



SLOVENSKI STANDARD
SIST EN 3005:2004

01-maj-2004

Aerospace series - Nuts, self-locking, in heat resisting nickel base alloy NI-P101HT (Waspaloy) - Classification: 1210 MPa/730 °C - Technical specification -

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MUTTERN,SELBSTSICHERND,AUS HOCHWARMFESTEM NICKELBASISLEGIERUNG NI-P101HT <WASPALLOY> - KLASSE 1210 MPA/730 GRADEN C -- TECHNISCHE LIEFERBEDINGUNGEN

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ECROUS,AUTO-FREINANT,EN ALLIAGE RESISTANT A CHAUD A BASE DE NICKEL NI-P101HT <WASPALLOY> - CLASSIFICATION 1210 MPA/730 DEGRES C

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49.030.30 Matice Nuts

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 3005

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ICS 49.030.30

English version

**Aerospace series - Nuts, self-locking, in heat resisting nickel
base alloy NI-P101HT (Waspaloy) - Classification: 1210
MPa/730°C - Technical specification**

This European Standard was approved by CEN on 24 June 2002.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 3005:2003) has been prepared by the European Association of Aerospace Manufacturers – Standardization (AECMA-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 AECMA, 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 July 2003, and conflicting national standards shall be withdrawn at the latest by July 2003.

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

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EN 3005:2003 (E)**1 Scope and field of application**

This standard specifies the technical; qualification and quality assurance requirements for self locking nuts in material NI-PI01-HT(Waspaloy) of tensile strength class 1210 MPa. at room temperature, maximum test temperature of material 730 °C.

Primarily for Aerospace applications it is applicable to such self locking nuts when referenced on the product standard or drawing.

2 References

- ISO 2859-1 Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection
- ISO 3452 Non destructive testing – Penetrant inspection – General principles
- ISO 3453 Non destructive testing – Liquid penetrant inspection – Means of verification
- ISO 3534 Statistics – Vocabulary and symbols
- ISO 8642 Aerospace – Self-locking nuts with maximum operating temperature greater than 425 °C – Test methods
- ISO 9002 Quality systems – Model for quality assurance in production, installation and servicing
- EN 2002-8 Aerospace series – Metallic materials – Test methods – Part 8: Micrographic determination of grain size ¹⁾
- EN 2959 Aerospace series – Heat resisting alloy NI-PH1302 (NiCr20Co13Mo4Ti3Al) – Solution treated and cold worked – Bar for forged fasteners – $3 \text{ mm} \leq D \leq 30 \text{ mm}$ ¹⁾
- EN 2960 Aerospace series – Heat resisting nickel base alloy (Ni-P101HT) – Cold worked and solution treated – Bar for machining for fasteners – $3 \text{ mm} \leq D \leq 50 \text{ mm}$ ¹⁾
- EN 3039 Aerospace series – Propulsion standard parts – Quality assurance ²⁾
- EN 3041 Aerospace series – Method change approval for qualified parts – Technical specification ²⁾
- EN 3042 Aerospace series – Quality assurance – EN aerospace products – Qualification procedure.
- EN 3220 Aerospace series – Heat resisting nickel base alloy (Ni-P101HT) – Cold worked and softened – Bar and wire for continuous forging or extrusion for fasteners – $3 \text{ mm} \leq D \leq 30 \text{ mm}$ ¹⁾
- TR 3040-1 Aerospace series – Quality assurance – EN aerospace products – List of approved manufacturers ³⁾

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

2) In preparation at the date of publication of this standard

3) Published as AECMA Technical Report at the date of publication of this standard

3 Definitions.

3.1

Production batch

Quantity of finished nuts fabricated by the same process from a single material cast(single heat of alloy),having the same basic part number and diameter, heat treated together to the same specified condition and produced as on~continuous run.

3.2

Inspection lot

Consists of nuts from a single production batch of the same part number which completely defines the nut.

3.3

Discontinuities.

3.3.1

Crack

Rupture in the material which may extend in any direction and which may be intercrystalline or transcrytalline in character.

3.3.2

Seam

Longitudinal surface defect in the form of an unwelded open fold in the material.

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

Inclusion

Non-metallic particles originating from the material making process. They may exist as discrete particles or strings of particles extending longitudinally

3.4

Test temperature

Ambient temperature. unless otherwise specified.

3.5

Simple random sampling 1)

The 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 1)

A 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 1)

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

3.8

Minor defect 1)

A defect that is not likely to reduce materially the useability 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 1)

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

EN 3005:2003 (E)**3.10****Limiting quality LQIO 1)**

In a sampling plan, a quality level which corresponds to a specified and relatively low probability of acceptance -in this case 10 percent probability of acceptance. It is the limiting lot quality characteristic that a lot of this quality would occur.

When expressed as a per cent defective, it may be referred to as a lot tolerance per cent defective

3.11**Acceptable quality level 1)**

A quality level 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.

3.12**Finished nut**

A nut ready for use. inclusive of any possible treatments and/or surface coatings. as specified in the product standard or drawing.

