

NATIONAL AEROSPACE STANDARD

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

SPECIFICATION

FASTENERS - BLIND

1. SCOPE

1.1 Scope.-- This specification establishes the requirements for Blind Fasteners with a minimum shear strength of 95,000 PSI which are capable of being installed from only one side of an assembly.

2. APPLICABLE SPECIFICATIONS, OTHER PUBLICATIONS AND DRAWINGS

2.1 Publications.-- 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 Military and Air Force-Navy Aeronautical Specifications.--

MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-B-7838	Bolt; Internal Wrenching, 160,000 PSI
MIL-C-5541	Chemical films for Aluminum and Aluminum Alloys
MIL-H-6088	Heat Treatment of Aluminum Alloys, Process for
MIL-H-6875	Heat Treatment of Steels (Aircraft); Process for
MIL-S-6049	Steel; Chrome-Nickel-Molybdenum (8740) (AMS6322) Bars, Rods & Forging Stock
MIL-S-8503	Steel; Chrome-Vanadium (6150) Bar and Billet
MIL-S-18732	Steel; Corrosion Resisting (16Cr-2Ni) Bar and Rod
MIL-S-7742	Screw Threads; Standard Aeronautical
MIL-S-5626	Steel; Chrome-Molybdenum (4140) Bars, Rods & Forging Stock
MIL-S-5000	Steel; Chrome-Nickel-Molybdenum (4340) (AMS6512) Bar & Reforging Stock
MIL-S-7720	Steel; Corrosion and Heat Resisting (18-8) Bars & Forging Stock
MIL-S-8695	Steel; Molybdenum (4037) Bars & Rods
MIL-T-8506	Tubing; Steel Corrosion-Resistant (304) Annealed

2.1.2 Federal Specifications.--

QQ-A-277	Aluminum Alloy, 7075, Bars, Rods & Shapes, Extruded
QQ-A-282	Aluminum Alloy, 7075, Bars, Rods & Shapes & Wire Rolled or Drawn
QQ-A-267	Aluminum Alloy, 2024, Bars, Rods & Shapes, Extruded
QQ-A-263	Aluminum Alloy, 2024, Bars, Rods & Wire Rolled or Drawn
QQ-P-416	Plating; Cadmium

2.1.3 NASC Specifications.--

NAS 496	Bolts - Internal Wrenching
NAS 672	Plating - High Strength Steels-Cadmium

2.1.4 Society of Automotive Engineer's Specification.--

AMS5641	Steel; Corrosion Resistant 18. 5Cr-10Ni Free Machining, Swaging or Hot Upsetting
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2.1.5 Standards.--Federal

FED-STD-151	Metals; Test Methods
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Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

NASC

NAS1059	Fasteners - Blind, High Strength
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Other Standards

Applicable vendor drawings and Company Standards

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PROCUREMENT
SPECIFICATION

TITLE

FASTENERS, BLIND

CLASSIFICATION
SPECIFICATION

NAS 1058

SHEET 1 OF 8

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3. TYPES AND SIZES

3.1 Types and Sizes.— Flush and protruding head standard and oversize fasteners shall be furnished as designated by the part numbers specified on the applicable drawings.

3.2 Grip Lengths.— Grip lengths for all diameters of fasteners shall be in 1/16" increments. (See NAS1059)

4. MATERIAL, WORKMANSHIP AND MARKING

4.1 Material.— The material used shall be as specified in paragraph 2.1 or other materials or finishes of aircraft quality satisfactory for the fabrication of these fasteners.

4.2 Temperature.— Fasteners made entirely from steel (alloy or corrosion resistant) shall be capable of meeting all the requirements of this specification for operating temperature applications up to and including 500°F. The shear and tensile strengths of these fasteners held at a temperature of 500°F. for a period of one-half hour shall not drop more than 20% at 500° when tested at 500°F.

5. GENERAL REQUIREMENTS

5.1 None.

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6. DETAIL REQUIREMENTS

6.1 Design and Construction

6.1.1 Heat Treatment.— Heat treatment of fasteners shall conform to specification MIL-H-6875 or MIL-H-6088 as required to meet the strength requirements of this specification.

