

FED.SUPPLY CLASS

5320

1.0 SCOPE

1.1 Scope - This specification establishes the requirements for procurement of self-plugging blind rivets, with a mechanically locked spindle, which can be installed in assemblies or construction where access to only one side is available. These rivets are intended for use in aerospace structure or similar applications.

1.2 Classes and Types - Rivets shall be furnished in the following classes and types:

Class 1 - Protruding Head Rivets

- Type C - Corrosion and Heat Resistant Steel, A-286
- ~~Type KE - Aluminum Alloy (7075) (Aluminum Spindle)~~
- Type H - Aluminum Alloy (2014A) (Aluminum Spindle)
- ~~Type V - Aluminum Alloy (7075) (Steel Spindle)~~

Class 2 - 100° Flush Head Rivets (MS20426 Head)

- Type C - Corrosion and Heat Resistant Steel, A-286
- ~~Type KE - Aluminum Alloy (7075) (Aluminum Spindle)~~
- Type H - Aluminum Alloy (2014A) (Aluminum Spindle)
- ~~Type V - Aluminum Alloy (7075) (Steel Spindle)~~

Class 3 - 100° Reduced Flush Head Rivets (NAS1097 Head)

- Type C - Corrosion and Heat Resistant Steel A-286
- ~~Type KE - Aluminum Alloy (7075) (Aluminum Spindle)~~
- Type H - Aluminum Alloy (2014A) (Aluminum Spindle)

2.0 APPLICABLE DOCUMENTS

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.

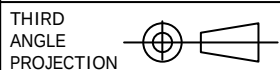
2.1.1 Federal Specifications

- ~~QQ-P-35 - Passivation~~
- ~~QQ-A-200/ QQ-A-225 - Aluminum Alloy Rod and Wire~~
- QQ-A-430 Aluminum Alloy Rod and Wire, For Rivets and Cold Heading
- ~~QQ-P-416 - Plating, Cadmium (Electrodesposited)~~
- ~~PPP-T-76 - Tape, Pressure Sensitive Adhesive Paper, Water Resistant, for Carton Sealing~~
- PPP-B-566 Boxes, Folding, Paperboard
- PPP-B-585 Boxes, Wood, Wirebound
- ~~PPP-B-591 - Boxes, Fiberboard, Wood Cleated~~
- ~~PPP-B-601 - Boxes, Wood, Cleated Plywood~~
- ~~PPP-B-621 - Boxes, Wood, Nailed and Lock Corner~~
- ~~PPP-B-636 - Boxes, Fiberboard~~
- ~~PPP-B-665 - Boxes, Paperboard, Metal Stayed~~
- PPP-B-676 Boxes, Set-Up
- ~~PPP-H-1581 - Hardware Packaging, Fasteners and Related Items~~

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(All the Federal and Military standards and specifications cited are available at <http://quicksearch.dla.mil>.)

~~(Copies of Federal Specifications and the Federal Specifications Index may be obtained upon application, accompanied by money order, coupon or cash, to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The price of Federal Specifications may be obtained for the Federal Specification index of the Superintendent of Documents.)~~



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PROCUREMENT
SPECIFICATION

TITLE

CLASSIFICATION
SPECIFICATION

NONE

**RIVET, BLIND, SELF-PLUGGING,
MECHANICALLY LOCKED SPINDLE**



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2.1.2. Military and Air Force-Navy Aeronautical Specifications

SP-R-0022A	General Specifications Vacuum Stability of Polymeric Material For Spacecraft Application
DOD-L-85645	Lubricant, Dry Thin Film, Molecular Bonded, Non-curing (Diconite-DL-5 Space Compatible Lube)
MIL-L-46010	Lubricant, Solid Film Heat Cured, Corrosion Inhibiting
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-H-6088	Heat Treat of Aluminum Alloys, Process for
MIL-H-6875	Heat Treatment of Steels
MIL-DTL-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-L-10547	Liner, Case and Sheet Overwrap, Water Vapor proof or Water proof, Flexible
MIL-STD-2073/1	Standard Practice for Military Packaging

Note: Unless otherwise specified all dimensions are in inches and all loads are in pounds.

(All the Federal and Military standards and specifications cited are available at <http://quicksearch.dla.mil>.)

