

FED. SUPPLY CLASS

53GP

The requirements of the specification shall be considered tentative until a qualified product becomes available.

1. SCOPE

1.1 Scope. This specification establishes the design and qualification requirements for high strength, quick-operating, rotary type fasteners.

1.2 Classification. High strength fasteners covered by this specification shall be of the following types, classes, and sizes.

1.2.1 Types

Type I – Flush head

Type II – Protruding head

1.2.2 Classes

Class A – 550 °F

Class B – 1,000 °F

1.2.3 Sizes

No. 0 – 2,720 lbs. Ultimate Shear Load

No. 1 – 4,650 lbs. Ultimate Shear Load

No. 2 – 7,300 lbs. Ultimate Shear Load

2. APPLICABLE DOCUMENTS

2.1 The following publications of the issue in effect on date of invitations for bids shall form a part of the specification to the extent specified herein:

2.1.1 Government documents

Federal

QQ-A-250/13 Aluminum Alloy Clad 7075 (UNS A97075), Plate and Sheet

QQ-M-151 Metals; General Specification for Inspection of

FED-STD-H28 Screw Thread Standards for Federal Services

Military

MIL-STD-970 Standards and Specifications, Order of Preference for the Selections of

MIL-STD-31000 Technical Data Packages

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

MIL-S-18728 Plate, Sheet, and Strip, (8630), Aircraft Quality

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

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP). <http://dodssp.daps.dla.mil>

2.1.2 Other publications

Aerospace Industries Association

NAS7100 Recess, Ribbed Cruciform, Dimensions of Recess and Gages

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

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THIRD ANGLE PROJECTION	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 5
PROCUREMENT SPECIFICATION NONE	TITLE FASTENER, ROTARY, QUICK-OPERATING, HIGH STRENGTH	CLASSIFICATION SPECIFICATION CLASS 547 SHEET 1 OF 10

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FORM 09-01

REVISION DATE: JANUARY 27, 2012

ISSUE DATE: MAY 1954



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SAE International

AMS6345	Steel, Sheet, Strip, and Plate .95Cr - .20Mo (.28 - .33C) (SAE 4130) Normalized or Otherwise Heat Treated - UNS G41300
AMS6350	Steel Sheet, Strip, and Plate .95Cr - .20Mo (.28 - .33C) (SAE 4130) - UNS G41300
AMS6351	Steel, Sheet, Strip, and Plate .95Cr - .20Mo (.28 - .33C) (SAE 4130) Spheroidized - UNS G41300
AMS-QQ-P-416	Plating; Cadmium (Electrodeposited)
AMS-QQ-A-250/13	Aluminum Alloy Alclad 7075 (UNS A97075), Plate and Sheet

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

3. REQUIREMENTS

- 3.1 Materials. Materials shall be of aircraft quality, suitable for the purpose intended, and shall be selected in accordance with MIL-STD-970.
- 3.2 Design. The fastener shall be of the stud-receptacle design and shall be so constructed that neither the stud assembly nor the receptacle assembly can be inadvertently disassembled during normal operation. The design shall be such that the stud and receptacle can be removed and replaced in service with any other acceptable fastener of the same type, class, and size without deviation from the dimensions noted herein and without the use of special tools. The fastener shall provide for retention of the stud in the outer sheet when unfastened.
- 3.2.1 Dimensions. The stud and receptacle shall fall within the envelope dimensions and shall conform to the detail dimensions shown on Figure 1 for the applicable type, class, and size.
- 3.2.1.1 Weight. Minimum weight is a prime requirement and is considered in the selecting of manufacturers of this component. The maximum weight shall not exceed the following:

PART	NO. 0	NO. 1	NO. 2
RECEPTACLE	.023 LB	.025 LB	.030 LB
STUD	SEE TABLE FOR STUD WEIGHT		
RETAINER RING	.0005 LB	.0006 LB	.0007 LB

STUD WEIGHTS (POUNDS)

SIZE		NO. 0	NO. 1	NO. 2
PROTRUDING HEAD	.25 GRIP	.016	.017	.019
	.50 GRIP	.020	.021	.023
FLUSH HEAD	.25 GRIP	.014	.015	.017
	.50 GRIP	.019	.020	.022

- 3.2.2 Stud. The stud configuration may employ a shear bushing, retainer ring, or other components. The stud assembly, however, must conform to the requirements of Paragraph 3.2.1. The stud assembly shall provide a means of ejecting the stud element outward from the sheet when the fastener is unfastened.
- 3.2.2.1 Recess. The recess in the head of the stud shall be of the standard cruciform type in accordance with NAS7100. ~~The 1950 Supplement to FED-STD-H28 except for gage point penetration. Gage point penetration shall be equal to or greater than that shown in FED-STD-H28.~~
- 3.2.2.2 Head flushness. In designs utilizing a shear bushing type component, the stud head shall be flush with the top of the shear bushing within $\pm .005$ inches.

