

FED. SUPPLY CLASS

5306

1. SCOPE

1.1 Scope. This specification covers internal wrenching bolts for use in applications requiring 160 KSI tensile strength, 96 KSI shear strength, or high fatigue strength and combinations thereof.

2. APPLICABLE DOCUMENTS

2.1 Government Documents

Specification, Standards and Handbooks. The following specifications, standards and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

2.1.1 Federal Specifications

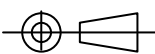
PPP-B-566	Boxes, Folding, Paperboard
PPP-B-585	Boxes, Wood, Wirebound
PPP-B-601	Boxes, Wood, Cleated Plywood
PPP-B-621	Boxes, Wood, Nailed and Lock Corner
PPP-B-636	Boxes, Shipping, Fiberboard
PPP-B-665	Boxes: Paperboard, Metal Edged and Components
PPP-B-676	Boxes, Setup

2.1.2 Military Specifications

MIL-P-116	Preservation, Method of
MIL-PRF-121	Barrier Materials, Greaseproof, Waterproof, Flexible, Heat-Sealable
MIL-S-5000	Steel, Chrome Mckel Molybdenum (4340) Bars, and Forging Stock
MIL-T-5544	Thread Compound, Antiseize, Graphite Petrolatum
MIL-S-5626	Steel, Chrome Molybdenum (4140) Bars, Rods, and Forging Stock (for Aircraft Applications)
MIL-S-6040	Steel, Chrome Nickel Molybdenum (8740) Bars and Reforging Stock (Aircraft Quality)
MIL-S-6098	Steel, Chrome Nickel Molybdenum (8735) Bars and Reforging Stock (Aircraft Quality)
MIL-H-6875	Heat Treatment of Steel Raw Materials
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series: General Specification for
MIL-S-8503	Steel Bars, Chrome Vandium, (6150) Aircraft Quality
MIL-S-8879	Screw Threads, Controlled Radius Tool with Increased Minor Diameter, General Specification for
MIL-L-10547	Liner, Case, and Sheet, Overwrap, Water Vaporproof or Waterproof, Flexible

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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-B-7838, REVISION C, AMENDMENT 1. CANCELED AFTER JULY 31, 2001 AND SUPERSEDED BY NAS4002 AND NAS4003. NASM7838 IS HEREBY REACTIVATED AND VALID FOR USE.

THIRD ANGLE PROJECTION 	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 4
PROCUREMENT SPECIFICATION NONE	TITLE BOLT, INTERNAL WRENCHING, 160 KSI Ft	CLASSIFICATION SPECIFICATION NASM7838

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FORM 09-01

REVISION DATE: APRIL 30, 2013
ISSUE DATE: JUNE 1999



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2.1.3 Military Standards

~~MIL-STD-105~~	~~Sampling Procedures and Tables for Inspection by Attributes~~
~~MIL-STD-129~~	~~Military Marking for Shipment and Storage~~
~~MIL-STD-1186~~	~~Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods~~
~~MIL-STD-1312~~	~~Fastener Test Methods~~
~~MIL-STD-1940~~	~~Magnetic Particle Inspection~~
~~MS20004 THRU MS20024~~	~~Bolt, Internal Wrenching, 160 KSI Ftu and 90 KSI Fsu~~
~~MIL-STD-2073~~	~~Standard Practice for Military Packaging~~

Copies can be obtained from DLA Document Services, Bldg 4/D, 700 Robbins Ave, Philadelphia, PA 19111.
<http://quicksearch.dla.mil/>

2.2 Other Publication. The following document(s) forms a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

2.2.1 American Society for Quality

ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

Copies can be obtained from the American Society for Quality, 600 North Plankinton Ave., Milwaukee, WI 53203.
www.asq.org

2.2.2 ASME

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

Copies can be obtained from ASME, Three Park Ave., New York, NY 10016-5990. www.asme.org

2.2.3 Uniform Classification Committee

Uniform Freight Classification Rules

Copies can be obtained from the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.