(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, Pennsylvania. AIA Specifications are available for purchase from the above agencies acting as agents for the Superintendent of Documents. The price may be obtained from the Index of Military Aeronautical (AN or MIL) Standard 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 Standards

Military Standards

MIL-STD-105	Sampling Procedure and Tables for Inspection by Attributes
MIL-STD-1916	DOD Preferred Methods for Acceptance of Product
MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-889	Dissimilar Metals
MIL-STD-1312	Fastener, Test Methods

Industry Standards

NAS1719	Rivet, Blind, 100° Reduced Flush Head, (NAS1097 Head), Mechanically Locked Spindle
NAS1720	Rivet, Blind, Protruding Head, Mechanically Locked Spindle
NAS1721	Rivet, Blind 100° Flush Head, (MS20426 Head) Mechanically Locked Spindle
NASM1312	Fastener Test Methods

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

(Copies of NAS Specifications and Drawings may be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80150)

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2.1.4 Other Publications

ASQ Z1.4	Sampling Procedure and Tables for Inspection by Attributes
AMS2700	Passivation of Corrosion-Resistant Steels
AMS2759	Heat Treatment of Steel Parts General Requirements
AMS2770	Heat Treatment of Wrought Aluminum Alloy Parts
AMS5731	Steel Corrosion and Heat Resistant, Bars, Wire, Forgings, Tubing and Rings (UNS S66286)
AMS5732	Steel Corrosion and Heat Resistant, Bars, Wire, Forgings, Tubing and Rings (UNS S66286)
AMS5734	Steel Corrosion and Heat Resistant, Bars, Wire, Forgings, and Tubing (UNS S66286)
AMS5737	Steel Corrosion and Heat Resistant, Bars, Wire, Forgings, and Tubing (UNS S66286)
AMS6322	Steel Bars, Forgings, and Rings (UNS G87400)
AMS-QQ-A-200	Aluminum Alloy, Bar, Rod, Shapes, Structural Shapes, Tube and Wire, Extruded General Specification for
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)
AS5272	Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting Procurement Specification
ASTM B117	Practice for Operating Salt Spray (Fog) Apparatus
ASTM D1974	Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D3951	Practice for Commercial Packaging
ASTM D5118/D5118M	Practice for Fabrication of Fiberboard Shipping Boxes
ASTM D5486/D5486M	Specification for Pressure - Sensitive Tape for Packaging, Box Closure and Sealing
ASTM D6251/D6251M	Specification for Wood-Cleated Panelboard Shipping Boxes
BS EN2100	Aluminum Alloy AL-P2014A-T4511, Extruded Bars and Sections
ASTM D6880/D6880M	Standard Specification for Wood Boxes

(Copies of American Society for Quality Specifications "ASQ" may be obtained from Quality Press, 600 N. Plankinton Avenue, Milwaukee, WI 53203. Copies of Aerospace Material Specifications "AMS" may be obtained from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096. Copies of ASTM Specifications can be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103. Copies of BS EN Specifications can be obtained from British Standard Institution, 389 Chiswick High Road, London W4 4AL)

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3.0 REQUIREMENTS

- 3.1 Qualification - The rivets furnished under this specification shall be a product which has been tested and passed the qualification tests specified herein. The rivet manufacturer shall be responsible for conducting the test of this specification. Results of these tests shall be submitted upon application for qualification.
- 3.2 Materials - The materials shall be as specified in the applicable NAS Standard.
- 3.3 Design and Construction
- 3.3.1 Construction - The installed rivet shall be of two (2) piece construction, must be an integral assembly, and shall include a means, other than friction, of mechanically locking the spindle to the rivet sleeve with visible lock after installation. Rivets qualifying to NAS1722 must be installed with common tooling.
- 3.3.2 Installation - Installation tests shall be conducted as specified in paragraph 4.4.6.1. Installation is to be accomplished with a common tool. The installation tool shall be capable of installing the blind rivet and mechanically locking the spindle to the blind rivet sleeve. The excess portion of the blind rivet spindle shall be separated during the installation operation.
- 3.3.3 Dimensions - Rivets shall conform dimensionally to the applicable NAS Standards.
- 3.3.4 Expansion - When tested in accordance with paragraph 4.4.6 the amount of shank expansion shall not be less than that shown in Table I.

TABLE I - Rivet shank expansion requirements (inches)

INDEX		OF	
CURRENT		SHEETS	
SHEET	NO	REV	NO
1		2	
2		2	
3		2	
4		1	

DIAMETER	MIN EXPANSION IN AIR
.125	.144
.156	.180
.190	.216

- 3.3.5 Spindle Retention - A means of mechanically locking the spindle to the rivet shank shall be accomplished during the driving operation. When tests are performed as specified by paragraph 4.4.7, the rivet spindle shall withstand an axial pushout load of the values specified in Table II. The spindle of an uninstalled rivet (rivet in the as received condition) shall be capable of withstanding an axial pushout load of the values specified in Table II.

