

FED. SUPPLY CLASS

5305

1. SCOPE

1.1 This specification defines the requirements for 500 and 700 MPa minimum tensile strength austenitic CRES externally threaded metric fasteners procured under part numbers listed on part standards which refer to this specification. Drawings may carry notes which modify the requirements of this specification. Receiving contractors may reject any lot which does not conform.

1.2 The specification includes mechanical property requirements for the following four classes of fasteners:

- Type 1 - Hex Head
- Type 2 - Pan Head
- Type 3 - Socket Head
- Type 4 - 100° Flush Head

1.3 Recommendations for improvements or corrections of this specification should be directed to the NASC representative of a using aerospace company or to the National Aerospace Standards Committee, Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA, 22209.

2. APPLICABLE DOCUMENTS

2.1 Documents listed herein of the issue in effect on date of price inquiry are a part of this specification to the extent indicated. In the event of a conflict between the requirements of this specification and referenced documents, the requirements herein shall govern.

Federal Standards

FED-STD-H28/20

Screw Thread Standards for Federal Services, Section 20, Inspection Methods for Acceptability of UN, UNR, UNJ, M and MJ Screw Threads

FED-STD-H28/21

Screw Thread Standards for Federal Services, Section 21, Metric Screw Threads

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

Industry Standards

ASTM International

ASTM E112

Standard Method for Determining Average Grain Size

ASTM A493

Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forming

ASTM E1417/E1417M

Standard Practice for Liquid Penetrant Examination

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

ASME

ASME B46.1

Surface Texture (Surface Roughness, Waviness and Lay)

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

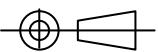
American Society for Quality

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

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PROCUREMENT
SPECIFICATION

NONE

TITLE

**PROCUREMENT SPECIFICATION, METRIC FASTENERS,
CRES 300 SERIES, EXTERNALLY THREADED,
MJ THREAD, 500 MPa Ft_u and 700 MPa Ft_u**

CLASSIFICATION
SPECIFICATION

DA0271
SHEET 1 OF 10

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

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PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

FORM 12-01

REVISION DATE: NOVEMBER 21, 2014

ISSUE DATE: AUGUST 1997

SAE International

SAE MA1520

Areas for Calculating Stress or Load Values for Metric MJ Externally Threaded Fasteners

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

www.sae.org

Aerospace Industries Association

NAM1312-108

Fastener Test Methods, Metric, Method 108, Tensile Strength

NAM1312-113

Fastener Test Methods, Metric, Method 113, Double Shear Test

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

3. REQUIREMENTS

- 3.1 General. Fasteners supplied to this specification shall comply with all the requirements of this specification and shall have passed all of the applicable tests herein.
- 3.2 Materials. Fasteners shall be fabricated from austenitic CRES conforming to UNS S30200, UNS S30400, UNS S30430, UNS S30500, UNS S31600, UNS S32100 or UNS S34700 in accordance with ASTM A493, the mechanical properties of 3.4 and the alloy selection criteria of Paragraphs 3.2.1 and 3.2.2 of this specification.
 - 3.2.1 500 MPa Materials. For 500 MPa minimum tensile strength fasteners, all alloys specified in Paragraph 3.2 may be used. UNS S30430 shall be cold worked sufficiently during the manufacturing process to achieve the strength levels specified in Table II.
 - 3.2.2 700 MPa Materials. For 700 MPa minimum tensile strength fasteners, only alloys UNS S32100, UNS S34700 and UNS S31600 specified in Paragraph 3.2 may be used and shall be cold worked sufficiently during the manufacturing process to achieve the strength levels specified in Table II.
- 3.3 Design and Construction. Fastener design and construction shall conform to the following requirements.
 - 3.3.1 Dimensions. Dimensions shall be in accordance with the applicable detail part standard. Dimensions shall include the finishes, if any, designated on the detailed drawing. Dimensions shall exclude dry film lubricants. Measurements shall be made per 4.4.1.
 - 3.3.2 Surface Texture. Surface texture shall be as specified in the detail drawing and in accordance with the requirements of ASME B46.1 (Reference Paragraph 4.4.1.1).
 - 3.3.3 Thread Form. MJ thread form and dimensions shall conform to FED-STD-H28/21.
 - 3.3.3.1 Thread Forming. Threads shall be formed by a single rolling process.
 - 3.3.3.2 Incomplete Threads. A maximum of 1,5 incomplete lead-in threads and maximum of 2 incomplete runout threads are permissible.
 - 3.3.3.3 Chamfer. The lead-in threads and point shall be chamfered as specified in the applicable detail part standard.
 - 3.3.3.4 Irregular Flank. The thread run-out shall fair into the shank with no abrupt changes in cross sectional area. The roots and thread flanks of the run-out thread shall be smooth and devoid of tool marks.
 - 3.3.3.5 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 illustrated in Figure 1.

