

FED. SUPPLY CLASS

5325

1. SCOPE

1.1 Scope. This specification covers nonstructural panel fasteners used on internal or external parts of aircraft.

1.2 Classification. Panel fasteners shall be of the following types, classes, styles, and sizes, as specified (see 3.2 and 6.2):

Type I Flush head
Type II Oval head
Type III Wing head

Class A Floating receptacle
Class B Rigid receptacle

Style 1 Type I for deep dimple without grommets.
Types II and III for undimpled sheet without grommets.
Style 2 Type I for deep dimple with grommets.
Types II and III for undimpled sheet with grommets.
Style 3 Type I for shallow dimple with grommets.
Types II and III for undimpled sheet with grommets.

Sizes Each head type shall be furnished in the sizes shown on Figure 1.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-A-250/4 Aluminum Alloy Plate and Sheet 2024

MILITARY

MIL-A-8625 Anodic Coatings, for Aluminum and Aluminum Alloys

MIL-S-18728 Steel Plate, Sheet, and Strip, Alloy 8630, Aircraft Quality

MIL-S-18729 Steel Plate, Sheet, and Strip, Alloy 4130, Aircraft Quality

STANDARDS

MILITARY

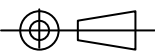
- (2) MIL-STD-31000 Technical Data Packages
(2) MIL-STD-2073-1 Standard Practice for Military Packaging

Copies of specifications, standards, drawings, and publications required by suppliers in accordance with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.

(2) <http://quicksearch.dla.mil>.

THE INITIAL RELEASE OF THIS DOCUMENT SUPERSEDES MIL-F-5591, REVISION C, AMENDMENT 2.

THIRD
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NATIONAL AEROSPACE STANDARDS COMMITTEE

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PROCUREMENT
SPECIFICATION

NONE

TITLE

FASTENERS, PANEL, NONSTRUCTURAL

CLASSIFICATION
SPECIFICATION

NAS 5591

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- 2.2 **2** Nongovernment publications. The following documents form a part of this documents to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified the issues of the documents are listed in the DODISS are issues of the documents cited in the solicitation.

SAE International

AMS-QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AMS6345	Steel, Sheet, Strip, and Plate, (SAE 4130), Normalized or Otherwise Heat Treated
AMS6350	Steel, Sheet, Strip, and Plate, (SAE 4130)
AMS6345	Steel, Sheet, Strip, and Plate, (SAE 4130), Spheroidized

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

ASTM International

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 USA www.astm.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

Aerospace Industries Association of America, Inc.

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

- 2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this document takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

- 3.1 Qualification. The fastener manufacturer shall be responsible for conducting qualification tests and furnishing part drawings, certified qualification test reports (if required by the purchaser) and test samples. The fasteners furnished under this specification shall be produced using the same manufacturing methods as those used to produce fasteners that have passed qualification tests. The purchaser may apply any or all tests specified herein to any product represented as meeting this specification, at any time, to verify conformance.

- 3.2 Design. The Style 1 fastener shall be of the stud-receptacle design. When the fastener is opened, the stud assembly shall be retained by the outer panel and the receptacle shall be retained by the panel support.

The Styles 2 and 3 fasteners shall be of the stud-grommet-receptacle design. When the fastener is opened, the stud shall be retained in the panel. The grommet shall be designed to guide the stud into the outer panel and to prevent contact between the outer panel and the stud and shall be independently retained in the outer panel.

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The design of each style fastener shall permit the removal of the stud or stud-grommet combination and shall permit replacement with a fastener conforming to the dimensions specified in Table I.

Grommets shall be removable without damage to the panel.

