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FED. SUPPLY CLASS

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REVISION DATE: JUNE 29, 2012

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1. SCOPE AND CLASSES

1.1 This specification defines the requirements for externally threaded fasteners manufactured from three different material types identified in Table I: 125 ksi UTS min for alloy steel (Type 1) and corrosion resistant steel (Type 2), and 62 ksi UTS min for aluminum (Type 3).
Receiving contractors may reject any manufactured lot which does not conform.

1.2 Workmanship of fasteners shall conform with aircraft manufacturing processes.

1.3 Recommendations for improvements or corrections to this specification should be directed to the Executive Secretary of the National Aerospace Standards Committee or a using member company.

1.4 Specifications listed herein, of the issue in effect on date of inquiry are a part of this specification to the extent indicated. In the case of conflict, the requirements herein shall take precedence.

2. APPLICABLE DOCUMENTS

2.1 Federal Specifications

~~QQ-P-35 Passivation treatments for corrosion resistant steel.~~
QQ-A-430 Aluminum Alloy Rod and Wire; for Rivets and Cold Heading

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP). http://dodssp.daps.dla.mil

2.2 Industry Standards

2.2.1 Aerospace Industries Association

NASM1312 (MIL-STD-1312) Fastener Test Methods
NASM1312-1 (MIL-STD-1312-1) Fastener Test Methods, Method 1, Salt Spray
NASM1312-6 (MIL-STD-1312-6) Fastener Test Methods, Method 6, Hardness
NASM1312-8 (MIL-STD-1312-8) Fastener Test Methods, Method 8, Tensile Strength
NASM1312-13 (MIL-STD-1312-13) Fastener Test Methods, Method 13, Double Shear Test

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

2.2.2 American Society for Quality

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

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THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-B-6812, REVISION E.

THIRD ANGLE PROJECTION	CUSTODIAN	REVISION
	NATIONAL AEROSPACE STANDARDS COMMITTEE	3
PROCUREMENT SPECIFICATION: NONE	TITLE: **FASTENERS, EXTERNALLY THREADED, ALLOY STEEL, CORROSION RESISTANT STEEL, ALUMINUM, 60,000 PSI TO 125,000 PSI**	CLASSIFICATION SPECIFICATION: **NASM6812**

SHEET 1 OF 11

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2.2.3 ASTM International

ASTM E 140	Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness
ASTM E 340	Standard Test Method for Macroetching Metals and Alloys
ASTM E407	Standard Practce for Microetching Metals and Alloys
ASTM E1417/E1417M	Standard Practice for Liquid Penetrant Testing
ASTM E1444/E1444M	Standard Practice for Magnetic Particle Testing
ASTM A 493	Standard Specification for Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging

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

2.2.4 SAE International

AMS-H-6088	Heat Treatment for Aluminum Alloys
AMS6300	Steel Bars and Forgings 0.25Mo (0.35 - 0.40C) (SAE 4037) (UNS G40370)
AMS6280	Steel Bars, Forgings, and Rings 0.50Cr - 0.55Ni - 0.20Mo (0.28 - 0.33C) (SAE 8630) (UNS G86300)
AMS6322	Steel Bars, Forgings, and Rings 0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 8740) (UNS G87400)
AMS6382	Steel, Bars, Forgings, and Rings 0.95Cr - 0.20Mo (0.38 - 0.43C) (SAE 4140) Annealed (UNS G41400)
AS3062	Bolts, Screws and Studs, Screw Thread Requirements
AMS2700	Passivation of Corrosion Resistant Steels
AMS-QQ-A-225	Aluminum and Aluminum Alloy, Bar, Rod, Wire, or Special Shapes; Rolled, Drawn, or Cold Finished; General Specification for
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AMS2759	Heat Treatment of Steel Parts General Requirements
AMS6325	Steel, Bars and Forgings 0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 8740) Heat Treated, 105 ksi (724 MPa) Tensile Strength (UNS G87400)
AMS6327	Steel Bars and Forgings 0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 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 - 0.38C) (SAE 8735) (UNS G87350)
AMS-S-6758	Steel, Chrome-Molybdenum (4130) Bars and Reforging Stock (Aircraft Quality)
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 Military Specifications

MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-DTL-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
~~MIL-H-6875~~	~~Heat Treatment of Steel Raw Materials~~
~~MIL-S-6049~~	~~Steel, Chrome-Nickel-Molybdenum (8740) Bars and Reforging Stock (Aircraft Quality)~~
MIL-S-6050	Steel, Chrome-Nickel-Molybdenum (8630) Bars and Reforging Stock (Aircraft Quality)
~~MIL-S-6098~~	~~Steel, Chrome-Nickel-Molybdenum (8735) Bars and Reforging Stock (Aircraft Quality)~~
~~MIL-S-6758~~	~~Steel, Chrome-Molybdenum (4130) Bars and Reforging Stock (Aircraft Quality)~~
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series: General Specification for
~~MIL-S-8879~~	~~Screw Threads, Controlled Radius Root with Increased Minor Diameter, General Specification for~~
MIL-S-18732	Steel Bars, Wire, Forging Stock, Forgings, Tubing (431), Special Quality

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP). http://dodssp.daps.dla.mil

