

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N. W., WASHINGTON, D. C. 20036

1. SCOPE

1.1 This specification covers the requirements for threaded fasteners requiring high strength at temperatures up to 1200°F. Types and sizes are defined by part numbers listed on drawings which refer to this specification.

1.2 In the event of a conflict between the drawing and this specification, the drawing will take precedence.

2. APPLICABLE SPECIFICATIONS, OTHER PUBLICATIONS, AND DRAWINGS

2.1 The following publications, of the issue in effect on date of invitation for bids, shall form a part of this specification to the extent specified herein.

2.1.1 Federal Specifications

PPP-B-566 Boxes, Folding, Paperboard
PPP-B-636 Boxes, Fibreboard
PPP-B-676 Boxes, Set-Up, Paperboard

(Copies of Federal Specifications and the Federal Specification Index may be obtained upon application, accompanied by money order, coupon or cash, to the Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price of Federal Specifications may be obtained from the Federal Specification Index)

2.1.2 Military and Air Force-Navy Aeronautical Specifications

MIL-B-121 Barrier Material, Greaseproofed, Waterproofed, Flexible
MIL-B-4229 Boxes, Paperboard, Metal-Stayed
MIL-S-5002 Surface Treatments for Metal and Metal Parts in Aircraft
MIL-I-6856 Inspection, Penetrant Method of
MIL-S-8879(ASG) Screw Threads, Controlled Radius Root with Increased Minor Diameter, General Specification For

(Copies of Air Force-Navy Aeronautical Specifications may be obtained upon application to the Commander, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio; or to the Commanding Officer, U.S. Naval Air Development Station, Johnsville, Penna. The price may be obtained from the index of Military Aeronautical (AN or MIL) Standards or upon application to either of the above agencies, and payments shall be made by check or money order, payable to the Superintendent of Documents or to the Treasurer of the United States).

2.1.3 NAS Specifications

NAS1597 Steel, Bar, Rod, and Forging, Corrosion and Heat Resistant

2.1.4 Standards

2.1.4.1 Federal

H-28 Handbook (1950 Supplement) Screw-Thread Standards for Federal Services
Federal Test Method Standard No. 151 Metals; Test Methods

2.1.4.2 Military

MIL-STD-10 Surface Roughness, Waviness, and Lay
MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 Marking for Shipment and Storage

2.1.4.3 NAS

NAS 618 Fastener - Recommended Shank, Hole, and Head-to-Shank Fillet Radius Limits for
NAS 1069 Tension Fatigue Test, Procedure for Aeronautical Fasteners
NAS 1347 Identification of Fasteners

(Copies of NAS Specifications and Drawings may be obtained from the National Aerospace Standards Committee, Aerospace Industries Association of America, Incorporated, 610 Shoreham Building, Washington 5, D.C.)

3. REQUIREMENTS

3.1 Materials

The fasteners shall be made from corrosion and heat resistant alloy conforming to NAS1597, Cond F.

3.2 Design and Construction

① INACTIVE FOR DESIGN AFTER 15 SEPT. 1975. NO SUPERSEDING STANDARD. (FOR DESCRIPTION OF STATUS NOTES, SEE NAS380)

LIST OF CURRENT SHEETS

NO.	REV.	NO.	REV.	NO.	REV.
1	1	5	1	9	1
2	1	6	1	10	1
3	1	7	1	11	1
4	1	8	1	12	1
				13	1

CUSTODIAN: NATIONAL AEROSPACE STANDARDS COMMITTEE

PROCUREMENT
SPECIFICATION

TITLE
FASTENERS - THREADED,
CORROSION & HEAT RESISTANT, 1200°F,
PROCUREMENT SPECIFICATION FOR

CLASSIFICATION
SPECIFICATION

NAS Documents
SHEET 1 OF 13

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N. W., WASHINGTON, D. C. 20036

3.2.1 Workmanship - Fasteners shall be made in conformance with high grade bolt manufacturing practice.

3.2.2 Dimensions - The dimensions of the finished fasteners shall conform to applicable standard drawings.

3.2.3 Threads

3.2.3.1 Form and Dimensions. Unless otherwise specified, the threads shall be right hand. The dimensions, form, and contour of the threads shall conform to Specification MIL-S-8879 except the maximum major diameter shall be a minimum of .001 less than the minimum shank diameter.

3.2.3.2 Rolling. Threads shall be fully formed by any single rolling process either in between the two aging cycles of heat treatment for condition F as per NAS 1597 or subsequent to all thermal treatment. Other thread forming processes such as grinding or turning may not be utilized.

3.2.3.3 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 1.



FIGURE 1. Grain Flow

3.2.4 Heads

The bolt heads shall be forged. Forged or machined lightening holes for reduction of weight are acceptable.

3.2.4.1 Bearing Surface

- Protruding Type. The bearing surface of protruding type fastener heads shall be at right angles to the shank within limits shown in Figure 2. 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 bearing face of the head at length approximately equal to the diameter of the bolt. Concentricity shall be within the limits shown in Table I.
- Flush Type. The bearing surface and the shank must be concentric within limits shown in Table I as measured with a V-Block and dial indicator.