- 3.2.1 Dimensions. Overall dimensions, rivet spacing, rivet hole size, and diameter of dimple and hole shall be as specified in Table I.
- 3.2.2 Engaging. The stud shall engage the receptacle within 180 degrees of rotation in the clockwise direction as viewed from the outside panel.
- 3.2.3 Locking. The stud shall be positively locked within 85 to 135 degrees of clockwise rotation, as viewed from the outside panel after the stud has been engaged.
 - 3.2.3.1 Stop. A positive stop shall be provided to prevent the stud from being turned past the position of full lock.
- 3.2.4 Unlocking. The stud shall unlock within 85 to 135 degrees of counterclockwise rotation, as viewed from the outside panel.
- 3.2.5 Heads.
 - 3.2.5.1 Flush head – Type I. The stud heads shall be flush with the surface of the outer panel within $\pm .015$ when the fasteners are installed in mounting holes conforming to the dimensions specified in Table I and locking the total applicable panel thickness.
 - 3.2.5.2 Oval head – Type II. Application of the oval head studs shall not require dimpling or countersinking of the outer panel.
 - 3.2.5.3 Wing head – Type III. The wing head fastener shall be designed for operation without tools. Application shall not require dimpling or countersinking of the outer panel.
- 3.2.6 Screwdriver slots. The screwdriver slot in the head Types I and II shall be such that a conventional blade-type screwdriver may be used to lock and unlock the fastener. When the fastener is in the locked position the slot shall be in line with the receptacle mounting rivets.
- 3.2.7 Floating receptacle. The Class A receptacle shall be floating and shall provide a minimum lateral movement as specified in Table II. Lateral movement is measured in all directions from the center or neutral position.
- 3.3 Interchangeability. All parts having the same manufacturer's part number shall be directly and completely interchangeable with each other with respect to installation and performance. The drawing number requirements of MIL-STD-31000 shall govern documentation of and changes in the manufacturer's part numbers.
- 3.4 Finish. Aluminum-alloy parts shall be coated with an anodic film in accordance with MIL-A-8625. Fasteners manufactured from steel or copper alloy shall be cadmium plated in accordance with AMS-QQ-P-416, Type II, Class 2 (see 4.6.1).

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TABLE I – PANEL FASTENER DIMENSIONS

STYLE	CLASS	SIZE NUMBER	TYPE	ØA MAX	ØB MAX	ØD		ØF MAX	H DEGREES		ØJ	K ± .005	L MAX	M MAX	N MAX
						MAX	MIN		MAX	MIN					
1	A	7	I II, III	.919 .919	.390 .390	.720 —	.700 —	.774 —	120 —	118 —	.125 .125	1.375 1.375	.625 .625	2.000 2.000	1.156 1.156
1	B	7	I II, III	.882 .822	.390 .390	.720 —	.700 —	.774 —	120 —	118 —	.125 .125	1.375 1.375	.625 .625	2.000 2.000	1.000 1.000
1	A	5	I II, III	.807 .807	.327 .327	.650 —	.630 —	.713 —	120 —	118 —	.125 .125	1.000 1.000	.562 .562	1.625 1.625	1.032 1.032
1	B	5	I II, III	.713 .713	.327 .327	.650 —	.630 —	.713 —	120 —	118 —	.125 .125	1.000 1.000	.562 .562	1.625 1.625	.875 .875
1	A	2	I II, III	.557 .557	.233 .233	.416 —	.396 —	.478 —	100 —	98 —	.094 .094	.750 .750	.438 .438	1.375 1.375	.598 .598
1	B	2	I II, III	.510 .510	.233 .233	.416 —	.396 —	.478 —	100 —	98 —	.094 .094	.750 .750	.438 .438	1.375 1.375	.562 .562
2	A	7	I II, III	.945 .902	.448 .476	.832 —	.700 —	.882 —	120 —	118 —	.125 .125	1.375 1.375	.625 .625	2.000 2.000	1.156 1.156
2	B	7	I II, III	.902 .902	.448 .476	.832 —	.700 —	.882 —	120 —	118 —	.125 .125	1.375 1.375	.625 .625	2.000 2.000	1.000 1.000
2	A	5	I II, III	.832 .832	.385 .476	.762 —	.630 —	.812 —	120 —	118 —	.125 .125	1.000 1.000	.562 .562	1.625 1.625	1.032 1.032
2	B	5	I II, III	.832 .832	.385 .476	.762 —	.630 —	.812 —	120 —	118 —	.125 .125	1.000 1.000	.562 .562	1.625 1.625	.875 .875
2	A	2	I II, III	.570 .570	.292 .292	.494 —	.396 —	.550 —	100 —	98 —	.094 .094	.750 .750	.438 .438	1.375 1.375	.598 .598
2	B	2	I II, III	.570 .570	.292 .292	.494 —	.396 —	.550 —	100 —	98 —	.094 .094	.750 .750	.438 .438	1.375 1.375	.562 .562
3	A	7L /a/	I II, III	.833 .833	.478 .478	.680 —	.660 —	.687 —	141 —	139 —	.125 .125	1.375 1.375	.734 .734	1.750 1.750	1.156 1.156
3	A	7S /a/	I II, III	.713 .713	.478 .478	.680 —	.660 —	.687 —	141 —	139 —	.125 .125	1.000 1.000	.734 .734	1.625 1.625	1.032 1.032
3	B	7	I II, III	.713 .713	.478 .478	.680 —	.660 —	.687 —	141 —	139 —	.125 .125	1.000 1.000	.734 .734	1.625 1.625	.875 .875
3	B	2	I II, III	.500 .500	.257 .257	.450 —	.437 —	.480 —	101 —	99 —	.094 .094	.750 .750	.703 .703	1.000 1.000	.562 .562

