

FED. SUPPLY CLASS

5340

1. SCOPE

- 1.1 Scope. This specification covers locked in, keyring locked, metal inserts which have self-locking and non-self-locking internal threads, and provides technical requirements identifiable as NAS1838-1.

2. APPLICABLE DOCUMENTS

- 2.1 The following documents, of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal

FED-STD-H28/2	Screw-Thread Standards for Federal Services
QQ-A-225/6	Aluminum Alloy Bar, Rod and Wire, Rolled, Drawn, or Cold Finished, 2024
QQ-A-250/6	Aluminum Alloy 5083, Plate and Sheet
QQ-W-423	Wire, Steel, Corrosion Resisting
QQ-S-766	Steel Plate, Sheet and Strip Corrosion Resisting
QQ-S-794	Steel, Bar, Corrosion, Resisting, Free Machining

Military

MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-2073/1	Standard Practice for Military Packaging
MIL-S-5626	Steel, Chrome Molybdenum (4140) Bars and Reforging Stock (for Aircraft Application)
MIL-S-6758	Steel, Chrome Molybdenum (4130) Bars and Reforging Stock (Aircraft Quality)
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-L-8937	Lubricant, Solid Film, Heat Cured
MIL-W-52263	Wire, Steel, Corrosion Resisting, Free Machining Stock

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

- 2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

American Society for Quality

ANSI/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

ASTM International

ASTM A581/A581M	Free-Machining Stainless and Heat-Resisting Wire
ASTM A582/A582M	Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished
ASTM E1282	Standard Guide for Specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative Analysis Methods for Metals, Ores, and Related Materials
ASTM E1417	Standard Practice for Liquid Penetrant Testing
ASTM E1444	Standard Practice for Magnetic Particle Testing
ASTM D3951	Standard Practice for Commercial Packaging

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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THIRD ANGLE PROJECTION	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 2
PROCUREMENT SPECIFICATION NONE	TITLE INSERTS, SCREW THREAD, METALLIC, KEYRING LOCKED, SPECIFICATION FOR	CLASSIFICATION SPECIFICATION NAS1838



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Aerospace Industries Association

NAS1495 Recommended Qualification Test Procedure for Compliance with NAS Specifications and Standard Drawings
NASM25027 Nut, Self-Locking, 250 °F, 450 °F, and 800 °F, 125 KSI FTU, 60 KSI FTU, and 30 KSI FtU

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

SAE International

AMS-QQ-A-225/6 Aluminum Alloy Bar, Rod and Wire, Rolled, Drawn, or Cold Finished, 2024
AMS-QQ-A-250/6 Aluminum Alloy 5083, Plate and Sheet
AMS-QQ-P-416 Plating, Cadmium (Electrodeposited)
AMS2410 Silver Plating, Nickel Strike, High Bake
AMS2411 Silver Plating for High Temperature Applications
AMS2700 Passivation Treatments for Austenitic, Ferritic and Martensitic CRES (Fastening Devices)
AMS2759 Heat Treatment of Steels (Aircraft Practice), Process For
AS5272 Lubricant, Solid Film, Heat Cured
AMS5504 Steel Sheet, Strip & Plate, Corrosion and Moderate Heat Resistant
AMS5506 Steel Sheet and Strip, Corrosion and Moderate Heat Resistant
AMS5613 Steel Bars, Forgings, Tubing, and Rings, Corrosion and Moderate Heat Resistant 12.5Cr (SAE 51410)
AMS5621 Steel Bars and Forgings, Corrosion Resistant 13Cr (.30-.40C) (SAE 5120)
AMS5731 Steel, Corrosion and Heat Resistant
AMS6349 Steel Bars .95Cr - .20Mo (.38 to .43C) (SAE 4140) Normalized (UNS G41400)
AMS6382 Steel, Bars, Forgings, and Rings .95Cr - .20Mo (.38 - .43C) (SAE 4140) Annealed (UNS G41400)
AMS-S-6758 Steel, Chrome-Molybdenum (4130) Bars and Reforging Stock (Aircraft Quality)
AS8879 Screw Threads, Controlled Radius Root and Increased Minor Diameter, General Specification for

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

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

3. REQUIREMENTS

3.1 Material

3.1.1 Inserts

3.1.1.1 Alloy steel inserts. Alloy steel inserts shall be made of 4140 or 4130 alloy steel as specified in ~~MIL-S-5626~~ AMS6349, AMS6382 or ~~MIL-S-6758~~ AMS-S-6758.

3.1.1.2 CRES inserts. CRES inserts shall be made of CRES, Type 303 per ASTM A581/A581M Condition B for inserts .500 inch external diameter and smaller and ASTM A582/A582M Condition A for inserts larger than .500 inch external diameter.

3.1.1.3 Corrosion and heat resistant steel. Inserts shall be made of corrosion and heat resistant steel, as specified in AMS5731 (A286).

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3.1.2 Keyrings

3.1.2.1 Locking keyrings. Insert locking keyrings shall be made from 410 CRES per AMS5504 or AMS5613, or 420 CRES per AMS5506 or AMS5621.

3.2 Heat Treatment

3.2.1 Inserts. Inserts, except Type 303 CRES, shall be heat treated in accordance with AMS2759.

3.2.2 Locking keyrings. Locking keyrings shall be heat treated in accordance with AMS2759.

3.3 Plating or Surface Treatment

3.3.1 Cadmium plating. Inserts fabricated from alloy steel shall be cadmium plated in accordance with AMS-QQ-P-416, Type II, Class 2. Keyrings shall be cadmium plated when assembled to cadmium plated inserts.