2.2.4 Aerospace Industries Association

NASM1312 Fastener Test Methods
NASM20004 THRU 20024 Bolts, Internal Wrenching, 160 KSI Ftu and 96 KSI Fsu

Copies can be obtained from the Aerospace Industries Association, 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209. www.aia-aerospace.org

2.2.5 ASTM International

ASTM D6251/D6251M Standard Specification for Wood-Cleated Panelboard Shipping Boxes
ASTM D6880/D6880M Standard Specification for Wood Boxes
ASTM D1974/D1974M Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM E1444/E1444M Standard Practice for Magnetic Particle Testing

Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. www.astm.org

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2.2.6 SAE International

AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AMS-S-5000	Steel, Chrome-Nickel-Molybdenum (E4340) Bars and Reforging Stock
AMS2518	Thread Compound, Anti-Seize, Graphite-Petrolatum
AMS6349	Steel Bars 0.95Cr - 0.20Mo (0.38 to 0.43C) (4140) Normalized (UNS G41400)
AMS6382	Steel, Bars, Forgings, and Rings 0.95Cr - 0.20Mo (0.38 to 0.43C) (4140) Annealed (UNS G41400)
AMS6322	Steel Bars, Forgings, and Rings 0.50Cr - 0.55Ni - 0.25Mo (0.38 to 0.43C) (8740) (UNS G87400)
AMS6325	Steel, Bars and Forgings 0.50Cr - 0.55Ni - 0.25Mo (0.38 to 0.43C) (8740) Heat Treated, 105 ksi (724 MPa) Tensile Strength (UNS G87400)
AMS6327	Steel Bars and Forgings 0.50Cr - 0.55Ni - 0.25Mo (0.38 to 0.43C) (8740) Heat Treated, 125 ksi (862 MPa) Tensile Strength (UNS G87400)
AMS6320	Steel Bars, Forgings, and Rings 0.50Cr - 0.55Ni - 0.25Mo (0.33 to 0.38C) (8735) (UNS G87350)
AMS2759	Heat Treatment of Steel Parts General Requirements
AMS6448	Steel, Bars, Forgings, and Tubing 0.95Cr - 0.22V (0.48 to 0.53C) (6150) (UNS G61500)
AS8879	Screw Threads - UNJ Profile, Inch Controlled Radius Root with Increased Minor Diameter

Copies can be obtained from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001. www.sae.org

2.3 Order of Precedence. In the event of conflict between the text of this specification and the references cited herein (except for associated detail specifications, part standards or NASM standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Military Standards. The individual item requirements shall be as specified herein and in accordance with the applicable standards. In the event of any conflict between the requirements of this specification and the NASM standards, the latter shall govern.

3.2 This paragraph left intentionally blank.

3.3 Material. Bolts shall be made from alloy steel conforming to specification ~~MIL-S-5000~~ AMS-S-5000 (UNS G43400 or UNS G43406), ~~MIL-S-5626~~ AMS6349 or AMS6382 (UNS G41400), ~~MIL-S-6049~~ AMS6322, AMS6325 or AMS6327 (UNS G87400), ~~MIL-S-6098~~ AMS-S-6098 (UNS G87350), or ~~MIL-S-8503~~ AMS6448.

3.4 Design and Construction. The design and construction of the bolt shall be as specified herein and on the applicable standard.

3.4.1 Dimensions. Dimensions shall be in accordance with NASM20004 THRU NASM20024 or other applicable specifications.

3.4.2 Threads.

3.4.2.1 Form and Dimension. The form and dimensions shall conform to AS8879 with the following exception: size 1-14 thread form and dimensions shall be per MIL-S-7742 and MS20016, except thread roots shall be round and minor diameter modified as specified in Figure 1.