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Documents
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- 3.3.4 Heads. Fastener heads shall be formed by forging or cold forming. Recesses and socket drives may be forged or machined. Flash or chip clearance in machined recess shall not cause recess dimensions to exceed the specified limits.
- 3.3.4.1 Bearing Surfaces. The bearing surface of fastener heads shall be oriented relative to the shank within the limits shown on the part standard.
- 3.3.4.2 Head Structure and Grain Flow. A metallographic cross section of the head shall show no detrimental defects (see section 4.4.4) and shall exhibit grain flow lines substantially as illustrated in Figure 1 for sizes larger than 5 mm thread. Grain flow shall be continuous and shall not terminate in the head to shank fillet, but may show minor interruption resulting from finish machine operations. Grain size throughout the part shall be predominately 5 or finer as defined in ASTM E112. Evaluation shall be conducted at 100X magnification.
- 3.3.4.3 Recess Drives. Recess drive design configuration and performance requirements shall be as specified on the detailed part standard.
- 3.3.5 Head-Shank Fillet. The juncture of the fastener head and shank shall meet the dimensional requirements of the applicable detail part standard.
- 3.3.6 Straightness. The straightness of the fastener shank shall be within the limits of Table I when the fastener shank is rolled in "V" blocks (maximum width of each block is 8 mm) placed on surface plates and the greatest deviation is measured with a dial indicator.

TABLE I – SHANK STRAIGHTNESS

NOMINAL SHANK DIAMETER	MAXIMUM DEVIATION (mm per 10 mm of length)
8 mm and smaller	0,02
10 mm and larger	0,015

- 3.3.7 Coaxiality. The coaxiality tolerance between the thread and the shank of bolts, which is the coaxiality of the shank with respect to the pitch diameter as the datum, shall be as specified on the detailed part standard. The position of measurement shall be at a distance of 1x "ØD" from the point where the thread runout meets the shank. When the shank length is less than 2x "ØD", coaxiality shall be measured midway between the head and the thread runout.
- 3.4 Mechanical Properties. Mechanical Properties of fasteners shall conform to the following requirements.
- 3.4.1 Ultimate Tensile Strength. When tested in accordance with 4.4.2.1, the minimum ultimate tensile strength shall conform to the requirements of Table II and 4.4.2.3 for the specified fastener strength. Tensile tests are not applicable to fully threaded fasteners whose length is less than three times the nominal diameter or to grip-type threaded fasteners with grip less than two times the nominal diameter. Tensile strength shall apply to fasteners prior to drilling.
- 3.4.2 Ultimate Double Shear Strength. When tested in accordance with 4.4.2.2, the minimum ultimate double shear strength shall conform to the requirements of Table II and 4.4.2.3. Shear tests are not applicable to protruding head fasteners whose grip is less than two times the nominal diameter and to flush head fasteners whose grip is less than two and one half times the nominal diameter.

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