SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS1349 | REV. A

Issued 1974-06
Revised 1997-10
Reaffirmed 2012-11

Superseding AS1349

Insert, Screw Thread, Helical Coil, Locking (Low Friction Systems), Performance Standard for

RATIONALE

AS1349A has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

This SAE Aerospace Standard (AS) covers helical coil 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 locking screw thread inserts for use in fastening systems utilizing a lubricant which induces a low coefficient of friction between insert and fastener.

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

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

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS1349A

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

ANSI B1.1 Unified Inch Screw Threads

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-T-5544 Thread Compound, Anti Seize
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. REQUIREMENTS:

3.1 Material:

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

3.2 Design:

The insert shall conform to the requirements of the applicable drawing. The locking feature shall be located to allow the engaging fastener to enter the insert a minimum of one turn before locking action occurs.

3.3 Prevailing Torque:

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 bolt threads within the prevailing torque limits specified in Table 1.

3.3.1 Maximum Prevailing Torque: Maximum prevailing torque shall be the maximum torque value encountered during any part of the installation or removal cycle with the bolt in motion and with no axial load on the bolt. Torques shall not exceed the maximum values listed.

3.3.2 Minimum Breakaway Torque: Minimum breakaway torque shall be the minimum torque required to start removal of the bolt from the fully engaged position, but with no axial load on the test bolt. The torque value for any cycle shall not be less than the minimum values listed.

TABLE 1 - Insert Torque at Room Temperature

Nominal Insert Thread Size	Maximum Prevailing Torque, Installation or Removal lbf-in	Minimum Breakaway Torque lbf-in
.190-32	13	2.0
.250-28	30	3.5
.3125-24	60	6.5
.375-24	80	9.5
.4375-20	100	14.0
.500-20	150	18.0

3.4 Identification:

The inserts shall be identified with a black color. Color shall be per Federal Standard No. 595 Color Chip 37038 or 37056.

4. PERFORMANCE TESTS:

4.1 Prevailing Torque Test:

Assembled inserts shall be torque tested with bolts that have Unified threads per ANSI B1.1 or MIL-S-8879, cadmium plated per AMS 2400, a hardness of 36 to 40 HRC and sufficient thread length to engage the complete length of insert plus extend one full turn past the end of the insert. The assembled insert shall be capable of meeting the requirements of 3.3 when a test bolt is installed and removed fifteen times as specified in 4.1.1. Torque readings shall be taken on the 1st, 7th and 15th cycles.

NOTE: Cadmium is recognized as a health concern and therefore its use in the United States is regulated by OHSA (Occupational Health and Safety Administration). Because cadmium plating is not outlawed in the United States and is still broadly used, this standard includes the use of cadmium plated torque test bolts. However, in recognition that cadmium plating is prohibited in some other countries, and that this standard 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 standard.

4.1.1 Test Methods: The test bolts shall be assembled through test spacers specified in 4.1.3 and the bolt-threads lubricated with a uniformly applied film of MIL-T-5544. The bolt and spacer shall be assembled into the test blocks specified in 4.1.2. The bolt threads may be re-lubricated at the beginning of each cycle. The test bolt shall be considered fully installed when the bolt extends at least one full turn past the insert. During the first five cycles, the test bolt shall be tightened in the test block to the values listed in Table 2. From the sixth through the fifteenth cycle, the bolt shall be fully installed, however, no clamp load shall be applied. The removal cycle shall be considered complete when the locking coils are disengaged. 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 bolts during each test shall not exceed 75 °F.

TABLE 2 - Assembly Torque

Nominal Insert Thread Size	Torque lbf-in
.190-32	30
.250-28	60
.3125-24	120
.375-24	160
.4375-20	200
.500-20	300

4.1.2 Test Block: The insert to be tested shall be installed per MS33537 or ASME B18.29.1 in a metal test block meeting the requirements of Figure 1 and made from 2024-T4 aluminum alloy. After installation the tang shall be removed. The surface of the test block from which the insert is assembled shall be marked "TOP" and shall be marked to indicate the radial location of where the assembled insert begins.

4.1.3 Test Spacer: The test spacer shall be made of case hardened low carbon steel or equivalent. The diameter of the bolt hole shall be .030-. 040 in. greater than the basic major diameter of the bolt thread. The spacer length shall be sufficient to allow the test bolt to engage the insert as specified in 4.1 without either the bolt shank or incomplete thread entering the test block. A 32 µin (0.8 µm) surface texture shall be provided on the area which contacts the bolt head bearing surface.