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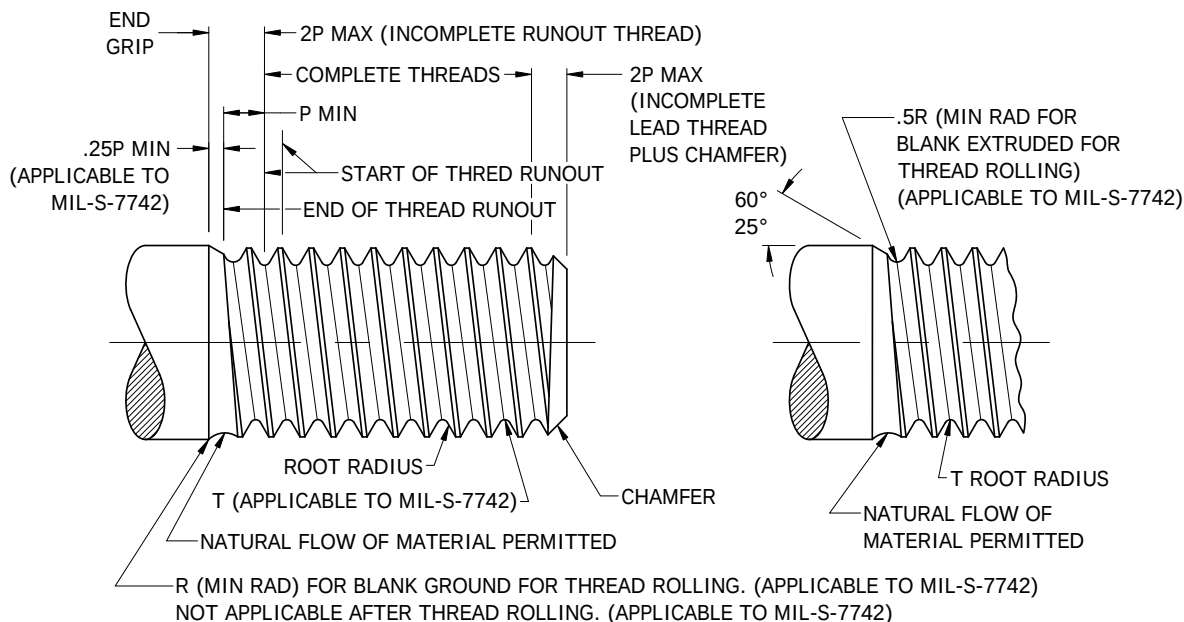
3.4.2.2 Rolling. Threads shall be fully formed by single rolling process after heat treatment.

3.4.2.3 Incomplete Threads. Thread runout, consisting of not more than two incomplete threads, shall fair into shank, thereby eliminating an abrupt change in cross sectional area as illustrated in Figure 1. There shall be a thread runout of not less than one thread. Bottom and sides of threads in runout may deviate from true thread form, but shall be smooth and devoid of tool marks. Incomplete threads shall conform to Figure 1A.

3.4.2.4 Grain Flow. The grain flow in the threads shall be continuous and shall follow the general thread contour with the maximum density at the bottom of the root radius as shown in Figure 2.

3.4.3 Heads. Heads shall be forged. Sockets may be forged or machined. Flash or chip clearance in machined sockets shall not penetrate the head dimensional thickness nor shall it be any larger than the hexagon width across flats.

3.4.3.1 Bearing Surface. The bearing surface of bolt heads shall be at right angles to the shank within limits shown in Figure 3. The angular error of the underside of the head must be uniform around the shank within a tolerance of ± 10 minutes, as measured from the face of the head at length approximately equal to the diameter of the bolt.



The following table is applicable to MIL-S-7742 and MS20016 only.

THREAD SIZE	P PITCH	.25P MIN	2P MAX	R RUNOUT RAD MIN	.5R	T /1/ ROOT RAD MIN
1-14 /2/	.07143	.018	.143	.025	.012	.008

/1/ Maximum thread root radius limited by requirement that threads accept "GO" thread gage.

/2/ 1-14NS inactivate for new design.

