SLOVENSKI STANDARD
SIST EN 4673-003:2010

01-oktober-2010

Aeronavtika - Vložki, navoj UNJ, samozapiralni, s samozagozdnim ključem - 003. del: Tehnična specifikacija

Aerospace series - Inserts, UNJ threads, self-locking, with self-broaching keys - Part 003: Technical specification

Luft- und Raumfahrt - Gewindeeinsätze, UNJ-Gewinden, selbstsichernd, mit selbsträumenden Stiften - Teil 003: Technische Lieferbedingungen

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Série aérospatiale - Douilles filetées, à filetage UNJ, à freinage interne, à clavettes auto-brochantes - Partie 003: Spécification technique

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 4673-003

August 2010

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English Version

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Foreword

This document (EN 4673-003:2010) 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of an identical text or by endorsement, at the latest by February 2011, and conflicting national standards shall be withdrawn at the latest by February 2011.

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.

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1 Scope

This European Standard specifies the characteristics, qualification and acceptance requirements for self-locking inserts, self-broaching keys with UNJ 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 ≤ (a or D) ≤ 150 mm with coarse peripheral grain control* [1)]

EN 4673-001, *Aerospace series — Inserts, UNJ threads, self-locking, with self-broaching keys — Part 001: Installation and removal procedure*

EN 4673-002, *Aerospace series — Inserts, UNJ threads, self-locking, with self-broaching keys — Part 002: Design standard*

EN 9133, *Aerospace series — Quality management systems — Qualification Procedure for Aerospace Standard Parts*

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

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ISO 3161, *Aerospace — UNJ threads — General requirements and limit dimensions*

ISO 3452-1, *Non-destructive testing — Penetrant inspection — Part 1: General principles*

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

ASTM-E112-96, *Standard Test Methods for Determining Average Grain Size* [2)]

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 by: ASTM National (US) American Society for Testing and Materials **http://www.astm.org/**.

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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

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

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3.2.4
inclusions
metallic or non-metallic particles originating from the manufacturing process. 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

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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

3.2.11
limiting quality (LQ_{10})
in a sampling plan, the 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. It is the maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection can be considered satisfactory as a process average.

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3.2.13
finished insert
insert ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the definition document

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3.2.14
definition document
document specifying all the requirements for finished inserts

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)

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

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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.

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4.2 Acceptance

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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.

4.2.2 Conditions

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.

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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	
				A	
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 must 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.	Calibration of the heat treatment equipment shall be confirmed.		
		Any scale which will not be removed by subsequent machining shall be removed by abrasive blasting with an appropriate equipment.	Visual examination.		
		The material shall be heat treated in accordance with the material specification defined in the definition document.	Examination of the heat treatment specification.		

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Table 1 *(continued)*

Clause	Characteristic	Requirement	Inspection and test method	Q/A [a]	Sample size
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
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 4673-001. Use a tool specified in accordance with EN 4673-001. Visual examination at a suitable magnification of × 10 to × 20. The recorded hardness of the test blocks must be indicated in the test report.	Q	5
				A	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

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