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Superseding AS1229A

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

RATIONALE

This document has been reaffirmed to comply with the SAE 5-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, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2400 Plating, Cadmium

AMS 4434 Magnesium Alloy Castings, Sand, 9.0A1 2.0Zn, Solution and Precipitation Heat Treated

2.1.2 ANSI Publications: Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI B1.1 Unified Inch Screw Threads

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2.1.3 U.S. Government Publications: Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

MS33537 Insert, Screw Thread, Helical Coil, Inch Series, Coarse and Fine Thread, Standard Assembly Dimensions for

MIL-S-8879 Screw Threads, Controlled Radius Root

2.1.4 ASME Publications: Available from ASME, 345 East 47th Street, New York, NY 10017-2330.

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

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 MS33537 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.

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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
.190-24	40	23
.190-32	45	23
.250-20	90	52
.250-28	90	52
.3125-18	180	105
.3125-24	180	105
.375-16	240	140
.375-24	240	140
.4375-14	300	175
.4375-20	300	175
.500-13	450	260
.500-20	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
.250-28	.190-32	45	23
.3125-24	.250-28	90	52
.375-24	.3125-24	180	105
.4375-20	.375-24	240	140
.500-20	.4375-20	300	175

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- 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 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 bolts or studs that have Unified threads per ANSI B1.1 or MIL-S-8879, 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 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.

NOTE: Cadmium is recognized as a health concern and therefore its use in the United States is regulated by OSHA (Occupational Health and Safety Administration). Because cadmium plating is not outlawed in the United States and is still broadly used, this document includes the use of cadmium plated torque test bolts. However, in recognition that cadmium plating is prohibited in some other countries, and that this document will be used in those countries as well as in entities in the United States that prohibit cadmium, alternatives to cadmium plated torque test bolts are being evaluated. As soon as the optimum alternative has been approved it will be added to this document.