FIGURE 1 – INCOMPLETE THREAD PITCHES, RUNOUT RADIUS AND ROOT RADIUS (OPTIONAL DESIGN)

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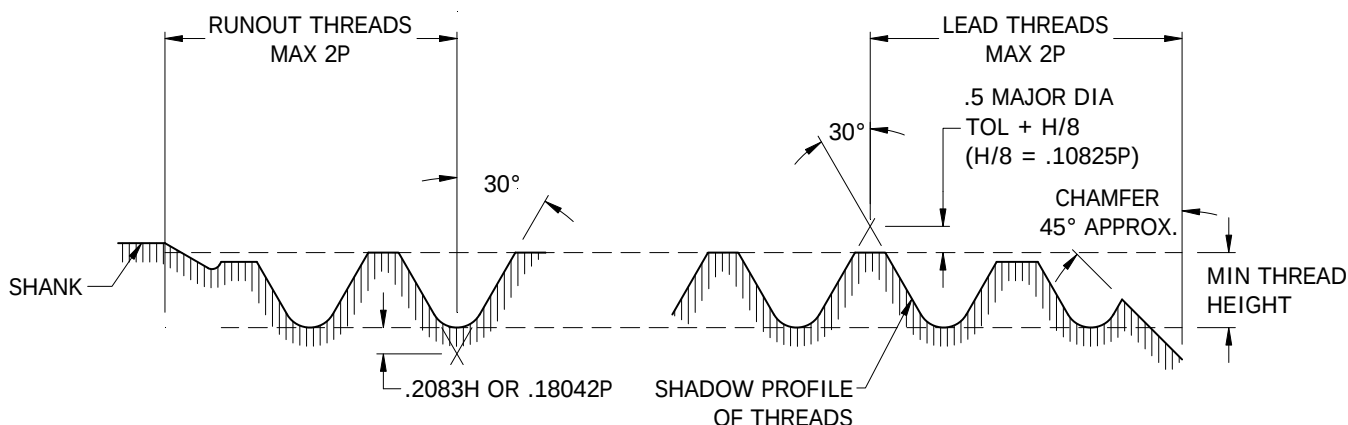


FIGURE 1A – DETERMINATION OF INCOMPLETE THREADS

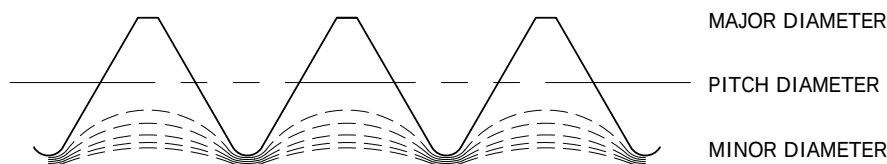


FIGURE 2 – THREAD GRAIN FLOW

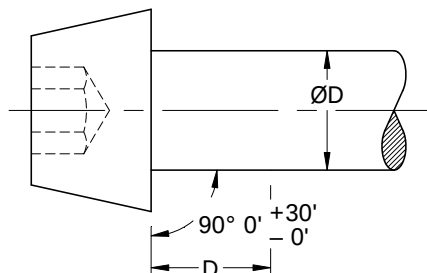


FIGURE 3 – HEAD ANGULARITY

- 3.4.3.2 Head Structure and Grain Flow. A section of the head shall show no detrimental defects and shall show grain flow lines substantially as shown in Figure 4. The grain flow lines may be slightly broken by the finish machining or grinding.
- 3.4.4 Fillet (Head-to-Shank). The fillet shall be cold worked in such a manner as to produce the fatigue strength requirements specified herein. Fillet shall be finished to radius specified on the applicable drawing. Cold working of fillet radius shall be accomplished subsequent to heat treatment of bolt. Fillet shall show no evidence of seams or inclusions.
- 3.4.4.1 Distortion Radius. Cold working of head-to-shank fillet may cause distortion of fillet area. Distortion shall not exceed .002 above "A" or below "B" contour shown on Figure 5. Distorted area shall not extend beyond "C" as illustrated in Figure 5.

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