SLOVENSKI STANDARD

SIST EN 2952:2019

01-junij-2019

Aeronavtika - Toplotnoodporna zlitina NI-PH2601 - Topilno žarjena in hladno preoblikovana - Palice za kovane vezne elemente - D ≤ 50 mm - 1270 MPa ≤ Rm ≤ 1550 MPa

Aerospace series - Heat resisting alloy NI-PH2601 - Solution treated and cold worked - Bar for forged fasteners - D ≤ 50 mm - 1 270 MPa ≤ Rm ≤ 1 550 MPa

Luft- und Raumfahrt - Hochwarmfeste Legierung NI-PH2601 - Lösungsgeglüht und kaltverfestigt — Stangen zum Stauchen für Verbindungselemente - D ≤ 50 mm - 1 270 MPa ≤ Rm ≤ 1 550 MPa

Série aérospatiale - Alliage résistant à chaud NI-PH2601 - Mis en solution et écroui - Barres pour éléments de fixations forgés - D ≤ 50 mm - 1 270 MPa ≤ Rm ≤ 1 550 MPa

Ta slovenski standard je istoveten z: EN 2952:2019

ICS:

49.025.05	Železove zlitine na splošno	Ferrous alloys in general
49.030.01	Vezni elementi na splošno	Fasteners in general

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EUROPEAN STANDARD

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English Version

Aerospace series - Heat resisting alloy NI-PH2601 - Solution treated and cold worked - Bar for forged fasteners - D ≤ 50 mm - 1 270 MPa ≤ Rm ≤ 1 550 MPa

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

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European foreword

This document (EN 2952:2019) 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of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is part of the series of EN metallic material standards for aerospace applications. The general organization of this series is described in EN 4258.

This European Standard has been prepared in accordance with EN 4500-003.

1 Scope

This European Standard specifies the requirements relating to:

Heat resisting alloy NI-PH2601
Solution treated and cold worked
Bar for forged fasteners
$D \leq 50$ mm
1 270 MPa ≤ R_m ≤ 1 550 MPa

for aerospace applications.

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 2002-016, *Aerospace series — Metallic materials — Test methods — Part 16: Non-destructive testing — Penetrant testing*

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use*

EN 4500-003, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 003: Specific rules for heat resisting alloys*

EN 4700-002, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 002: Bar and section*

3 Terms and definitions

No terms and definitions are listed in this document.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Requirements

See Table 1.

Table 1 — Requirements for heat resisting alloy NI-PH2601

1	Material designation		Heat resisting alloy NI-PH2601										
2	Chemical composition %	Element	C	Si	Mn	P	S	Al	B	Ca	Co	Cr	Cu
		min.	0,02	–	–	–	–	0,20	20 *	–	–	17,0	–
		max.	0,08	0,35	0,35	0,015	0,015	0,80	60 *	0,010	1,00	21,0	0,30
		Element	Fe	Mg	Mo	Nb + Ta	Ti	Ag	Bi	Pb	Ni		
		min.	16,5	–	2,80	4,80	0,70	–	–	–	Base		
		max.	20,5	0,010	3,30	5,50	1,15	5 *	1 *	5 *			
3	Method of melting		Vacuum induction melted and consumable electrode remelted (vacuum or slag)										
4.1	Form		Bar for forged fasteners										
4.2	Method of production		Cold worked, straightened and ground										
4.3	Limit dimension(s)	mm	$D \leq 50$										
5	Technical specification		EN 4700-002										

6.1	Delivery condition	Solution treated and cold worked
	Heat treatment	930 °C ≤ θ ≤ 1 010 °C / t = 1 h / AC or faster + 15 % ≤ cold worked ≤ 30 % at θ ≤ 650 °C
6.2	Delivery condition code	U
7	Use condition	Delivery condition
	Heat treatment	–

Characteristics

8.1	Test sample(s)				Cut from bar	Cut from bar	
8.2	Test piece(s)				SIST EN 2952:2019	–	
8.3	Heat treatment				https://standards.iteh.ai/catalog/standards/sist/29f8553b-feb1-457b-8c97-42744b20c261/sist-en-2952-2019 Delivery condition	Reference heat treatment: see line 29	
9	Dimensions concerned			mm	–	–	
10	Thickness of cladding on each face			%	–	–	
11	Direction of test piece				L	L	
12	T	Temperature	θ	°C	–	Ambient	650
13	T	Proof stress	$R_{p0,2}$	MPa	–	≥ 1 035	≥ 860
14	T	Strength	R_m	MPa	–	1 270 ≤ R_m ≤ 1 550	≥ 1 000
15	T	Elongation	A	%	–	≥ 11	≥ 11
16	T	Reduction of area	Z	%	–	≥ 15	≥ 15
17	Hardness				≤ 385 HV	331 ≤ HB ≤ 450 or 36 ≤ HRC ≤ 48 [a]	
18	Shear strength		R_c	MPa	–	–	
19	Bending		k	–	–	–	
20	Impact strength				–	–	
21	C	Temperature	θ	°C	–	650	
22	C	Time		h	–	t_R ≥ 23	
23	C	Stress	σ_a	MPa	–	–	
24	C	Elongation	a	%	–	–	
25	C	Rupture stress	σ_R	MPa	–	690 [b, c]	
26	C	Elongation at rupture	A	%	–	≥ 5	
27	Notes (see line 98)				*, a, b, c		

29	Reference heat treatment	–	Solution treated and precipitation treated Delivery condition + θ = 995 °C / t = 1 h / AC or faster + θ = 720 °C / t = 8 h / FC at θ = 50 °C per h to θ = 620 °C / t = 8 h / AC
34	Grain size	–	See EN 4700-002.
		2	One per batch
		3	L and LT
		7	4 or finer – Isolated grains up to 2 – No duplex structure
44	External defects	–	See EN 4700-002.
		1	EN 2002-016
51	Macrostructure	–	See EN 4700-002.
		2	One per batch
61	Internal defects	–	See EN 4700-002.
		7	Class 5
95	Marking inspection	–	–
96	Dimensional inspection	–	–
98	Notes	–	* p.p.m. a The product cannot be rejected on the sole basis of the hardness measurements if the measured tensile characteristics are in conformity with the requirements in line 14. b Proportional round test piece. c Stress may be increased after 48 h to promote the rupture.
99	Typical use	–	–