6.2 Mechanical Properties

6.2.1 Strength.— The ultimate double shear strength and tension strength shall be as specified in Table I when tested.

TABLE I

Strength Requirements of Standard Diameter Steel Fasteners		
Size	Double Shear Strength (Min.) Pounds	Tensile Strength (Min.) Pounds
# 8	4,010	
# 10	5,380	1,900
1/4	9,300	3,630
5/16	14,600	4,635
3/8	21,000	6,560
7/16	28,600	8,160
1/2	37,300	11,100

6.2.1.1 Qualification.— Oversize fasteners may not be used for qualification of this specification.

6.2.2 Weight.— Minimum weight is a design objective. The weight should not exceed the maximum specified in the vendor drawings or airframe manufacturers standards.

6.2.3 Hardness.— Alloy steel fasteners and/or Alloy Steel Components carrying shear loads shall have a minimum Rockwell hardness of C-40 and maximum Rockwell of C-44 taken on a smooth flat prepared surface at any suitable location. Applicable to short length fasteners only, see paragraph 7.2.2.

6.2.4 Tension Pre-Load.— The fastener shall be capable of a tension pre-load of 60% of the minimum ultimate tensile strength. Tension pre-load is defined as the tensile load required to produce a measurable separation of two tensile test flats, per FEDERAL-STD-151

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PROCUREMENT SPECIFICATION	TITLE	CLASSIFICATION SPECIFICATION
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6.2.5 Sheet Take Up.— In the tabulated grip range the longest grip in the material being fastened with a fastener of the shortest applicable grip shall be capable of closing a gap between sheets of 1/32 of an inch, (the fastener grip not to include the 1/32 gap) where the force resisting the closing of the gap will not exceed the tension preload as indicated in paragraph 6.2.4.

6.2.5.1 Interference Fits.— The steel fastener shall be capable of being driven in a minimum of .0015 inch interference fit hole; in 7075-T6 material in any combination of sheet thickness up to and including two times the diameter of the fastener. In lieu of interference if the fastener effectively swells in the hole an interference fit is not required.

6.3 Decarburization.— No decarburization, partial or complete, shall be evident on steel fasteners when micro examined. Carbon recovery is acceptable.

6.4 Fatigue Strength.

6.4.1 Tension Fatigue.— The fatigue loading shall be tension-tension. The fatigue tests shall be conducted at room temperature and steel fasteners shall be capable of withstanding an average minimum of 65,000 cycles but single specimen shall not be less than 45,000 cycles, when tested as shown in MIL-B-7838, the loading to be as shown below in Table II, with a minimum of twelve samples for each diameter. The method of test and fixtures to be the same as MIL-B-7838 and NAS496. The tests may be discontinued on any single fastener under test if the fastener does not fail below 130,000 cycles.

TABLE II

Tension Fatigue Loading for Steel Fasteners		
Nom. Fastener Dia.	Low Tension Load (Pounds) ± 2%	High Tension Load (Pounds) ± 2%
# 8		
# 10	99.0	990
1/4	190.0	1900
5/16	240.0	2400
3/8	340.0	3400
7/16	420.0	4200
1/2	---	---

6.4.2 Shear Fatigue.— The fatigue loading shall be single shear, the tests shall be conducted at room temperature and steel fasteners shall be capable of withstanding an average minimum of 2,000,000 cycles but no single specimen shall be less than 1,400,000 cycles when loaded as shown in Table IIa, with a minimum of twelve samples for each diameter. The loading shall be single shear using a direct stress fatigue machine capable of producing a direct axial load in the test specimen through repeated cycles of tension. The sheets shall be of steel heat treated to RC 46 to 50 and shall be as shown in Fig. (1) and Fig. (2). Tests where this sheet fails at an average less than 2,000,000 cycles shall be rejected.

TABLE IIa

Shear Fatigue Loading for Steel Fasteners			
Nominal Fastener Diameter	Sheet Thickness	Load Per Fastener (Pounds)	
		Minimum	Maximum
# 8	.140	100	1,000
# 10	.160	130	1,300
1/4	.212	230	2,300
5/16	.266	360	3,600
3/8	.318	520	5,200
7/16	.372	720	7,200
1/2	.426	930	9,300

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