SLOVENSKI STANDARD
SIST EN 3915:2008

01-julij-2008

Aeronavtika - Vloģki, tanka stena, samozapiralni, navoj MJ, iz toplotnoodporne zlitine na nikljevi osnovi NI-PH2601 (NI-P100HT, Inconel 718), za popravljanje sestavnih delov - Klasifikacija: 1 275 MPa (pri temperaturi okolice) / 550 ÁC - Tehniļ na specifikacija

Aerospace series - Insert, thin wall, self-locking, MJ threads, in heat resisting nickel base alloy NI-PH2601 (NI-P100HT, Inconel 718), for salvage of components - Classification: 1 275 MPa (at ambient temperature) / 550 °C - Technical specification

Luft- und Raumfahrt - Gewindeeinsätze, dünnwandig, selbstsichernd, MJ-Gewinde, aus hochwarmfester Nickelbasislegierung NI-PH2601 (NI-P100HT, Inconel 718), zur Nacharbeit von Bauteilen - Klasse: 1 275 MPa (bei Raumtemperatur) / 550 °C - Technische Lieferbedingungen

Série aérospatiale - Douilles filetées, à paroi mince, à freinage interne, filetage MJ, en alliage résistant à chaud à base de nickel NI-PH2601 (NI-P100HT, Inconel 718), pour récupération - Classification : 1 275 MPa (à température ambiante) / 550 °C - Spécification technique

Ta slovenski standard je istoveten z: **EN 3915:2008**

ICS:

49.030.99	Drugi vezni elementi	Other fasteners

SIST EN 3915:2008 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3915

April 2008

ICS 49.030.99

English Version

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

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Ref. No. EN 3915:2008: E

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Foreword

This document (EN 3915:2008) 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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by October 2008.

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1 Scope

This standard specifies the characteristics, qualification and acceptance requirements for self-locking thin wall salvage inserts with MJ threads in NI-PH2601 (NI-P100HT).

Classification: 1 275 MPa [1] / 550 °C [2].

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 2404 [3], *Heat resisting nickel base alloy NI-P100-HT — Solution treated and precipitation treated — Bars — Aerospace series.* [4]

EN 3298, *Aerospace series — Inserts, thin wall, self-locking — Installation and removal procedure.*

EN 3676, *Aerospace series — Inserts, thin wall, self-locking — Design standard.*

EN 4376, *Aerospace series — Heat resisting alloy NI-PH2601 (NiCr19Fe19Nb5Mo3) — Solution treated and precipitation treated — Bar and section — $D_e \leq 200$ mm.* [5]

EN 4377, *Aerospace series — Heat resisting alloy NI-PH2601 (NiCr19Fe19Nb5Mo3) — Non heat treated — Forging stock — a or D ≤ 300 mm.* [5]

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

EN ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture (ISO 4288:1996).*

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 3534:1977, *Statistics — Vocabulary and symbols.*

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

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

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1) The strength class of the insert is equal to the minimum tensile stress which the insert is able to withstand at ambient temperature without breaking or cracking when tested with a bolt of higher strength class.

2) Maximum test temperature of the parts.

3) Inactive for new designation, see EN 4376 and EN 4377.

4) Published as ASD Standard at the date of publication of this standard.

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

ASTM E 112-96, *Standard test methods for determining average grain size*. [6)]

AMS 4117, *Aluminum alloy, rolled or cold finished bars, rods, and wire and flash welded rings, 1.0Mg – 0.60Si – 0.28Cu – 0.20Cr, solution and precipitation heat treated*. [7)]

AMS-QQ-A-225/8, *Aluminum alloy 6061, bar, rod, wire, and special shapes; rolled, drawn, or cold finished*. [7)]

3 Terms and definitions

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

3.1
production batch
quantity of finished thin wall salvage inserts manufactured, using the same process, from a single material cast (single heat of alloy), having the same number (of product standard or definition document), thread code and diameter, heat treated together to the same specified condition and produced as one continuous run

3.2
inspection lot
quantity of thin wall salvage inserts from a single production batch with same number (of product standard or definition document) which completely defines the thin wall insert

3.3 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

6) Published by: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive,. PO Box C700, West Conshohocken, PA 19428-2959 USA.

