



SLOVENSKI STANDARD

SIST EN 3761:2020

01-marec-2020

Aeronavtika - Toplotno odporna zlitina FE-PA2601 - Popuščana in hladno obdelana
- Palice za kovane vezne elemente - $D \leq 50 \text{ mm}$ - $1100 \text{ MPa} \leq R_m \leq 1300 \text{ MPa}$

Aerospace series - Heat resisting alloy FE-PA2601 - Softened and cold worked - Bar for forged fasteners - $D \leq 50 \text{ mm}$ - $1100 \text{ MPa} \leq R_m \leq 1300 \text{ MPa}$

Luft- und Raumfahrt - Hochwarmfeste Legierung FE-PA2601 - Weichgeglüht und kaltverfestigt - Stangen zum Stauchen für Verbindungselemente - $D \leq 50 \text{ mm}$ - $1100 \text{ MPa} \leq R_m \leq 1300 \text{ MPa}$

Série aérospatiale - Alliage résistant à chaud FE-PA2601 - Adouci et écroui - Barres pour éléments de fixations forgés - $D \leq 50 \text{ mm}$ - $1100 \text{ MPa} \leq R_m \leq 1300 \text{ MPa}$

Ta slovenski standard je istoveten z: EN 3761:2020

ICS:

49.025.05 Železove zlitine na splošno Ferrous alloys in general

SIST EN 3761:2020

en,fr,de

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EUROPEAN STANDARD

EN 3761

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2020

ICS 49.025.05

English Version

Aerospace series - Heat resisting alloy FE-PA2601 -
Softened and cold worked - Bar for forged fasteners - $D \leq$
50 mm - $1\ 100\ \text{MPa} \leq R_m \leq 1\ 300\ \text{MPa}$

Série aéronautique - Alliage résistant à chaud FE-
PA2601 - Adouci et écroui - Barre pour éléments de
fixations forgés - $D \leq 50\ \text{mm}$ - $1\ 100\ \text{MPa} \leq R_m \leq 1\ 300$
MPa

Luft- und Raumfahrt - Hochwarmfeste Legierung FE-
PA2601 - Weichgeglüht und kaltverfestigt - Stange zum
Stauben für Verbindungselemente - $D \leq 50\ \text{mm}$ - 1
 $100\ \text{MPa} \leq R_m \leq 1\ 300\ \text{MPa}$

This European Standard was approved by CEN on 14 July 2019.

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

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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European foreword

This document (EN 3761:2020) 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2020, and conflicting national standards shall be withdrawn at the latest by July 2020.

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 organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 3761:2020 (E)

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.

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1 Scope

This document specifies the requirements relating to:

Heat resisting alloy FE-PA2601
Softened and cold worked
Bar for forged fasteners
 $D \leq 50$ mm
 $1\ 100\ \text{MPa} \leq R_m \leq 1\ 300\ \text{MPa}$

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 2002-16, *Aerospace series — Metallic materials — Part 016: Non-destructive testing — Penetrant testing*¹⁾

EN 4700-002, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 002: Bars and sections*¹⁾

3 Terms and definitions (standards.iteh.ai)

No terms and definitions are listed in this document.

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

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

4 Requirements

See Table 1.

1) Published as ASD-STAN Standard at the date of publication of this standard by AeroSpace and Defence industries Association of Europe - Standardization (ASD-STAN), <http://www.asd-stan.org/>

EN 3761:2020 (E)

Table 1 — Requirements for heat resisting alloy FE-PA2601

1	Material designation		Heat resisting alloy FE-PA2601														
2	Chemical composition %	Element	C	Si	Mn	P	S	Al	B	Cr	Mo	Ni	Pb	Ti	V	Fe	
		min.	-	-	-	-	-	-	-	30*	13,5	1,0	24,0	-	1,9	0,10	Base
		max.	0,08	1,0	2,0	0,020	0,015	0,35	100*	16,0	1,5	27,0	50*	2,3	0,50		
3	Method of melting		Air melted or 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		See EN 4700-002.														

6.1	Delivery condition		Softened, cold worked and ground													
	Heat treatment		900 °C/t = 1 h/ AC or faster + 15 % ≤ cold worked ≤ 25 % at $\theta \leq 870$ °C + ground													
6.2	Delivery condition code		U													
7	Use condition		Delivery condition													
	Heat treatment		-													

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Characteristics
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8.1	Test sample(s)		Cut from bar											Cut from bar				
8.2	Test piece(s)		SIST EN 3761:2020											-				
8.3	Heat treatment		Delivery condition											See line 29.				
9	Dimensions concerned	mm	$D \leq 50$											$D \leq 50$				
10	Thickness of cladding on each face	%	-											-				
11	Direction of test piece		-											-				
12	Temperature	-	°C	-											Ambient			
13	Proof stress	$R_{p0,2}$	MPa	-											≥ 770			
14	Strength	R_m	MPa	-											$1\ 100 \leq R_m \leq 1\ 300$			
15	Elongation	A	%	-											≥ 12			
16	Reduction of area	Z	%	-											-			
17	Hardness		≤ 277 HB											$341 \leq HB \leq 410$				
18	Shear strength	R_c	MPa	-											-			
19	Bending	k	-	-											-			
20	Impact strength		-											-				
21	Temperature	θ	°C	-											650			
22	Time		h	-											≥ 23			
23	Stress	σ_a	MPa	-											-			
24	Elongation	a	%	-											-			
25	Rupture stress	σ_R	MPa	-											480 a, b			
26	Elongation at rupture	A	%	-											≥ 4			
27	Notes (see line 98)		*, a, b															

29	Reference heat treatment	-	Precipitation treated Delivery condition + 720 °C/t = 16 h/AC
34	Grain size	-	See EN 4700-002.
		2	1 (one) per batch
		3	L and LT
		7	5 (five) or finer - No duplex structure
44	External defects	-	See EN 4700-002.
		1	See EN 2002-16.
51	Macrostructure	-	See EN 4700-002.
		7	As stated on the order
61	Internal defects	-	See EN 4700-002.
		7	Flat-bottomed hole $D = 1,2$ mm
97	Designation	-	-
98	Notes	-	* ppm a Proportional round test piece b Stress may be increased after 48 h to promote rupture.
99	Typical use	-	-
100	-	Product qualification	-
			Qualification programme to be agreed between manufacturer and purchaser.

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