SLOVENSKI STANDARD
oSIST prEN 2943:2022

01-julij-2022

Aeronavtika - Žični navojni vložki, vijačni navoji MJ in M - Tehnična specifikacija

Aerospace series - Inserts, MJ and M screw threads, helical coil - Technical specification

Luft- und Raumfahrt - Draht-Gewindeeinsätze, MJ- und M-Gewinde - Technische Lieferbedingungen

Série aérospatiale - Filets rapportés, filetages MJ et M - Spécification technique

Ta slovenski standard je istoveten z: **prEN 2943**

ICS:

49.030.20 Sorniki, vijaki, stebelni vijaki Bolts, screws, studs

oSIST prEN 2943:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 2943

May 2022

ICS 49.030.30

Will supersede EN 2943:2019

English Version

Aerospace series - Inserts, MJ and M screw threads, helical coil - Technical specification

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 2943:2022) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 2943:2019.

In comparison with the previous edition, the following technical modifications have been made:

a) normative references updated;

a) 4.1 and 4.2 updated;

b) Table 1 “Technical requirements and test methods” revised;

c) Table 3 “Test equipment“ revised;

d) Table 4 “Values of breakaway torque, self-locking torque and seating torque” and Table 5 “Values of breakaway torque, self-locking torque and seating torque“ extended by more thread types;

e) Annex A extended in accordance with the revised Table 4 and Table 5;

f) standard editorially revised.

1 Scope

This document specifies the characteristics, qualification and acceptance requirements for helical coil screw thread inserts.

It is applicable whenever referenced.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2398, *Aerospace series — Heat resisting steel FE-PA2601 (X6NiCrTiMoV26-15) —* $R_m \geq 900$ *MPa — Bars for machined bolts —* $D \leq 25$ *mm*

EN 2945, *Aerospace series — Inserts, screw thread, helical coil, self-locking — Assembly procedure*

EN 3044, *Aerospace series — Installation holes for inserts, screw thread, helical coil, self-locking — Design standard*

EN 3219,[1] *Aerospace series — Heat resisting nickel base alloy (Ni-P100HT) — Cold worked and softened — Bar and wire for continuous forging or extrusion for fasteners —* $3 \text{ mm} \leq D \leq 30 \text{ mm}$

EN 9138,[2] *Aerospace Series — Quality Management Systems — Statistical Product — Acceptance Requirements*

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

ISO 3353 (all parts), *Aerospace — Lead and runout threads*

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 5855-1, *Aerospace — MJ threads — Part 1: General requirements*

ISO 5855-2, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

[1] Published as ASD-STAN Prestandard at the date of publication of this standard by AeroSpace and Defence Industries Association of Europe – Standardization (ASD-STAN) (www.asd-stan.org).

[2] Published as ASD-STAN Prestandard at the date of publication of this standard by AeroSpace and Defence Industries Association of Europe – Standardization (ASD-STAN) (www.asd-stan.org).

3.1
batch
quantity of finished thread inserts, of the same type and same diameter, produced from a material obtained from the same melt, manufactured in the course of the same production cycle, following the same manufacturing route and having undergone all the relevant heat treatments and surface treatments

3.2
surface discontinuities
3.2.1
crack
rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character

3.2.2
seam
open surface defect

3.2.3
lap
surface defect caused by folding over metal fins or sharp corners and then compressing them into the surface

3.2.4
inclusions
non-metallic particles originating from the material manufacturing process

Note 1 to entry: These particles may be isolated or arranged in strings.

3.3
test temperature
ambient temperature, unless otherwise specified

3.4
simple random sampling
sampling where a sample of *n* sampling units is taken from a population in such a way that all the possible combinations of *n* sampling units have the same probability of being taken

3.5
sampling test and examinations
Note 1 to entry: Shall be in accordance with the requirements of EN 9138. Acceptance quality shall be based on zero imperfections.

3.5.1
non-destructive tests-visual and dimensional
process of examining a component visually and dimensionally to assess its integrity by a means which does not compromise the components properties and characteristics

Note 1 to entry: A random sample shall be selected from each production lot, the size for the sample to be as specified in Table 2. All dimensional characteristics are considered imperfect when out of tolerance.

3.5.2
destructive tests- screw locking torque
process of examining properties of a component with regards to the screw locking torque after which the tested component cannot be used anymore

Note 1 to entry: A random sample shall be selected from each production sample lot as per Table 2. Normal size inspection shall be in effect until conditions for adjusting from normal to reduced size are satisfied. Normal size inspection shall resume when the conditions for switching from reduced to normal size occur.

Note 2 to entry: Sample size switching

Switching from normal to reduced sample shall be instituted providing the following conditions are satisfied:

a) the preceding 10 batches have been on normal inspection and all have been accepted;

b) production of a sample item or items using similar processes has been continuous under normal size sampling without break longer than 90 days;

c) reduced inspection is considered desirable.

When reduced sample size inspection is in effect, normal sample size inspection shall be instituted if any of following conditions occur on original inspection:

a) a batch is rejected;

b) production of a sample item using similar processes ceases or is delayed for a period greater than 90 days;

c) other conditions warrant that normal size inspection is resumed.

