



SLOVENSKI STANDARD

SIST EN 4621:2010

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Aeronavtika - Vložki, navoj MJ, samozapiralni, samozagozdni ključ - Tehnična specifikacija

Aerospace series - Inserts, MJ threads, self-locking, self-broaching keys - Technical specification

Luft- und Raumfahrt - Gewindeeinsätze, MJ-Gewinden, selbstsichernd mit selbsträumenden Stiften - Technische Lieferbedingungen

Série aérospatiale - Douilles filetées, à filetages MJ, à freinage interne à clavettes autobrochantes - Spécification technique

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EUROPEAN STANDARD

EN 4621

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English Version

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This European Standard was approved by CEN on 9 January 2010.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 4621:2010) 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 Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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EN 4621:2010 (E)**1 Scope**

This standard specifies the characteristics, qualification and acceptance requirements for self-locking inserts, self-broaching keys with MJ threads, for aerospace applications.

It is applicable whenever referenced.

2 Normative references

The following referenced documents are indispensable for the application 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 2638, *Aerospace series — Aluminium alloy 2024-T3 — Extruded bar and section — $1,2\text{ mm} \leq (a \text{ or } D) \leq 150\text{ mm}$ — With coarse peripheral grain control*¹⁾

EN 4619, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys — Installation and removal procedure*

EN 4620, *Aerospace series — Inserts, MJ threads, self-locking, with self-broaching keys — Design standard*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3452:1984, *Non-destructive testing — Penetrant inspection — General principles*

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*

ASTM E 112-96, *Standard Test Methods for Determining Average Grain Size*²⁾

3 Terms and definitions

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

3.1 batch

quantity of finished parts, of the same type and same diameter, produced from the same 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

1) Published as ASD Prestandard at the date of publication of this standard.

2) Published by: American Society for Testing and Materials (ASTM), 1916, Race Street, Philadelphia, PA 19103, USA.

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 rolling or forging them into the surface

3.2.4

inclusions

metallic or non-metallic particles originating from the manufacturing process

NOTE These particles may be isolated or arranged in strings.

3.2.5

test temperature

ambient temperature, unless otherwise specified

3.2.6

simple random sampling

taking of n items from a population of N items in such a way that all possible combinations of n items have the same probability of being chosen

3.2.7

critical defect

defect that, according to judgement and experience, is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the considered product, or that is likely to prevent performance of the function of a major end item

3.2.8

major defect

defect other than critical, that is likely to result in a failure or to reduce materially the usability of the considered product for its intended purpose

3.2.9

minor defect

defect that is not likely to reduce materially the usability of the considered product for its intended purpose, or that is a departure from established specification having little bearing on the effective use or operation of this product

3.2.10

sampling plan

plan according to which one or more samples are taken in order to obtain information and possibly to reach a decision

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EN 4621:2010 (E)**3.2.11****limiting quality****LQ₁₀**

in a sampling plan, quality limit which corresponds to a specified 10 % probability of acceptance

NOTE 1 It is the limiting lot quality characteristic that the consumer is willing to accept with a low probability that a lot of this quality would occur.

NOTE 2 For the purposes of this standard, the limiting quality quoted in Table 4 corresponds to a probability of acceptance of 10 %.

3.2.12**acceptance quality limit****AQL**

quality limit which in a sampling plan corresponds to a specified but relatively high probability of acceptance

NOTE It is the maximum percent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection, can be considered satisfactory as a process average.

3.2.13**finished insert**

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

3.2.14**definition document**

document specifying all the requirements for finished inserts

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3.2.15**self-locking torque**

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

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3.2.16**seating torque**

tightening torque to be applied to the insert or bolt to introduce or to increase the axial load in the assembly

3.2.17**unseating torque**

untightening torque to be applied to the insert or bolt to reduce or remove the axial load in the assembly

3.2.18**breakaway torque**

torque required to start unscrewing the insert or the bolt from the associated part, with the insert locking device 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 Qualification

EN 9133.