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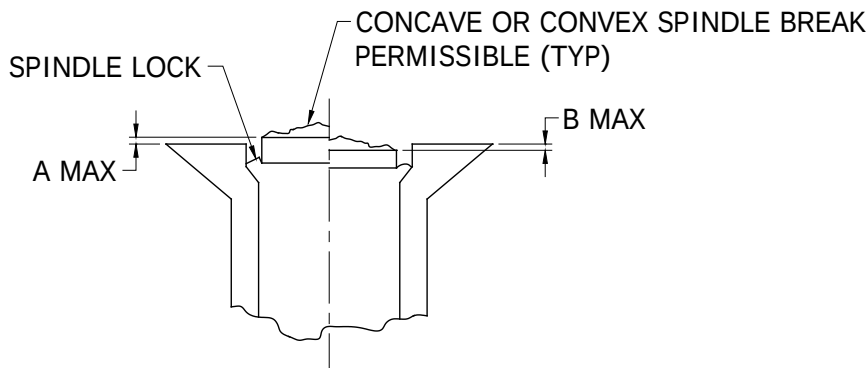
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TABLE II – Minimum spindle retention loads (pounds)

RIVET NOMINAL DIAMETER	CLASS 1, 2, AND 3 TYPE KE AND H		CLASS 1, 2, AND 3 TYPE C		CLASS 1 AND 2 TYPE V	
	UNINSTALLED	INSTALLED	UNINSTALLED	INSTALLED	UNINSTALLED	INSTALLED
.125	7	70 60	10	125	10	125
.156	7	70	10	175	15	175
.190	10	110	10	250	15	250

- 3.3.6 Roundness and Concentricity of Heads - Rivet heads shall be concentric with the shank within the limits specified in Table VII when tested as specified in paragraph 4.4.2.
- 3.3.7 Spindle Removal and Flushness - The tool shall be able to drive and lock the rivet satisfactorily with one contact with the rivet. The break-off portion of the rivet spindle shall be removed during the driving operation and shall be flush within the limits of Figure 1. A means of visual inspection shall be provided to show that the rivet is properly driven. Only single action tooling shall be used.



SPINDLE SHALL MEET THE DIMENSIONS SHOWN ABOVE.
THIS APPLIES TO BOTH FLUSH AND PROTRUDING HEAD RIVETS.

NOMINAL RIVET DIAMETER	A	B	1/64 OVERSIZE RIVET DIAMETER	A	B
.125	.005	.015	.140	.010	.015
.156	0	.020	.173	.010	.020
.190	0	.030	.201	.025	.030

FIGURE 1.
Spindle flushness limits

- 3.3.8 Finish - Rivets shall be finished in accordance with the applicable NAS Standards.
- 3.3.9 Heat Treatment - All alloys used in the fabrication of blind rivets shall be heat treated in accordance with specification AMS2770 for aluminum and specification AMS2759 for A-286.
- 3.3.10 Shear Strength - The single shear strength of the rivet shall not be less than the value specified in Table III when tested in accordance with paragraph 4.4.3.

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TABLE III – Shear strength

NOMINAL RIVET DIAMETER	HEAD CONFIGURATION	MINIMUM GRIP (INCH)	MINIMUM SHEAR STRENGTH (lbf)			
			TYPE KE 7050	TYPE H 2014A	TYPE C A-286	TYPE KE 7050 1/64 OVERSIZE
.125	CLASS 1	.125	450	450	1000	592
	CLASS 2 & CLASS 3	.187	450	450	900	619
	CLASS 2 & CLASS 3	.250	450	450	1000	619
.156	CLASS 1	.156	700	700	1500	935
	CLASS 2 & CLASS 3	.234	700	700	1350	935
	CLASS 2 & CLASS 3	.312	700	700	1500	935
.190	CLASS 1	.190	950	950	2200	1260
	CLASS 2 & CLASS 3	.285	950	950	1980	1260
	CLASS 2 & CLASS 3	.375	950	950	2200	1260

3.3.11 Tensile Strength - The tensile strength of the driven rivet shall not be less than the values listed in Table IV when tested in accordance with paragraph 4.4.4.

3.3.12 Fatigue Strength - Rivets shall withstand a minimum of 8 million stress cycle at the loads specified in Table IX when tested as specified in paragraph 4.4.9.

TABLE IV – Tensile strength values (pounds)

NOMINAL RIVET DIAMETER	TYPE KE & H		TYPE C		TYPE V	MINIMUM TOTAL GRIP
	CLASS 1 & 2	CLASS 3	CLASS 1 & 2	CLASS 3	1/64 OVERSIZE	
.125	280	238	640	544	345	.126
.156	500	425	1100	935	530	.160
.190	700	595	1500	1275	830	.200

3.3.13 Lubrication - Lubrication as necessary except for space applications, to assure proper function of the rivet is permissible. All lubricants used shall pass the Lubricant Coating Corrosion Test of paragraph 4.4.5 and shall not be changed without requalification of the rivet.

3.3.14 Workmanship - Rivets shall be of uniform quality in accordance with high grade aircraft manufacturing practice. The rivet head shall not possess more than three discontinuities comprised of either seams, inclusions, nicks, or gouges having a depth exceeding the limits specified in Table V when measured normal to the surface. Discontinuities on the bearing surface that would prevent firm seating are not acceptable.

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