SLOVENSKI STANDARD
oSIST prEN 4048:2025

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Aeronavtika - Matice, samozapiralne, navoj MJ, iz toplotnoodporne zlitine na nikljevi osnovi NI-PH2601 (Inconel 718), mazane z MoS2 - Klasifikacija: 1 550 MPa (pri temperaturi okolice)/425 °C - Tehnična specifikacija

Aerospace series - Nuts, self-locking, MJ threads, in heat-resisting nickel base alloy NI-PH2601 (Inconel 718), MoS2 coated - Classification: 1 550 MPa (at ambient temperature)/425 °C - Technical specification

Luft- und Raumfahrt - Muttern, selbstsichernd, MJ-Gewinde, aus hochwarmfester Nickelbasislegierung NI-PH2601 (Inconel 718), MoS2-beschichtet - Klasse: 1 550 MPa (bei Raumtemperatur)/425 °C - Technische Lieferbedingungen

Série aérospatiale - Écrous, à freinage interne, à filetage MJ, en alliage résistant à chaud à base de nickel NI-PH2601 (Inconel 718), revêtus MoS2 - Classification : 1 550 MPa (à température ambiante)/425 °C - Spécification technique

Ta slovenski standard je istoveten z: **prEN 4048**

ICS:

49.030.30 Matice Nuts

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EUROPEAN STANDARD

NORME EUROPÉENNE

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Will supersede EN 4048:2004

English Version

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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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 4048:2024) 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 4048:2004.

This document includes the following significant technical changes with respect to EN 4048:2004:

— Clause 2: EN 3497 added;

— Table 1, Clause 5.3.2: heat treating temperature tolerances and duration modified;

— Table 1, Clause 5.3.4: thread and thread deformation requirements modified;

— Table 1, Clause 5.3.6.2: thickness measurement methods added;

— Table 1, Clause 5.4.4.1: Axial load requirement at ambient temperature modified;

— Table 1, Clause 5.4.4.2: Axial load requirement after 425°C baking modified;

— Table 1, Clause 5.4.5.1: Self-locking torque at ambient temperature (five cycles) method modified;

— Table 1, Clause 5.4.9: Hardness requirement modified;

— Table 5: requirement modified (wrench feature torque, push out load and torque out test);

— Table 7: seating torque values and footnote modified.

1 Scope

This document specifies the characteristics, qualification and acceptance requirements for self-locking nuts with MJ threads in NI-PH2601, MoS_2 coated, for aerospace applications.

Classification: 1 550 MPa[1]/425 °C[2].

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 2491, *Aerospace series — Molybdenum disulphide dry lubricants — Coating methods*

ISO 1463, [3] Metallic and oxide coatings — Measurement of coating thickness — Microscopical method

ISO 3497, *Metallic coatings — Measurement of coating thickness — X-ray spectrometric methods*

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

ISO 8642:2008, *Aerospace — Self-locking nuts with maximum operating temperature greater than 425 °C — Test methods*

ASTM E 112-96, [4] Standard Test Methods for Determining Average Grain Size

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

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
inspection lot
quantity of parts from a single production batch with the same part number which completely defines the part

[1] Correspond to the minimum tensile stress which the nut is able to withstand at ambient temperature without breaking or cracking when tested with a bolt of a higher strength class.
[2] Maximum test temperature of the parts.
[3] Published by: ISO International Organization for Standardization http://www.iso.org/.
[4] Published by: ASTM International (US) https://www.astm.org/.

3.3 Surface discontinuities

3.3.1
crack
rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character

3.3.2
seam
open surface defect

3.3.3
lap
surface defect caused by folding over metal fins or sharp corners and then rolling or forging them into the surface

3.3.4
inclusions
non-metallic particles originating from the material manufacturing process. These particles may be isolated or arranged in strings

3.4
test temperature
ambient temperature unless otherwise specified

3.5
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

3.6
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

3.7
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

3.8
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

3.9
sampling plan
plan according to which one or more samples are taken in order to obtain information and possibly to reach a decision

3.10
limiting quality
LQ_{10}
quality limit in a sampling plan which corresponds to a specified 10 % probability of acceptance

3.11
acceptance quality limit
AQL
quality limit which in a sampling plan corresponds to a specified but relatively high probability of acceptance

Note 1 to entry: 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.

3.12
finished nut
nut ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the product standard or definition document

3.13
definition document
document specifying all the requirements for finished nuts

3.14
self-locking torque
torque to be applied to the nut or bolt to maintain movement of rotation in relation to the associated part, the assembly being under no axial load and the nut locking system being completely engaged with the bolt (minimum protrusion of two pitches including end chamfer)

3.15
seating torque
tightening torque to be applied to the nut or bolt to introduce or to increase the axial load in the assembly

3.16
unseating torque
untightening torque to be applied to the nut or bolt to reduce or remove the axial load in the assembly

3.17
breakaway torque
torque required to start unscrewing the nut or bolt with respect to the associated part, with the nut 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

3.18
wrench feature torque
torque to be applied to the wrenching feature of the nut

4 Quality assurance

4.1 Qualification

The qualification procedure for aerospace standard products (e.g. according to EN 9133 or an equivalent aerospace accepted and established qualification procedure) shall 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 nuts) are specified in Table 1. They shall be carried out on:

— each type and diameter of nut;

— 46 nuts selected from a single inspection lot by simple random sampling.

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

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

4.2 Acceptance

4.2.1 Purpose

Acceptance inspections and tests (requirements, methods, numbers of nuts) are specified in Table 1; they shall be carried out on each production batch or inspection lot. Nuts from the batch or lot to be tested shall be selected by simple random sampling.

Each nut 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 inspection and testing. In this case, the number of nuts submitted to these inspections and tests is the same as that submitted for qualification inspection and tests.

4.2.2 Responsibility

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

4.2.3 Inspection and test report

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

5 Requirements

Requirements shall be according to Table 1.

The same test sample may be utilized for more than one test provided that none of the characteristics of the samples are altered during the examination procedure (see Table 2).

Table 1 — Technical requirements and tests 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 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 product standard or definition document.	Standard gauging.	Q	43
				A	Tables 3 and 4
5.3	**Manufacturing**				
5.3.1	**Forming**	Nuts shall be formed by a hot or cold forming process. If hot formed, the forming temperature shall not exceed 1 150 °C and they shall be air cooled or faster. The equipment shall ensure a uniform temperature throughout the production batch.	The method of forming shall be indicated.	Q	
5.3.2	**Heat treatment**	The heat treatment medium or atmosphere shall not cause any surface contamination except as permitted by 5.5.4.	Calibration of the heat treatment equipment shall be confirmed.	Q	
		Any scale which will not be removed by subsequent machining shall be removed by abrasive blasting with an appropriate equipment.	Visual examination.		
		Solution treat (if applicable) at a temperature of 940 °C to 1010 °C, hold at the selected temperature within ± 15 °C for between 1 h min. and 2 h max., quench in oil, or alternative medium or faster. Precipitation treatment at (720 ± 5) °C, held at temperature for at least 8 h, furnace cooled at (55 ± 5) °C per hour to (620 ± 5) °C, held at 620 °C for at least 8 h , followed by air cooling or faster. Instead of the 55 °C per hour cooling rate to 620 °C, parts may be furnace cooled at any rate provided the time at 620 °C is adjusted to give a total precipitation time of 18 h min.	Examination of the heat treatment specification.		