SLOVENSKI STANDARD
SIST EN 3220:2019

01-junij-2019

Aeronavtika - Toplotno odporne zlitine na nikljevi osnovi (Ni-P101HT) - Hladno preoblikovana in mehko žarjena - Palice in žice za kontinuirno kovanje ali iztiskanje vezalnih elementov - 3 mm ≤ D ≤ 30 mm

Aerospace series - Heat resisting nickel base alloy (Ni-P101HT) - Cold worked and softened - Bar and wire for continuous forging or extrusion for fasteners - 3 mm ≤ D ≤ 30 mm

Luft- und Raumfahrt - Hochwarmfeste Nickellegierung (Ni-P101HT) - Kaltverfestigt und abgeschreckt - Stangen und Drähte zum kontinuierlichen Verformen oder Strangpressen für Verbindungselemente - 3 mm ≤ D ≤ 30 mm

Aerospace series - Heat resisting nickel base alloy (Ni-P101HT) - Cold worked and softened - Bar and wire for continuous forging or extrusion for fasteners - 3 mm ≤ D ≤ 30 mm

Ta slovenski standard je istoveten z: EN 3220:2019

ICS:

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

SIST EN 3220:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3220

April 2019

ICS 49.025.99

English Version

Aerospace series - Heat resisting nickel base alloy (Ni-P101HT) - Cold worked and softened - Bar and wire for continuous forging or extrusion for fasteners - 3 mm ≤ D ≤ 30 mm

Série aérospatiale - Alliage résistant à chaud base nickel (Ni-P101HT) - Écroui et adouci - Barre et fil pour le forgeage ou l'extrusion en continu pour fixations - 3 mm ≤ D ≤ 30 mm

Luft- und Raumfahrt - Hochwarmfeste Nickellegierung (Ni-P101HT) - Kaltverfestigt und abgeschreckt - Stangen und Drähte zum kontinuierlichen Verformen oder Strangpressen für Verbindungselemente - 3 mm ≤ D ≤ 30 mm

This European Standard was approved by CEN on 2 December 2018.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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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 (EN 3220:2019) 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 October2019.

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.

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Introduction

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

1 Scope

This document specifies the requirements relating to:

Heat resisting nickel base alloy (Ni-P101HT)
Cold worked and softened
Bar and wire for continuous forging or extrusion for fasteners
3 mm ≤ *D* ≤ 30 mm

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 2344, *Aerospace series — Round bars, machined in heat resisting alloys — Diameter 10 mm ≤ D ≤ 180 mm — Dimensions*

EN 2369, *Aerospace series — Wires, heat resisting alloys — Diameter 0,2 mm ≤ D ≤ 8 mm — Dimensions*

EN 2600, *Aerospace series — Designation of metallic semi-finished products — Rules*

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 4700-004, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 004: Wire*

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 — Heat resisting nickel base alloy (Ni-P101HT)

1	Material designation		Heat resisting nickel base alloy (Ni-P101HT)									
2	Chemical composition %	Element	C	Si	Mn	P	S	Ag	Al	B	Bi	Co
		min.	0,02	–	–	–	–	–	1,2	0,003	–	12,0
		max.	0,10	0,15	0,10	0,015	0,008	(5)	1,6	0,010	(1)	15,0
		Element	Cr	Cu	Fe	Mo	Pb	Ti	Zr	Ca	Mg	Ni
		min.	18,0	–	–	3,5	–	2,8	0,02	–	–	Base
		max.	21,0	0,10	2,0	5,0	(10)	3,3	0,08	0,01	0,01	
3	Method of melting		Vacuum melted and consumable electrode remelted									
4.1	Form		Bar and wire for continuous forging or extrusion									
4.2	Method of production		Cold worked									
4.3	Limit dimension(s)	mm	$3 \leq D \leq 30$									
5	5.1 Technical specification		EN 4700-004									
	5.2 Dimensional standard		EN 2344					EN 2369				

6.1	Delivery condition	10 % ≤ cold worked ≤ 30 % reduction temperature $\theta \leq$ 870 °C
	Heat treatment	Softened 1 010 °C ≤ $\theta \leq$ 1 080 °C/t > 15 min/AC, equivalent or faster
6.2	Delivery condition code	U
7	Use condition	–
	Heat treatment	Delivery condition

Characteristics

8.1	Test sample(s)				–	See line 29
8.2	Test piece(s)				–	–
8.3	Heat treatment				Delivery condition	Reference treatment
9	Dimensions concerned			mm	$3 \leq D \leq 30$	
10	Thickness of cladding on each face			%	–	–
11	Direction of test piece				–	–
12	T	Temperature	θ	°C	–	Ambient
13	T	Proof stress	$R_{p0,2}$	MPa*	–	≥ 800
14	T	Strength	R_m	MPa*	–	≥ 1 210
15	T	Elongation	A	%	–	≥ 13
16	T	Reduction of area	Z	%	–	≥ 18
17	Hardness				≤ 365 HV	≥ 350 HV ≤ 485 HV
18	Shear strength		R_c	MPa*	–	–
19	Bending		k	–	–	–
20	Impact strength				–	–
21	C	Temperature	θ	°C	–	730
22	C	Time		h	–	≥ 23
23	C	Stress	σ_a	MPa*	–	–
24	C	Elongation	a	%	–	–
25	C	Rupture stress	σ_R	MPa*	–	520
26	C	Elongation at rupture	A	%	–	≥ 5
27	Notes (see line 98)				*, (1)	

28	–	–	–
29	Reference heat treatment	–	Solution treated stabilised and precipitation treated 1 010 °C ≤ θ ≤ 1 080 °C/t = 1 h/OQ, equivalent or faster + 850 °C/t = 4 h/AC, equivalent or faster + 760 °C/t = 16 h/AC, equivalent or faster
34	Grain size	–	Predominantly recrystallized grain size 3 or finer with isolated grain up to .25 mm (maximum dimension) allowed
95	Marking inspection	–	–
96	Dimensional inspection	–	–
97	Designation	–	The rules governing the designation of semi-finished products are indicated in standard EN 2600. When the codified designation is used, the identification code shall be as follows: EN 3220 U XX ------ Material standard number Letter code (see 6.2) Appropriate dimensional standard code (see 5.2) Data concerning dimension (see EN 2600)
98	Notes	–	* 1 MPa = 1 N/mm². (1) Combination notched/unnotched test piece or separate notched and smooth test pieces. Rupture shall occur in the unnotched portion of the combined test piece. If separate test pieces are used, the time to rupture of the notched test piece shall exceed that of the unnotched test piece.
99	Typical use	–	Nuts, bolts and studs for engines.