Qualification inspections and tests (requirements, methods, numbers of inserts with self-broaching keys) are specified in Table 1. They shall be carried out on:

- each type and diameter of inserts;
- 39 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 inserts provided that the design and manufacturing conditions are identical.

Table 2 indicates the allocation of insert samples for the inspections and tests.

4.2 Acceptance

4.2.1 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 inserts constituting the batch satisfy the requirements of this standard.

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4.2.2 Conditions

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

Each insert may be submitted to several inspections or tests.

If a more stringent inspection is deemed necessary, all or part of the qualification inspections and tests may be performed during the acceptance inspections and tests. In this case, the number of inserts submitted to these inspections and tests is the same as that submitted for qualification inspection and tests.

4.2.3 Responsibility

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

4.2.4 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 definition document	Chemical analysis or certificate of conformity issued by the manufacturer of the semi-finished product	Q	
5.2	Dimensions, tolerances and tolerances of form and position	In accordance with the definition document. A "GO" inspection gauge is to be fitted on the insert keys. On completion of this inspection, the keys shall neither be bent nor moved.	Standard gauging See Annex E.	Q	39
				A	Tables 3 and 4
5.3	Manufacturing				
5.3.1	Process	Insert threads may be produced by machining or forming.	Manufacturing method shall be indicated on test report.		
5.3.2	Heat treatment	The heat treatment medium or atmosphere shall not cause any surface contamination. Any scale which will not be removed by subsequent machining shall be removed by abrasive blasting with an appropriate equipment. The material shall be heat treated in accordance with the material specification defined in the definition document.	Calibration of the heat treatment equipment shall be confirmed. Visual examination Examination of the heat treatment specification		
5.3.3	Thread deformation (form out-of round)	Threads in the locking zone may be deformed in any manner provided that the insert meets the requirements of this standard. The finished inserts shall allow the "GO" thread plug gauge to enter a minimum of three turns, when gauged from the installation side before engagement in the locking zone.	Standard gauging	Q	39
				A	Tables 3 and 4
5.3.4	Surface roughness	In accordance with the definition document	ISO 4288	Q	3
				A	Tables 3 and 4
5.3.5	Surface coating	In accordance with the definition document	See applicable coating standard.	Q	36
				A	Tables 3 and 4
				A	Table 6

(continued)

Table 1 (continued)

Clause	Characteristic	Requirement	Inspection and test method	Q/A ^a	Sample size
5.4	Mechanical properties				
5.4.1	Installation requirement	The screwing of insert shall be possible freely by hand. After testing, the inserts shall show no signs of: – buckling and/or incomplete fitting of the keys; – deformation of the internal thread of the insert caused by keys installation.	Inserts shall be installed into test block (see Annex A, normative) in accordance with EN 4619. Use a tool specified in accordance with EN 4619. Visual examination at a suitable magnification of $\times 10$ to $\times 20$ The recorded hardness of the test blocks must be indicated in the test report.	Q A	5 Table 5
5.4.1.1	into test block in aluminium	See 5.4.1.	See 5.4.1.	Q	14
5.4.1.2	into test block in corrosion resisting steel	See 5.4.1.	See 5.4.1.	Q	16
5.4.1.3	into test block in titanium alloy	See 5.4.1.	See 5.4.1.	Q	6
5.4.2	Rotational resistance				
5.4.2.1	into test block in aluminium alloy	Inserts shall withstand the torque specified in Table B.1 without rotation.	Inserts shall be installed in accordance with 5.4.1.1. The installed inserts shall be tested in a counter clockwise direction as shown in Annex B (normative).	Q	5
5.4.2.2	into test block in corrosion resisting steel ^b	See 5.4.2.1.	Inserts shall be installed into test block in corrosion resisting steel (see Annex A). Test method, see 5.4.2.1.	Q	5

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