3.6
finished thread insert
thread insert ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the product standards or definition document

3.7
definition document
document specifying all the requirements for finished thread inserts

3.8
self-locking torque
torque to be applied to the associated bolt to maintain its movement of rotation in relation to the thread insert assembly which is under no axial load and the thread insert locking zone being completely engaged with the bolt (minimum protrusion of two pitches, including the end chamfer)

3.9
seating torque
tightening torque to be applied to the thread insert and bolt assembly to introduce or to increase the axial load in the assembly

3.10
unseating torque
untightening torque to be applied to the thread insert and bolt assembly to reduce or remove the axial load in the assembly

3.11
breakaway torque
torque required to start unscrewing the associated bolt with respect to the installed thread insert, with the insert locking zone still fully engaged on the bolt, but after the axial load in the assembly has been removed by unscrewing half a turn followed by a halt in rotational movement

4 Quality assurance

4.1 Approval of manufacturers

The manufacturer's operations shall be an approved production organization for aerospace products and shall demonstrate that it has implemented and is able to maintain a quality management system (e.g. according to EN 9100 or an equivalent aerospace accepted and established quality management system).

4.2 Qualification

The qualification procedure for aerospace standard products (e.g. according to EN 9133 or an equivalent aerospace accepted and established qualification procedure) may be used and documented according to the specified tests if not otherwise agreed between customer and supplier.

Qualification inspections and tests (requirements, methods, numbers of thread inserts) are specified in Table 1. They shall be carried out on

— each type and diameter of thread insert and

— 26 thread inserts selected from a single batch by simple random sampling.

The test programme may possibly be reduced, or the qualification be granted without inspection or testing: any such decision shall be based on the results obtained on similar types and diameters of thread inserts provided that the design and manufacturing conditions are identical.

4.3 Acceptance

4.3.1 Purpose

The purpose of acceptance inspections and tests is to check, as simply as possible, by a method representative of actual use conditions, with the uncertainty inherent to statistical sampling, that the thread inserts constituting the batch satisfy the requirements of this standard.

4.3.2 Conditions

Acceptance inspections and tests (requirements, methods, numbers of thread inserts) are specified in Table 1. They shall be carried out on each batch. Thread inserts from the batch to be tested shall be selected by simple random sampling.

Each thread insert may be submitted to several inspections or tests.

4.3.3 Responsibility

Acceptance inspections and tests shall be carried out by the manufacturer, or under his responsibility.

4.3.4 Inspection and test report

A test report showing actual numerical values shall be provided if specified in the purchase order.

5 Requirements

See Table 1.

Table 1 — Technical requirements and test methods

Clause	Characteristic	Requirement	Inspection and test method	Q/A a	Sample size
5.1	Material	In accordance with the product standard or definition document	Chemical analysis or certificate of compliance issued by the manufacturer of the semi-finished product	—	—
5.2	Dimensions, tolerances and tolerances of form and position	In accordance with the product standard or definition document		—	—
5.2.1	Thread	In accordance with the product standard or definition document	The gauging shall be done from the opposite end to the drive tang. c The minimum requested number of coils above locking coil is 1,25°. Gauging to be conducted at the destructive test before the insert has engaged with a test bolt.	Q A	5 Table 2
5.2.2	Outer diameter	In accordance with the product standard or definition document	usual measuring equipment	A	Table 2
5.3.3	Number of coils	In accordance with the product standard or definition document	Visual examination	A	Table 2
5.3	Manufacturing	—	—	—	—
5.3.1	Surface roughness	In accordance with the product standard or definition document	ISO 4288 Visual examination	Q A	3 2
5.3.2	Surface coating	In accordance with the product standard or definition document	See applicable coating standard.	Q A	23 Table 2
5.3.3	Colour	In accordance with the product standard or definition document	Visual examination	A	Table 2
5.4	Mechanical properties	Thread inserts shall be assembled into test equipment (see Table 3) according to EN 2945	—	—	—

Clause	Characteristic	Requirement	Inspection and test method	Q/A a	Sample size
5.4.1	Reusability set test of the locking coil (ambient temperature)	Measured torques of the thread. Inserts shall not exceed the maximum self-locking torque nor shall be less than the minimum breakaway torque, see Table 4 and Table 5.	—	—	—
5.4.1.1	Self-locking torque at ambient temperature (15 cycles)	Shall be between the minimum breakaway torque and the maximum self-locking torque, see Tables 4, for each cycle.	Lubricate the bolt using clean engine oil. Place the bolt in the spacer, fit the bolt in the thread insert, until it protrudes at least two pitches beyond the locking zone of the thread insert. Unscrew, until the bolt has completely left the locking zone. Start of cycles. Screw up again until the bolt protrudes at least two pitches beyond the locking zone of the thread insert, measuring the self-locking torque on screwing. Apply the seating torque to Table 5. Remove the load from the thread insert by unscrewing at least one half turn and until the spacer can be moved freely. Repeat the unscrewing operation, measuring the breakaway torque. Check that the bolt dimensions are within the limits given in Annex C and that their threads have not been damaged. The rotation of the bolts shall be sufficiently slow so that the temperature of the thread insert does not exceed 45 °C during operations. Repeat above a total of 15 times.	Q/A	Q 10 A 5
5.4.1.2	Self-locking torque at ambient temperature	Shall be between the minimum breakaway torque and the maximum self-locking torque,	As 5.4.1.1, except cycles requirement, but after applying the seating torque and before removing the load, heat the assembly in an oven at the maximum test	Q	10