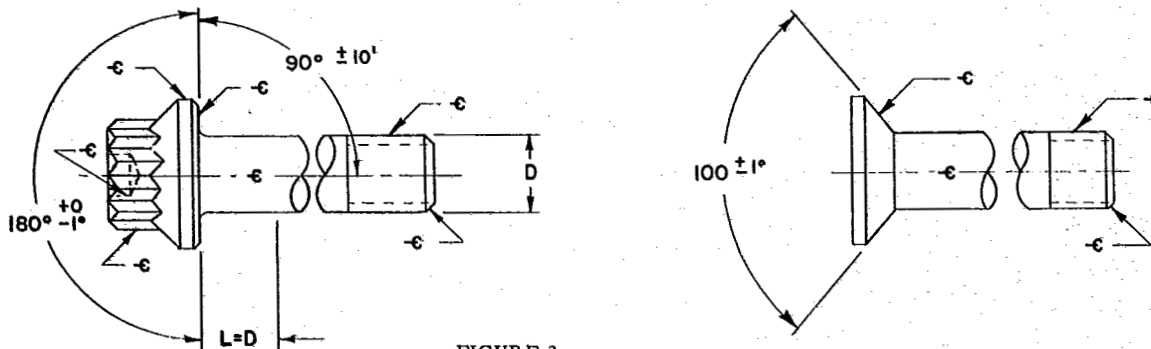


FIGURE 2.

① INACTIVE FOR DESIGN AFTER 15 SEPT. 1975.
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NAS Documents
SHEET 2
Document Sharing Hub

TABLE I

CONCENTRICITY LIMITS:

Size	LIMITS		
	X max	Y max	Z max
10-32	.005	.007	.005
1/4-28	.005	.007	.005
5/16-24	.006	.008	.005
3/8-24	.008	.010	.005
7/16-20	.009	.011	.006
1/2-20	.010	.012	.006
9/16-18	.011	.014	.006
5/8-18	.012	.016	.006
3/4-16	.015	.018	.006
7/8-14	.018	.022	.009
1-12	.020	.025	.009
1-1/8-12	.022	.026	.009
1-1/4-12	.025	.036	.009

- NOTES: 1. Protruding Head Types
- Shank and thread pitch shall be concentric with "Z" values T I R
 - Shank, Bearing face and chamfer shall be concentric with "X" values T I R
 - Shank and periphery of bearing surfaces shall be concentric with "Y" values T I R
 - On 12 point heads, the lightening hole shall be concentric to the double hex configuration within "Y" values T I R
2. Flush Head Types
- Shank, Bearing Surface, and Thread Pitch shall be concentric within "Z" values T I R
 - Shank and chamfer shall be concentric within "X" values T I R

3.2.4.2 Head Structure and Grain Flow

A section of the head, when examined as specified in Section 4, shall show no detrimental effects. Flow lines in the fillet area immediately below the surface shall conform substantially to the fillet contour as shown in Figure 3. The grain flow lines may be slightly broken by the finish machining or grinding.

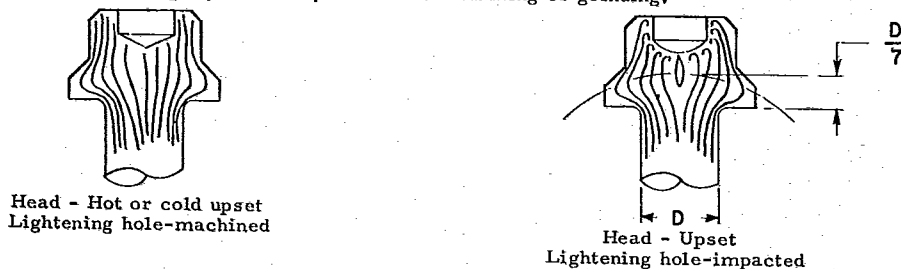


FIGURE 3. Head Structure and Grain Flow

3.2.4.3 Fillet (Head to Shank) - The head-to-shank fillet radius shall be cold worked (subsequent to heat treatment) in such a manner as to produce the fatigue strength requirements specified herein. The fillet shall be finished to the radius specified in the applicable Standard drawing. Distortion from the smooth contour, which results from cold working, shall not exceed 0.002 inch at "A" or "B" and the distorted area shall not extend beyond "C" as illustrated in Figure 4, and Table II.

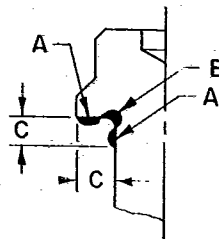


FIGURE 4. Fillet Rolling Permissible Distortion

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TABLE II

NOMINAL SIZE	UNDER 5/16	5/16 AND 3/8	7/16 THRU 5/8	3/4 THRU 1	OVER 1
C MAX	.062	.094	.125	.156	.188

3.3 Surface Roughness

The surface roughness of the bolts shall not exceed the values shown in Table III. The surface roughness shall be measured in accordance with Standard MIL-STD-10.

TABLE III

Roughness Height Rating

Area	RHR (max.)
Shank and underside of head	32
Head-to-shank fillet	32
Sides of thread and root area	32
Other surfaces	125

3.4 Straightness

The straightness of the bolt shank shall be within the values specified in Table IV when the bolt is rolled on a surface plate and the point of greatest deviation is measured with a feeler gage.

TABLE IV

Straightness of Shank

SIZE	Deviation of Shank from Plate (inch per inch of length) (max.)		
	LENGTH		
	Up to 2-1/2"	2-1/2" to 5"	5" and Up
1/4 and under	0.0030	0.0015	0.0010
5/16, 3/8, and 7/16	0.0025	0.0012	0.0008
1/2 and larger	0.0020	0.0010	0.0006

3.5 Heat Treatment

Bolts shall be heat treated in accordance with specification NAS1597, Cond F, to develop the mechanical properties specified herein.

3.6 Cleaning

Bolts fabricated to this specification shall be cleaned and passivated in accordance with MIL-S-5002.

3.7 Mechanical Properties

3.7.1 Tensile and Rupture Strength

The tensile and rupture strength of these bolts shall be equal to or greater than the values specified in Table V.

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