/a/ "L" and "S" indicate a long (L) and short (S) rivet spacing. The same stud and grommet may be used for both the "L" and "S" receptacles.

TABLE II – MECHANICAL PROPERTIES

Size No. /c/		2		5	7	
Style		1 & 2	3	1 & 2	1 & 2	3
Locking torque, minimum	lb. in.	3.5	1.0	5.0	7.5	5.0
Locking torque, maximum	lb. in.	8	11	12	18	20
Unlocking torque, minimum	lb. in.	3.5	1.0	5.0	7.5	7.5
Unlocking torque, maximum	lb. in.	10.4	12.5	15.6	23.4	25.5
Initial tension, minimum	lb.	15	8	35	50	35
Rated tensile load	lb.	200	200	500	700	700
Rated shear load	lb.	200	200	500	700	700
Locking stop strength, minimum	lb. in.	30	30	60	80	60
Vibration requirements:						
Frequency	cpm ±100	3600	3600	3600	3600	3600
Amplitude	inches	1/16	1/16	1/16	1/16	1/16
Load	pounds	75	75	175	225	225
Endurance, minimum	cycles	5000	5000	25,000	40,000	40,000
Lateral movement of Class A, Types I, II and III receptacles, minimum	inches	.031	.031	.062	.62 /b/	.062 /b/

/b/ When receptacle with 1.000-inch rivet spacing is used, lateral movement may be .031 inch minimum.

/c/ See Figure 1.

3.5 Performance characteristics.

3.5.1 Initial tension. The initial tension (bearing pressure) between the panels shall not be less than the value specified in Table II (see 4.4.3.1).

3.5.2 Sheet separation. The sheet separation shall be not greater than 3/64 inch at the rated tensile load as specified in Table II.

3.5.3 Torque. The fasteners shall show no fracture or deformation when subjected to the torque tests specified in 4.4.3.5 thru 4.4.3.8.

3.5.3.1 Maximum torque (lock and unlock). The maximum torque required to lock and unlock the fastener shall be not greater than the maximum locking and unlocking torques specified in Table II (see 4.4.3.5).

3.5.3.2 Minimum torque (lock and unlock). The minimum torque required to lock and unlock the fastener shall not be less than the minimum locking and unlocking torques specified in Table II (see 4.4.3.6).

3.5.3.3 Absolute maximum torque (lock and unlock). The absolute maximum torque required to lock and unlock the fastener shall be not greater than 133 percent of the maximum locking and unlocking torque values specified in Table II (see 4.4.3.7).

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