	3.690	295,200	369,000	346,860	487,450	479,700	531,400			276,750	369,000
2.500	12	4.600	368,000	460,000	432,400	483,000	598,000	662,400			345,000	460,000
2.750	12	5.590	447,200	559,000	525,460	586,960	726,700	805,000			419,250	559,000
3.000	12	6.690	535,200	669,000	628,860	702,450	869,700	963,400			501,750	669,000
3.250	12	7.890	631,200	789,000							591,750	789,000
3.500	12	9.180	734,400	918,000							688,500	918,000
3.750	12	10.570	845,600	1,057,000							792,750	1,057,000
4.000	12	12.060	964,800	1,260,000							904,500	1,206,000

Notes:

1/ Strengths of slotted and castle nuts shall be assumed as 67 percent of the tabulated loads. Strengths of jam nuts shall be assumed as 50 percent of the tabulated loads.

2/ Proof-loads shown above are based on stress areas shown and minimum tensile strengths specified (see Table III for carbon steel nuts and 3 l 2 for cres nuts)

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TABLE V. Cross reference data.

FF-N-836	FF-N-836A	FF-N-836B	FF-N-836C	FF-N-836D
Group A				
Type 1	Type I Style 1	Type I Style 1	Type I Style 1	Type I Style 1
Type 2	Type I Style 2	Type I Style 2	Type I Style 2	Type I Style 2
Group B				
Type 1				
None	None	Type I Style 4	Type VIII Style 19	Type VIII Style 19
None	None	Type I Style 5	Type VII Style 20	Type VII Style 20
Style 1	Type II Style 1	Type II Style 1	Type II Style 4	Type II Style 4
Style 2	Type II Style 2	Type II Style 2	Type II Style 5	Type II Style 5
Style 3	Type IV Style 1	Type IV Style 1	Type IV Style 16	Type IV Style 16
Style 4	Type V Style 1	Type V Style 1	Type V	Type V
Type 2				
Style 1	Type II Style 3	Type II Style 3	Type II Style 6	Type II Style 6
Style 2	Type IV Style 2	Type IV Style 2	Type IV Style 17	Type IV Style 17
Type 3				
Style 1	Type II Style 4	Type II Style 4	Type II Style 7	Type II Style 7
Style 2	Type II Style 5	Type II Style 5	Type II Style 8	Type II Style 8
Style 3	Deleted	None	None	None
Style 4	Deleted	None	None	None
Style 5	Deleted	None	None	None
Type 4				
Style 1	Tyle II Style 6	Tyle II Style 6	Type II Style 9	Type II Style 9
Style 2	Type II Style 7	Type II Style 7	Type II Style 10	Type II Style 10
Style 3	Type II Style 8	Type II Style 8	Type II Style 11	Type II Style 11
Style 4	Type II Style 9	Type II Style 9	Type II Style 12	Type II Style 12
Style 5	Type IV Style 3	Type IV Style 3	Type IV Style 18	Type IV Style 18
Type 5				
Style 1	Type III Style 1	Type III Style 1	Type III Style 14	Type III Style 14
Style 2	Type III Style 2	Type III Style 2	Type III Style 15	Type III Style 15
Group C				
Type 1	Type I Style 3	Type I Style 3	Type I Style 3	Type I Style 3
Type 2				
Style 1	Type II Style 10	Type II Style 10	Type II Style 13	Type II Style 13
None	None	Type II Style 11	Type VIII Style 20	Type VIII Style 20
None	None	None	Type VI	Deleted
None	None	None	Type VII	Type VII
None	None	None	Type IX	Type IX

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TABLE VI. Reference slot diameters for pins.

Slot Dia	Pin Dia
.078	.073
.094	.084
.125	.110
.156	.141
.172	.152
.188	.168
.203	.183
.250	.230
.312	.292
.375	.355