3.3.2 Silver plating. Inserts requiring silver plating shall be silver plated as specified in AMS2410 or AMS2411 as called for on the applicable detail part drawing. Keyrings shall be silver plated when assembled to silver plated inserts.

3.3.3 Passivation. Inserts and locking keyrings fabricated from CRES shall be passivated in accordance with AMS2700, Method 1, Class 4, or as specified on the applicable detail part drawing.

3.4 Lubrication

3.4.1 When used, dry film lubricant shall conform to ~~MIL-L-8937~~ AS5272, Type I.

3.5 Design, Dimensions and Tolerances. Inserts and locking keyrings shall be in accordance with the design, dimensions and tolerances specified on the applicable detail part drawing. These dimensions and tolerances shall apply after application of the protective plating or surface treatment and prior to application of the lubricant as specified in 3.4.1.

3.6 Construction. The insert, locking keyrings, and internal thread locking device shall be an integral all-metal assembly.

3.7 Threads

3.7.1 Hand. Insert internal and external threads shall be right-hand unless otherwise specified on the applicable detail part drawing.

3.7.2 Internal threads. Internal threads shall conform to AS8879. Thread gaging shall be performed after plating and prior to application of the lubricant. When a locking feature is employed the GO plug gage shall enter a minimum of 3/4 turn before engagement of the locking device. When the application of a lubricant prevents the use of gages, the insert shall permit a minimum free rotational bolt thread engagement of 3/4 turn before engagement of the locking element.

3.7.3 External threads. External threads shall be as specified on the applicable detail part drawing.

3.7.4 External thread forming. Sizes 1/4-20 and 12-24 may be rolled or machined prior to plating. All other sizes shall be fully formed by a single rolling process prior to plating.

3.7.5 Lead threads. Internal and external lead threads shall not exceed two pitches, including chamfer.

3.7.6 Concentricity. The internal thread pitch diameter shall be concentric with the external pitch diameter within .005 full indicator movement (FIM).

3.7.7 Self-locking torque. Threads in the area of the locking feature shall be displaced or deformed in a manner which is in accordance with the applicable detail part drawing. The installed insert shall provide a locking torque as specified in NASM25027.

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- 3.8 Surface roughness. The surface roughness of the inserts prior to plating shall not exceed 125 microinches. The surface roughness of external threads shall not exceed 63 microinches.
- 3.9 Mechanical Properties
- 3.9.1 Axial tensile strength. The installed insert (with or without locking keyrings installed) shall have a minimum axial tensile strength as specified in Table I.
- 3.9.2 Pullout strength. The installed inserts (with or without locking keyrings installed) shall have a minimum ultimate pullout strength as specified in Tables II or III.
- 3.9.3 Torque-out. Torque-out values for installed inserts shall be not less than the values listed in Table IV.
- 3.10 Metallurgical Properties
- 3.10.1 Discontinuities. Inserts shall not contain discontinuities which equal or exceed the following limitations. Care must be exercised not to confuse cracks with discontinuities, as described herein. When visual inspection discloses discontinuities which show cause for further examination, magnetic particle, or penetrant inspection as applicable shall be as specified 4.5.4.
- 3.10.1.1 Laps, seams and inclusions. Inserts shall not have laps, seams and inclusions in locations as shown in Figure 1. Laps, seams and inclusions in other locations shall not exceed 20 percent of the thread height (sharp V thread).
- 3.10.2 Cracks. Inserts shall be free from cracks in any direction or location.
- 3.11 Workmanship. Workmanship shall be consistent with the type of product, finish, and class of thread fit specified. Inserts shall be of uniform quality and free from defects which would be detrimental to the performance of the insert.
- 3.12 Qualification test procedure. Inserts furnished under this specification shall be a product which has been tested and has passed the qualification tests herein, and conforms to the applicable detail part drawings. The insert manufacturer shall be responsible for conducting the qualification tests in accordance with NAS1495.

TABLE I – INSERT AXIAL TENSILE STRENGTH (LBF)

Insert Internal Thread Size	Tensile Stress Area /a/	Lightweight Series		Heavy Duty Series	
		Dash No.	Load /b/	Dash No.	Load /c/
.1120-40	.0060	–	–	04	960
.1380-32	.0091	–	–	06	1,456
.1640-32	.0140	08	1,750	08	2,240
.1900-32	.0200	3	2,500	3	3,200
.2500-28	.0364	4	4,550	4	5,824
.3125-24	.0580	5	7,250	5	9,280
.3750-24	.0878	6	10,975	6	14,048
.4375-20	.1187	7	14,837	7	18,992
.5000-20	.1599	8	19,987	8	25,584
.5625-18	.203	–	–	9	32,480
.6250-18	.256	–	–	10	40,960
.7500-16	.373	–	–	12	59,680
.8750-14	.509	–	–	14	81,440
1.0000-12	.663	–	–	16	106,080

/a/ Stress area per FED-STD-H28/2, Screw Thread Standards for Federal Services.

/b/ Load = (Bolt tensile stress area, in²) x 125 KSI.

/c/ Load = (Bolt tensile stress area, in²) x 160 KSI.

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