SLOVENSKI STANDARD
oSIST prEN 3311:2021

01-september-2021

Aeronavtika - Titanova zlitina TI-P64001 (Ti-6Al-4V) - Žarjeno - Palice za obdelavo - D < 300 mm - 900 MPa ≤ Rm ≤ 1160 MPa

Aerospace series - Titanium alloy TI-P64001 (Ti-6Al-4V) - Annealed - Bars for machining - D < 300 mm - 900 MPa ≤ Rm ≤ 1 160 MPa

Luft- und Raumfahrt - Titanlegierung TI-P64001 (Ti-6Al-4V) - Geglüht - Stangen zum Zerspanen - D < 300 mm - 900 MPa ≤ Rm ≤ 1 160 MPa

Série aérospatiale - Alliage de titane TI-P64001 (Ti-6Al-4V) - Recuit - Barres pour usinage - D < 300 mm - 900 MPa ≤ Rm ≤ 1 160 MPa

Ta slovenski standard je istoveten z: **prEN 3311**

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49.025.30 Titan Titanium

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EUROPEAN STANDARD

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English Version

Aerospace series - Titanium alloy TI-P64001 (Ti-6Al-4V) - Annealed - Bars for machining - D < 300 mm - 900 MPa ≤ Rm ≤ 1 160 MPa

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 3311:2021) 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 document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 3311:2009.

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 4500-004.

1 Scope

This document specifies the requirements relating to:

Titanium alloy TI-P64001 (Ti-6Al-4V)

Annealed

Bars for machining

$D < 300$ mm

900 MPa ≤ R_m ≤ 1 160 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 2954-002, *Aerospace series — Macrostructure of titanium and titanium alloy wrought products — Part 002: Macrostructure of bar, section, forging stock and forgings*

EN 3114-002, *Aerospace series — Test method — Microstructure of (α + ß) titanium alloy wrought products — Part 002: Microstructure of bars, sections, forging stock and forgings*

EN 4050-1, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 1: General requirements*

EN 4267, *Aerospace series — Round bars in titanium and titanium alloys — Diameter 6 mm ≤ D ≤ 160 mm — Dimensions*

EN 4800-002, *Aerospace series — Titanium and titanium alloys — 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:

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

4 Requirements

See Table 1.

Table 1 — Requirements for Titanium alloy TI-P64001 (Ti-6Al-4V)

1	Material designation		Titanium alloy TI-P64001 (Ti-6Al-4V)									
2	Chemical composition %	Element	Al	V	O+2N	N	H	Fe	C	Others[a]		Ti
										Each	Total	
		min.	5,5	3,5	—	—	—	—	—	—	—	Base
		max.	6,75	4,5	0,25	0,03	0,012 5	0,30	0,08	0,10	0,40	
3	Method of melting		See EN 4800-002.									
4.1	Form		Bars for machining									
4.2	Method of production		—									
4.3	Limit dimension(s)	mm	$D < 300$									
5	Technical specification		EN 4267, EN 4800-002									

6.1	Delivery condition	Annealed
	Heat treatment	690 °C ≤ θ ≤ 840 °C/t ≥ 30 min/AC or inert atmosphere
6.2	Delivery condition code	A
7	Use condition	Delivery condition
	Heat treatment	—

Characteristics

8.1	Test sample(s)			—		
8.2	Test piece(s)			—		
8.3	Heat treatment			Use condition		
9	Dimensions concerned		mm	$D \leq 75$	$75 < D < 300$	
11	Direction of test piece			L	L or T	
12	T	Temperature	θ	°C	Ambient	
13		Proof stress	$R_{p0,2}$	MPa	≥ 830	≥ 830
14		Strength	R_m	MPa	$900 \leq R_m \leq 1\,160$	$900 \leq R_m \leq 1\,160$
15		Elongation	A	%	≥ 10	≥ 8
16		Reduction of area	Z	%	≥ 25	≥ 20
17	Hardness				—	
18	Shear strength		R_c	MPa	—	
19	Bending		k	—	—	
20	Impact strength				—	
21	C	Temperature	θ	°C	—	
22		Time		h	—	
23		Stress	σ_a	MPa	—	
24		Elongation	a	%	—	
25		Rupture stress	σ_R	MPa	—	
26		Elongation at rupture	A	%	—	
27	Notes (see line 98)				a	

30	Microstructure	—	See EN 4800-002.		
		1	See EN 3114-002.		
		7	*D* [mm]	Acceptable microstructure	Not acceptable microstructure
			≤ 25	From 2 T 1 to 2 T 12	From 2 T 13 to 2 T 15
				From 2 L 1 to 2 L 7	From 2 L 8 to 2 L 15
				From 2 T 100 to 2 T 103	From 2 T 104 to 2 T 117
				2 A 1	—
				—	From 2 T 200 to 2 T 201
			25 < *D* < 300	From 2 T 1 to 2 T 15	—
				From 2 L 1 to 2 L 12	From 2 L 13 to 2 L 15
				From 2 T 100 to 2 T 106	2 T 117
				From 2 T 108 to 2 T 110, if number of imperfections is less than 5 per cm^2 of the sampling section	From 2 T 108 to 2 T 110, if number of imperfections is equal or more than 5 per cm^2 of the sampling section
				—	From 2 T 111 to 2 T 117
				2 A 1	—
				—	From 2 T 200 to 2 T 201
44	External imperfections (Visual testing – VT)	—	See EN 4800-002.		
51	Macrostructure	—	See EN 4800-002.		
		1	EN 2954-002		
		7	*D* [mm]	Maximum acceptable macrostructure	Not acceptable macrostructure	Macrostructure submitted for approval
			50 < *D* < 300	2 MA 3	2 MA 80 to 2 MA 84 and 2 MA 100	2 MA 40 to 2 MA 42 and 2 MA 60 to 2 MA 62
61	Internal imperfections (Ultrasonic testing – UT)	—	See EN 4800-002.		
		1	EN 4050-1		
		7	*D* ≤ 100 mm	*D* > 100 mm	
			Class 5	Class 4	
98	Notes	—	[a] Determination not required for routine acceptance.		
99	Typical use	—	—		

100	—	Product qualification	—	— Qualification programme to be agreed between manufacturer and purchaser.