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- 3.2.3 Receptacle. The receptacle shall be capable of engagement with the stud when misaligned 1/32 inch in any direction from the centered position over the stud hole specified in Figure 2. The receptacle design need not provide for dimpled sheet adaptability without the use of countersunk shims.
- 3.3 Locking and unlocking. When the stud is mated with its receptacle, the installed fastener shall be capable of being fully locked within 180 degrees of rotation in the clockwise direction as viewed from the outer sheet. After rotation in the counterclockwise direction to the point of disengagement, and when the inner and outer sheets are then separated by an amount equal to the applicable minimum sheet pull-up value, the fastener shall be capable of relocking without additional counter-clockwise rotation. The fastener shall be considered to be fully locked when tightened to a torque which will enable it to meet the sheet separation requirement of Paragraph 3.11 but which does not exceed the applicable maximum locking torque value listed in Table I. The fully locked fastener shall unlock to the point of complete disengagement within 180 degrees of rotation in the counter-clockwise direction as viewed from the outer sheet.
- 3.4 Installation. The receptacle shall be attachable by means of rivets unless otherwise specified. If weld projections are specified, the spacing of the projection shall be the same as specified for the rivet holes. Sheet preparation for production installations shall be determined by the design requirements of the application.
- 3.4.1 Curved sheet installation. The fastener shall be adaptable to a rigid, curved sheet installation wherein the radius of curvature is not less than 12 inches and the included angle between extreme fasteners is 90 degrees when tested in accordance with Paragraph 4.2.2.13. The fastener shall be likewise adaptable when the sheet has a radius of curvature of not less than 24 inches, is hinged at one side, and the included angle between the hinge and any fastener is 45 degrees.
- 3.5 Interchangeability. All parts having the same manufacturer's part number shall be directly and completely interchangeable with each other in respect to installation and performance. Changes of manufacturer's part numbers shall be governed by the drawing number requirements of MIL-STD-31000.
- 3.6 Finish. Aluminum alloy parts shall be anodized in accordance with MIL-A-8625 or chemically treated in accordance with MIL-DTL-5541. Parts of copper alloy and of non-CRES in the Class A fastener shall be cadmium-plated in accordance with AMS-QQ-P-416, Type II, Class 2. Other materials in the Class A fastener and all material in the Class B fastener shall be provided with a finish that will meet the elevated temperature requirement.

TABLE I – ROOM TEMPERATURE MECHANICAL PROPERTIES

SIZE NUMBER	NO. 0	NO. 1	NO. 2
Locking Torque	20 lbf-in (max)	30 lbf-in (max)	40 lbf-in (max)
Unlocking Torque	25 lbf-in (max)	35 lbf-in (max)	45 lbf-in (max)
Torque Out	60 lbf-in (min)	100 lbf-in (min)	160 lbf-in (min)
Ultimate Shear Load	2,720 lbf (min)	4,650 lbf (min)	7,300 lbf (min)
Rated Shear Load	2,080 lbf (min)	3,580 lbf (min)	5,620 lbf (min)
Ultimate Tensile Load	1,290 lbf (min)	2,210 lbf (min)	3,470 lbf (min)
Rated Tensile Load	990 lbf (min)	1,710 lbf (min)	2,660 lbf (min)
Sheet Separation (Test Condition)	Not to exceed .005 in. at rated tensile load	Not to exceed .005 in. at rated tensile load	Not to exceed .005 in. at rated tensile load
Sheet Pull-Up	.0625 in. (min)	.0625 in. (min)	.0625 in. (min)
Stud Push	150 lbf (min)	200 lbf (min)	250 lbf (min)
Receptacle Push Out	100 lbf (min)	125 lbf (min)	125 lbf (min)

- 3.7 Locking and unlocking torque. The maximum locking torque value listed in Table I shall not be exceeded while operating the fastener through the entire range of sheet pull-up from initial engagement to the fully locked condition when tested in accordance with Paragraph 4.2.2.1. The unlocking torque value listed shall not be exceeded while rotating the fastener from the fully locked condition to the point of complete disengagement.

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