SLOVENSKI STANDARD
SIST EN 3311:2009

01-november-2009

Aeronavtika - Titanova zlitina TI-P64001 (Ti-6Al-4V) - Žarjeno - Palice za obdelavo - D < 110 mm

Aerospace series - Titanium alloy TI-P64001 (Ti-6Al-4V) - Annealed - Bar for machining - D < 110 mm

Luft- und Raumfahrt - Titanlegierung TI-P64001 (Ti-6Al-4V) - Geglüht - Stangen zum Zerspanen - D < 110 mm

Série aérospatiale - Alliage de titane TI-P64001 (Ti-6Al-4V) - Recuit - Barres pour usinage - D < 110 mm

Ta slovenski standard je istoveten z: EN 3311:2009

ICS:

49.025.30 Titan Titanium

SIST EN 3311:2009 en,de

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3311

September 2009

ICS 49.025.30

English Version

Aerospace series - Titanium alloy TI-P64001 (Ti-6Al-4V) - Annealed - Bar for machining - D < 110 mm

Série aérospatiale - Alliage de titane TI-P64001 (Ti-6Al-4V) - Recuit - Barres pour usinage - D < 110 mm

Luft- und Raumfahrt - Titanlegierung TI-P64001 (Ti-6Al-4V) - Geglüht - Stangen zum Zerspanen - D < 110 mm

This European Standard was approved by CEN on 27 June 2009.

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 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 Management Centre has the same status as the official versions.

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

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

This document (EN 3311:2009) 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 March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This 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 standard has been prepared in accordance with EN 4500-4.

1 Scope

This standard specifies the requirements relating to:

Titanium alloy TI-P64001 (Ti-6Al-4V)
Annealed
Bar for machining
$D < 110$ mm

for aerospace applications.

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 2954-002, *Aerospace series — Macrostructural examination of titanium and titanium alloy wrought product — Part 002: Macrostructure of bar, section, forging stock and forgings.* [1)]

EN 3114-002, *Aerospace series — Test method — Microstructure of (α+ ß) titanium alloy wrought products — Part 002: Microtructure 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.* [1)]

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

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

EN 4500-4, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 4: Specific rules for titanium and titanium alloys.* [1)]

EN 4800-002, *Aerospace series — Titanium and titanium alloys — Technical specification — Part 002: Bar and section.* [1)]

---

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

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	0,0125	0,30	0,08	0,10	0,40	
3	Method of melting		See EN 4800-002.									
4.1	Form		Bar for machining									
4.2	Method of production		–									
4.3	Limit dimension(s)	mm	$D < 110$									
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	$D \leq 75$	$75 < D < 110$
11	Direction of test piece				L	L or T
12	T	Temperature	θ	°C	Ambient	
13	T	Proof stress	$R_{p0,2}$	MPa	≥ 830	≥ 830
14	T	Strength	R_m	MPa	$900 \leq R_m \leq 1\,160$	$900 \leq R_m \leq 1\,160$
15	T	Elongation	A	%	≥ 10	≥ 8
16	T	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	C	Time		h	–	
23	C	Stress	σ_a	MPa	–	
24	C	Elongation	a	%	–	
25	C	Rupture stress	σ_R	MPa	–	
26	C	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* < 110	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 defects less than 5 per cm^2 of the sampling section	From 2 T 108 to 2 T 110, if number of defects less 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 defects	–	See EN 4800-002.		
		1	Visual examination		
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* < 110	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 defects	–	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	–	–		