SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS1229 | REV. C

Issued 1973-03
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Reaffirmed 2012-11

Superseding AS1229B

Insert, Screw Thread, Helical Coil, Stud Locking, Performance Standard for

RATIONALE

AS1229C has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This SAE Aerospace Standard (AS) covers helical coil stud locking screw thread inserts made from formed wire in which the inner surface of the coil, after assembly provides threads of standard Unified 60° form as specified on the assembly drawing. This document also covers the performance requirements of the locking feature of the insert which will retain Unified ANSI B1.1 (UN Profile) or AS8879 (UNJ Profile) external threaded parts.

1.1 Purpose

To establish the performance requirements of helical coil stud locking screw thread inserts.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS 2400 Plating, Cadmium

AMS 4434 Magnesium Alloy Castings, Sand, 9.0Al - 2.0Zn, Solution and Precipitation Heat Treated

AS8879 Screw Threads - UNJ Profile, Inch, Controlled Radius Root with Increase Minor Diameter

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI B1.1 Unified Inch Screw Threads

2.1.3 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

Federal Standard No. 595 Color (Requirements for Individual Color Chips)

2.1.4 ASME Publications

Available from American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ASME B18.29.1 Helical Coil, Screw Thread Inserts - Free Running and Screw Locking (Inch Series)

2.1.5 AIA/NAS Publications

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 703-358-1000, www.aia-aerospace.org.

NASM33537 Insert, Screw Thread, Helical Coil, Inch Series, Coarse and Fine Thread, Standard Assembly Dimensions for

3. DEFINITIONS

STRAIGHT STUD INSERT: One that is designed to retain a stud with the same nominal diameter for both the nut end thread and the stud end thread (fast end).

STEPPED STUD INSERT: One that is designed to retain a stud with the nut end thread one thread size smaller in diameter than the stud end thread (fast end).

4. REQUIREMENTS

4.1 Material

The material of the insert shall be as specified on the drawing.

4.2 Design

The insert shall conform to the requirements of the applicable drawing except that the cross section of the wire may deviate from the drawing in the locking portion of the insert. Such deviation, however, shall not prevent installation of the stud into the assembled insert or of the insert into the tapped hole. The locking feature shall be located to allow the bolt or stud to enter the installed insert a minimum of one turn before locking action occurs.

4.3 Prevailing Torque

The prevailing torque requirements shall be as follows:

AS1229-1 indicates torque limits of Table 1 apply.

AS1229-2 indicates torque limits of Table 2 apply.

The insert, when installed into a hole threaded to class 3B requirements of NASM33537 or ASME B18.29.1, and tested per Section 4, shall provide a frictional lock to retain the stud threads within the prevailing torque limits specified in Table 1 or 2, as applicable.

TABLE 1 - STRAIGHT STUD-PREVAILING TORQUE, ROOM TEMPERATURE
APPLICABLE WHEN AS1229-1 IS SPECIFIED ON PART DRAWING

Nominal Insert Thread Size and Nut End Thread Size	Maximum Prevailing Torque, Installation or Removal lbf-in	Minimum Breakaway Torque lbf-in
.1900-24	40	23
.1900-32	45	23
.2500-20	90	52
.2500-28	90	52
.3125-18	180	105
.3125-24	180	105
.3750-16	240	140
.3750-24	240	140
.4375-14	300	175
.4375-20	300	175
.5000-13	450	260
.5000-20	450	260

NOTE: The nut end of the stud has the same diameter size thread as the stud end.

TABLE 2 - STEPPED STUD-PREVAILING TORQUE, ROOM TEMPERATURE -
APPLICABLE WHEN AS1229-2 IS SPECIFIED ON PART DRAWING

Nominal Insert Thread Size and Stud End Thread Size	Ref. Nut End Thread Size	Maximum Prevailing Torque, Installation or Removal lbf-in	Minimum Breakaway Torque lbf-in
.2500-28	.1900-32	45	23
.3125-24	.2500-28	90	52
.3750-24	.3125-24	180	105
.4375-20	.3750-24	240	140
.5000-20	.4375-20	300	175

4.3.1 Maximum Prevailing Torque

Maximum prevailing torque shall be the maximum torque value encountered during any part of the installation or removal cycle. Torques shall not exceed the maximum values listed in the applicable table. During specified tests the torque readings shall be taken for all installations and for all removal cycles.

4.3.2 Minimum Breakaway Torque

Minimum breakaway torque shall be the minimum torque required to start removal of the test bolt or stud from the fully engaged position, but with no axial load on the test bolt or stud. The torque readings shall be taken for all removal cycles. The torque value for any cycle shall not be less than the minimum values listed in the applicable table.

4.4 Identification

Inserts shall be colored as follows.

4.4.1 When the part drawing specifies performance per AS1229-1, the inserts shall be identified with a green color. Color shall be per Federal Standard No. 595 Color Chip 14115.

4.4.2 When the part drawing specifies performance per AS1229-2, the inserts shall be identified with a lavender color. Color shall be per Federal Standard No. 595 Color Chip 37142.

5. STUD PREVAILING TORQUE TEST

Assembled inserts shall be torque tested with test bolts or studs that have Unified threads per ANSI B1.1 or AS8879, cadmium plated per AMS 2400, a hardness of 26-32HRC and sufficient thread length to engage the complete length of insert plus one full turn. The test bolt or stud shall be assembled into the test block specified in 5.1. The assembled insert shall be capable of meeting the requirements of 4.3 when a test bolt or stud is installed or removed three times. A new test bolt or stud may be used for each of the three installations. The test shall be run at room temperature and at a rate slow enough to yield a dependable measure of torque. The increase in temperature of the test bolt or stud during each test shall not exceed 35 °F. The test bolt or stud shall be installed without any lubricant. The test bolt or stud shall be considered fully installed when one full thread of the bolt or stud extends past the bottom end of the insert; the removal cycle shall be considered complete when the locking coils are disengaged.

5.1 Test block

The Stud locking insert to be tested shall be installed per NASM33537 or ASME B18.29.1 in metal test block meeting the requirements of Figure 1 and made from AMS 4434 magnesium or 356-T6 cast aluminum. After installation the tang shall be removed.

5.2 Marking

The surface of the test block from which the insert is assembled shall be marked "TOP".

5.2.1 The test block, after installation of the insert, shall be marked on top to indicate the radial location of where the assembled insert begins.

6. QUALITY

Inserts shall be considered to have failed the requirements of this standard under the following conditions:

a. Any break or crack in the insert.

b. Installation or removal torque in excess of the applicable values for straight stud inserts or for stepped stud inserts.

c. Breakaway torque less than the values in Table 1 for straight stud inserts or Table 2 for stepped stud inserts, as applicable.

d. Movement of the insert beyond ±45° relative to the TOP surface when installing or removing the test bolt or stud after the first installation and removal cycle.

e. Seizure or galling of the insert or test bolt or stud.