BS EN 3464:2012

BSI Standards Publication

Aerospace series — Titanium alloy Ti-6Al-4V — Annealed — Plate — 6 mm < a ≤ 100 mm

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National foreword

This British Standard is the UK implementation of EN 3464:2012. It supersedes BS EN 3464:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/61/-/49, Titanium and its Alloys for Aerospace Purposes.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Date	Text affected

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English Version

Aerospace series - Titanium alloy Ti-6Al-4V - Annealed - Plate - 6 mm < a ≤ 100 mm

Série aérospatiale - Alliage de titane Ti-6Al-4V - Recuit - Plaques - 6 mm < a ≤ 100 mm

Luft- und Raumfahrt - Titanlegierung Ti-6Al-4V - Geglüht - Platten - 6 mm < a ≤ 100 mm

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 3464:2012) 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 supersedes EN 3464:2009.

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of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

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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 European Standard specifies the requirements relating to:

Titanium alloy Ti-6Al-4V
Annealed
Plate
6 mm < *a* ≤ 100 mm

for aerospace applications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2002-8, *Aerospace series — Metallic materials — Test methods — Part 8: Micrographic determination of grain size* [1)]

EN 2032-2, *Aerospace series — Metallic materials — Part 2: Coding of metallurgical condition in delivery condition*

EN 3114-003, *Aerospace series — Test method — Microstructure of ($\alpha + \beta$) titanium alloy wrought products — Part 003: Microstructure of plate*

EN 4050-4, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 4: Acceptance criteria*

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

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 4800-001, *Aerospace series — Titanium and titanium alloys — Technical specification — Part 001: Plate, sheet and strip*

1) Published as ASD-STAN Prestandard at the date of publication of this standard by Aerospace and Defence Industries Association of Europe-Standardization (ASD-STAN), (www.asd-stan.org).

1	Material designation		Titanium alloy Ti-6Al-4V										
2	Chemical composition %	Element	Al	V	O+2N	N	H	Fe	C	Y	Others		Ti
											Each	Total	
		min.	5,50	3,50	–	–	–	–	–	–	–	–	Base
		max.	6,75	4,50	0,25	0,03	0,012 5	0.30	0,08	0,005 0	0,10	0,40	
3	Method of melting		See EN 4800-001.										
4.1	Form		Plate										
4.2	Method of production		–										
4.3	Limit dimension(s)	mm	$6 < a \leq 100$										
5	Technical specification		See EN 4800-001.										

6.1	Delivery condition	Annealed
	Heat treatment	690 °C ≤ θ ≤ 840 °C / t ≥ 30 min / AC in inert atmosphere
6.2	Delivery condition code	U [a]
7	Use condition	Delivery condition
	Heat treatment	–

Characteristics

8.1	Test sample(s)			See EN 4800-001.				
8.2	Test piece(s)			See EN 4800-001.				
8.3	Heat treatment			Use condition				
9	Dimensions concerned		mm	$6 < a \leq 12$	$12 < a \leq 40$	$40 < a \leq 100$		
10	Thickness of cladding on each face		%	–				
11	Direction of test piece			L - LT			ST	
12	T	Temperature	θ °C	Ambient				
13	T	Proof stress	$R_{p0,2}$ MPa	≥ 830	≥ 830	≥ 830	≥ 830	
14	T	Strength	R_m MPa	$900 \leq R_m \leq 1\,160$	$900 \leq R_m \leq 1\,160$	$900 \leq R_m \leq 1\,160$	$900 \leq R_m \leq 1\,160$	
15	T	Elongation	A %	≥ 10	≥ 8	≥ 8	≥ 6	
16	T	Reduction of area	Z %	–	≥ 20	≥ 20	≥ 15	
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 4800-001.		
		1	EN 3114-003		
		3	LT-ST section		
		7	*a* mm	Acceptable microstructure	Unacceptable microstructure
			$6 < a \leq 30$	3 T 1 to 3 T 19	3 T 20 and 3 T 21
				3 T 22 to 3 T 27	3 T 28 to 3 T 30
				3 T 31 to 3 T 33	3 T 34 to 3 T 38
				3 T 100 and 3 T 101, if incidence less than 5 per cm^2 of the sampling section	3 T 100 and 3 T 101, if incidence of 5 or more per cm^2 of the sampling section
				–	3 T 102 to 3 T 106
				3 A 1 to 3 A 8	–
				–	3 T 200 to 3 T 202
			$30 < a \leq 100$	3 T 1 to 3 T 19	3 T 20 and 3 T 21
				3 T 22 to 3 T 38	–
				3 T 100 to 3 T 102	3 T 103 and 3 T 104
				3 T 105	–
				3 T 106, if incidence less than 5 per cm^2 of the sampling section	3 T 106, if incidence of 5 or more per cm^2 of the sampling section
				3 A 1 to 3 A 8	–
				–	3 T 200 to 3 T 202
34	Grain size	–	See EN 4800-001.		
		1	See EN 2002-8.		
		3	LT – ST section		
		7	$G \geq 6$		
44	External defects	–	See EN 4800-001.		
61	Internal defects	–	See EN 4800-001.		
		1	EN 4050-4		
		7	Class 5		
74	Surface contamination	–	See EN 4800-001.		
95	Marking inspection	–	See EN 4800-001.		
96	Dimensional inspection	–	See EN 4800-001.		
98	Notes	–	[a] According to EN 2032-2.		
99	Typical use	–	–		

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

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