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TABLE I – BASIC REQUIREMENTS

CHARACTERISTICS	MATERIAL TYPE	ENGINEERING REQUIREMENTS	TESTING REQUIREMENTS (SEE 3.1)	
			TEST METHOD	SAMPLING PLAN
MATERIAL	1	AMS6300 STEEL (G40370) AMS6280 STEEL (G86300) AMS6322 STEEL (G87400) AMS6382 STEEL (G41400) AMS6325 STEEL (G87400) AMS6327 STEEL (G87400) MIL-S-6050 STEEL (G86300) AMS6320 STEEL (G87350) AMS-S-6758 STEEL (G41300)	Per material specification. Spectrographic analysis for routine checking. Chemical analysis for doubtful material.	Check material composition for 25 % (or more) of the parts used for metallurgical examination. Not mandatory.
	2	MIL-S-18732 CRES		
	3	AMS-QQ-A-225 ALUM QQ-A-430 ALUM		
DIMENSIONS	1 2 3	After all plating, coating, passivation, or surface treatment.	Conventional measuring methods.	Per Tables VII thru IX.
HEAD TO SHANK SQUARENESS	1 2 3	Bearing surface squareness shall be within 2˚ for fastener sizes under Ø.500 and 1˚ for Ø.500 fasteners and larger, FIM of the shank.	Conventional measuring methods.	Per Tables VII thru IX.
HEAD TO SHANK CONCENTRICITY	1 2 3	Within 3 % of either the width across flats or the diameter of the head of clevis or eye bolts.	Conventional measuring methods.	Per Table VII.
HEAD SLOTS	1 2 3	The depth of slots shall be measured from the highest part of the head to the bottom of the slot.	Conventional measuring methods.	Per Tables VII thru IX.
HEX HEAD FASTENERS	1 2 3	Top surface of hexagon head fasteners shall be chamfered and approximately flat with the diameter of the top flat circle from 85 % to 100 % of the width across flats.	Visual examination with unaided eye.	Per Tables VII thru IX.
SHANK STRAIGHTNESS	1 2 3	Per Table IV.	Conventional measuring methods.	Per Tables VII thru IX.
SURFACE TEXTURE	1 2 3	Unless otherwise specified, the surface texture of the shank on close tolerance fasteners shall be 63 RHR or finer and all other surfaces shall be 125 RHR or finer. The surface texture, including the shank, of all other type fasteners or bolts shall be 125 RHR or finer.	Per ASME B46.1 by visual or fingernail comparison. In case of controversy, profilometer may be used for checking roughness if surface is accessible.	Per Tables VII and IX.
IDENTIFICATION	1 2 3	Per Part Standard plus the manufactures logo if area permits.	Visual examination to assure legibility. Control stamp depth to assure max. is not exceeded.	Per Table IX.

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TABLE I – BASIC REQUIREMENTS (Continued)

CHARACTERISTICS	MATERIAL TYPE	ENGINEERING REQUIREMENTS	TESTING REQUIREMENTS (SEE 3.1)	
			TEST METHOD	SAMPLING PLAN
THREAD	1 2 3	AS8879 or MIL-S-7742 as required by the applicable part standard.	Indicating gages, micrometer, caliper, and/or comparator.	Per Tables VII and IX.
HEAT TREATMENT	1 2	Shall develop the mechanical properties defined herein. Per AMS2759.	Test of mechanical and metallurgical properties verifies heat treatment. /a/	As indicated for each test requirement.
	3	AMS-H-6088.		
HARDNESS	1	Individual hardness readings shall be within the limits of 26 - 32HRC (or equivalent per ASTM E 140).	Hardness test per NASM1312-6. /b/	Destructive test per Table X.
	2 3	Not applicable.	Not applicable.	Not applicable.
TENSILE STRENGTH	1 2 3	Minimum tensile strengths per Table II with limitations per Table II notes or unless otherwise specified on the Part Standard.	Static tensile test per NASM1312-8.	Per Table X.
SHEAR STRENGTH	1 2 3	Minimum shear strengths per Table II with limitations per Table II notes or unless otherwise specified on the Part Standard.	Double shear test per NASM1312-13.	Per Table X.
METALLURGICAL	1 2 3	No cracks permitted in any location. A crack is a clean crystalline break passing through the grain or grain boundary. Other discontinuities permitted per Table VI.	Magnetic inspection per ASTM E1444/E1444M circular and longitudinal method after plating. Magnetic inspection not required on fasteners of nominal diameter below .2500. Penetrant inspection per ASTM E1417/E1417M, Type I, Method B. penetrant inspection not required on fasteners of nominal diameter below .2500.	Sample per Table VII, increase to 100 % if any indications are found in samples exceeding the limits of Table VI.
MICROSTRUCTURE	1 2 3	Shall be free from bursts, voids, and overheating. Alloy segregation which adversely affects the mechanical or physical properties of the part is not acceptable.	Specimens shall be cut per Figure 1, etched per ASTM E 340 and ASTM E407, and examined per 3.4.	Per Table X.
CARBURIZATION OR DECARBURIZATION	1	Per Table III.	Metallurgical examination. See 3.4 and Figure 1, transverse section.	Per Table X.
	2 3	Not Applicable.	Not Applicable.	Not Applicable.

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