7) Published by: Society of Automotive Engineers, Inc. (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA.

3.5
single 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 possibility of being chosen

[ISO 3534, see definition]

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

[ISO 3534, see definition]

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

[ISO 3534, see definition]

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

[ISO 3534, see definition]

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

[ISO 3534, see definition]

3.10
limiting quality (LQ_{10})
in a sampling plan, the quality level which corresponds to the specified 10 % probability of acceptance

3.11
acceptable quality level (AQL)
quality level which in a sampling plan corresponds to a specified but relatively high probability of acceptance

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.

3.12
finished thin wall insert
thin wall insert 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 thin wall inserts

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

3.15
seating torque
tightening torque to be applied to the thin wall insert and bolt assembly to introduce or to increase the axial load in the assembly

3.16
unseating torque
untightening torque to be applied to the thin wall insert and bolt assembly to reduce or remove the axial load in the assembly

3.17
breakaway torque
torque required to start unscrewing the bolt with respect to the thin wall salvage insert, 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

3.18
salvage insert
oversize version of a thin wall insert. This allows the salvage of components with damaged threads, out of position holes, etc.

4 Quality assurance

4.1 Qualification

4.1.1 Purpose

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

4.1.2 EN 9133

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

— each type and diameter of thin wall insert,

— 25 thin wall inserts selected from a single inspection lot by simple random sampling.

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

Table 2 indicates the allocation of thin wall insert specimens for the inspection 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 thin wall inserts constituting the batch satisfy the requirements of this standard.

4.2.2 Conditions

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

Each thin wall 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 inspection and testing. In this case, the number of thin wall inserts submitted to these inspections and test 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 at the purchaser's option as part of the terms of 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 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 A	25 Tables 5 and 6
5.3	**Manufacturing**				
5.3.1	**Process**	Inserts may be manufactured by machining or forming.	The method of processing shall be indicated.	Q	
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.	Calibration of the heat treatment equipment shall be confirmed. Appropriate equipment.	Q	

continued

Table 1 — Technical requirements and test methods *(continued)*

Clause	Characteristic	Requirement	Inspection and test method	Q/A [a]	Sample size
5.3.2.1	**Solution and precipitation heat treatment**	The blanks shall be solution treated at a temperature of 930 °C to 1 010 °C, held at the selected temperature within ± 15 °C for not less than 1 hour and air cooled or faster. The solution treated blanks shall be precipitation heat treated at (720 ± 5) °C, held at this temperature for 8 hours ± 15 min, furnace cooled at (55 ± 5) °C per hour to (620 ± 5) °C held at 620 °C for 8 hours ± 15 minutes, 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 hours minimum.			
5.3.3	**Thread deformation** (form out of round)	Threads in the locking region may be deformed in any manner provided that the thin wall salvage insert meets the requirements of this specification. The finished thin wall salvage inserts shall allow the "GO" thread plug gauge to enter a minimum of three quarters of a turn, when gauged from the counterbore side.	Standard gauging.	Q	25
				A	Tables 5 and 6
5.3.3.1	**Insert test**	The maximum torque at insertion of insert shall not exceed 0,5 Nm.	Insert shall be inserted to EN 3298. The maximum dimensions of the tapped hole shall be the minimum dimensions of the tapped hole to EN 3676.	A	Tables 5 and 6
5.3.4	**Surface roughness**	In accordance with the product standard or definition document.	ISO 4288 — Visual examination	Q	3
				A	Tables 5 and 6
5.3.5	**Surface coating**	In accordance with the product standard or definition document.	See applicable coating standard.	Q	22
				A	Tables 5 and 6

continued