3.13**Drawing**

Document specifying all the requirements for nuts i.e.

- metallurgical
- geometrical.and dimensional
- functional (strength and temperature classes).

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3.14**Self-locking torque**

The 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(two pitches minimum protrusion including end chamfer).

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3.15**Seating torque**

The 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**

The untightening torque to be applied to the nut or bolt to reduce or remove the axial load in the assembly.

3.17**Breakaway torque**

The 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 torque**

The tightening and untightening torques which the driving feature of the nut shall withstand, repeatedly, without any permanent deformation which would prevent the appropriate wrench from being used and preclude reuse of the nut.

<p>1) Definition taken in ISO 3534-1977 (in course of revision within ISO/TC69).</p>
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4 Certification and quality assurance.

The allocation of tests' corresponding to the requirements of this standard is as follows:

4.1 Qualification

4.1.1 Purpose

The purpose of qualification tests is to ensure that the nut design and nut manufacturing conditions allow the nut to comply with the requirements of this standard .

4.1.2 Conditions

The qualification tests summarised in table 3 shall be performed on each type and diameter of nut. Proposed changes in manufacturing source or procedure shall be subject to the requirements of EN 3041

46 nuts selected from a single inspection lot by simple random sampling shall be subjected to the qualification tests.

The number of nuts to be subjected to each test as well as the method(s) to be used are specified in table 1

The tests to be applied to each nut are shown in table 2

The test programme may possibly be reduced. this decision will be based on the comparison of results obtained from parts of similar design. size and manufacturing conditions.

All or part of these tests may also be performed for production acceptance, when a reinforced inspection seems to be necessary, or to survey nuts that have not proved satisfactory in use.

In that case, the sample to be subjected to these tests is the same as that used for the Qualification inspection and tests.

4.1.3 Qualification test requirements and procedures.

The qualification test requirements and procedures shall be to the requirements of EN 3042.

4.1.4 Qualified manufacturers

A list of qualified manufacturers for specific standard parts is listed in CN/TR 3040.

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4.2 Acceptance

4.2.1 Purpose

The purpose of acceptance 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 nuts constituting the batch satisfy the requirements of this standard.

4.2.2 Conditions

Acceptance tests are summarised in table 3. They shall be performed on each batch. Table 1 specifies, the test method and sampling plan to be used for each test. Nuts from the batch to be tested shall be selected by simple random sampling.

Each nut may be submitted to several tests

The nuts to be subjected to destructive tests may be those on which non-destructive tests have been performed.

4.3 Quality system certification

4.3.1 Purpose

The purpose of quality system certification is to ensure that the manufacturer has demonstrated the acceptability of his quality system and his ability for continuing production of parts to this standard, to the required level of quality.

4.3.2 Requirements and procedure

The requirements and procedures for quality system certification shall be to the requirements of ISO 9002 and EN 3039.

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4.4 Responsibility for inspection and tests

The manufacturer is responsible for the performance of all inspection and test requirements as specified herein. Each manufacturer will use their own or exceptionally, any other facilities approved in accordance with 4.1 and 4.2 for the implementation of these inspection and test requirements.

4.5 Inspection and test report

A test report showing actual numerical values shall be provided at the purchaser's option as part of the terms of the purchase order.

5 Table

Table 1 Technical requirements and test method

* Q = Qualification approval requirements (4.1)

A = Production acceptance requirements (4.2)

Clause	Characteristic	Technical requirement	Inspection and test method	Q/A	Sample size
5.1	Materials	Material NI-P101_ht to specification prEN 2959;prEN 2960 or prEN3220 supplied by an approved source; shall be used for the manufacture of nuts (or nut elements in the case of floating nuts). The material of the nut cage in the case of floating nuts shall be as specified by the product standard or drawing.	As stated in the material specification and prEN 2098-06		
5.2	Dimensions; tolerances of form & position; threads & quality			Q A	46 tables 6 & 7
5.2.1	Dimensions	The dimensions of the finished nuts shall conform to the product standard or drawing	All dimensions shall be controlled by an approved system of gauging.		
5.2.2	Tolerances of form & position	Tolerances of form and position shall conform to the product standard or drawing.	Tolerances of form & position shall be controlled by an approved system of gauging.		
5.2.3	Threads	Threads shall conform to the product standard or drawing.	Threads shall be gauged by an approved system of gauging.		
5.2.4	Quality	Parts shall be uniform in quality and condition, clean, sound and free from fins, burrs, cracks and other imperfections detrimental to their performance, parts shall also be free of tool marks except those resulting from producing the self looking feature and these must blend smoothly without abrupt change.	Visual.		
5.3	Manufacturing	Nuts may be manufactured by machining or forming dependant upon the material allowed by the product standard or drawing.	Whichever method is used shall be approved.		
5.3.1	Forming	Formed nuts may be produced by hot or cold forming process. If hot formed the forming temperature shall not exceed 1150°C. and parts shall be air cooled or faster. The heating equipment for forming shall be of a type which ensures a consistent temperature throughout the batch.			