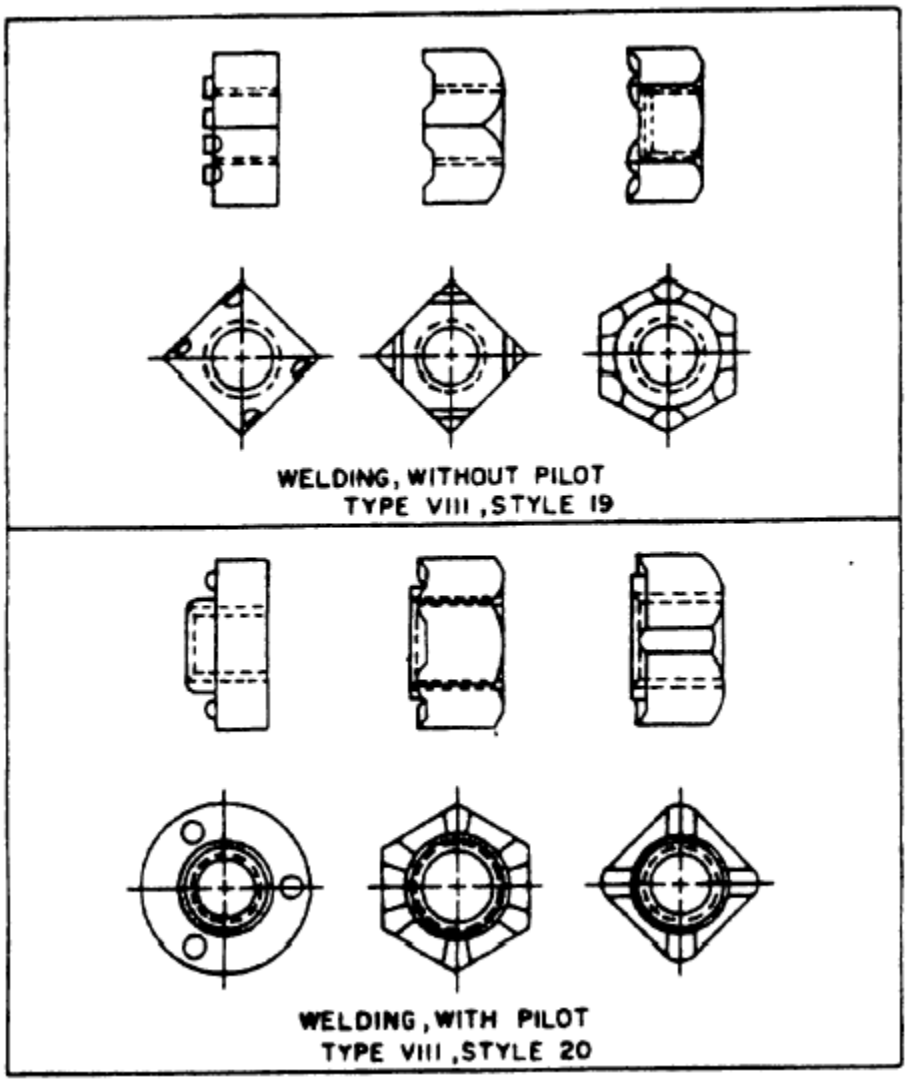


FIGURE 1. Nuts.

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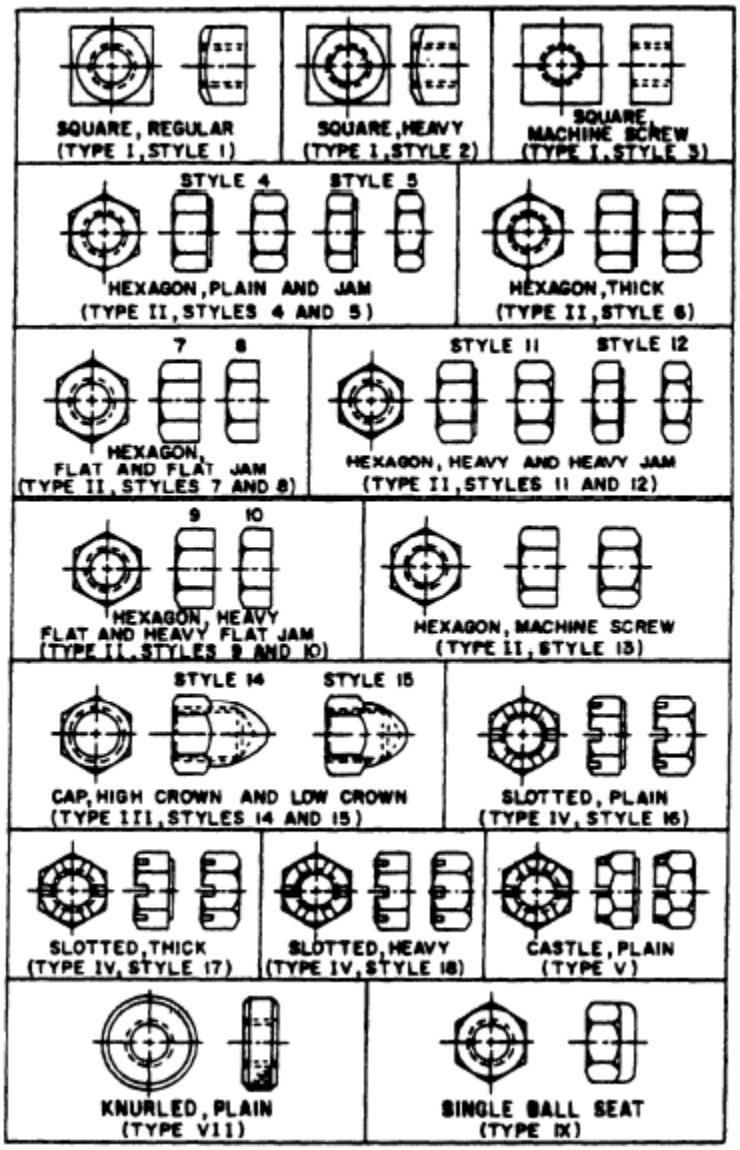


FIGURE 1. Nuts – Continued.

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CONCLUDING MATERIAL

Custodians:
Army – AR
Navy – AS
Air Force – 71
DLA – GS

Preparing Activity:
DLA – GS7

(Project 5310-2023-001)

Review Interests:
Army – AT, AV, EA, GL, MI
Navy – MC, OS

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