



SLOVENSKI STANDARD
SIST EN 3351:2014

01-marec-2014

Aeronavtika - Titanova zlitina Ti-4Al-4Mo-2Sn - Topilno žarjena in starana - Kovani izdelki - De ≤ 150 mm

Aerospace series - Titanium alloy Ti-4Al-4Mo-2Sn - Solution treated and aged - Forgings - De ≤ 150 mm

Luft- und Raumfahrt - Titanlegierung Ti-4Al-4Mo-2Sn - Lösungsgeglüht und ausgelagert - Schmiedestücke - De ≤ 150 mm

Série aérospatiale - Alliage de titane Ti-4Al-4Mo-2Sn - Mis en solution et revenu - Pièces forgées ou matricées - De ≤ 150 mm

<https://standards.iteh.ai/catalog/standards/sist/2584d93a-d230-4f08-8d7f-ad03a3e4ec97/sist-en-3351-2014>

Ta slovenski standard je istoveten z: EN 3351:2012

ICS:

49.025.30 Titan Titanium

SIST EN 3351:2014 en

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EUROPEAN STANDARD

EN 3351

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2012

ICS 49.025.30

English Version

Aerospace series - Titanium alloy Ti-4Al-4Mo-2Sn - Solution treated and aged - Forgings - $De \leq 150$ mm

Série aérospatiale - Alliage de titane Ti-4Al-4Mo-2Sn - Mis en solution et revenu - Pièces forgées ou matricées - $De \leq 150$ mm

Luft- und Raumfahrt - Titanlegierung Ti-4Al-4Mo-2Sn - Lösungsgeglüht und ausgelagert - Schmiedestücke - $De \leq 150$ mm

This European Standard was approved by CEN on 23 June 2012.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 3351:2012) 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 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 April 2013, and conflicting national standards shall be withdrawn at the latest by April 2013.

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

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EN 3351:2012 (E)

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 4500-004.

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1 Scope

This European Standard specifies the requirements relating to: ¹⁾

Titanium alloy Ti-4Al-4Mo-2Sn
Solution treated and aged
Forgings
 $D_e \leq 150$ mm

for aerospace applications.

NOTE Other common designation:
Ti550,
AECMA: TI-P63,
ASD-STAN: TI-P63001.

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

EN 2954-002, *Aerospace series — Macrostructure of titanium and titanium alloy wrought products — Part 002: Macrostructure of bar, section, forging stock and forgings*

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

EN 4500-004, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 004: Specific rules for titanium and titanium alloys* ²⁾

EN 4800-005, *Aerospace series — Titanium and titanium alloys — Technical specification — Part 005: Forging stock*

EN 4800-006, *Aerospace series — Titanium and titanium alloys — Technical specification — Part 006: Pre-production and production forgings*

1) Quality Grade 2 according to EN 4800-005.

2) Published as ASD-STAN Standard at the date of publication of this standard (www.asd-stan.org).

EN 3351:2012 (E)

1	Material designation		Titanium alloy Ti-4Al-4Mo-2Sn											
2	Chemical composition %	Element	Al	Mo	Sn	Si	O	N	H	Fe	C	Others		Ti
		min.	3,0	3,0	1,5	0,3	–	–	–	–	–	–	–	Base
		max.	5,0	5,0	2,5	0,7	0,25	0,03	0,012 5	0,20	0,08	0,10	0,40	
3	Method of melting		Quality Grade 2 according to EN 4800-005											
4.1	Form		Forgings											
4.2	Method of production		Forged from forging stock EN 4800-005											
4.3	Limit dimension(s)	mm	$D_e \leq 150$											
5	Technical specification		EN 4800-006											

6.1	Delivery condition		Solution treated and aged										
	Heat treatment		$880\text{ °C} \leq \theta \leq 920\text{ °C}/t \geq 20\text{ min/AC}$ $490\text{ °C} \leq \theta \leq 510\text{ °C}/t = 24\text{ h/AC}$										
6.2	Delivery condition code		U ^a										
7	Use condition		Delivery condition										
	Heat treatment		–										

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Characteristics

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8.1	Test sample(s)		See EN 4800-006.											
8.2	Test piece(s)		See EN 4800-006.											
8.3	Heat treatment		Use condition											
9	Dimensions concerned	mm	$D_e \leq 100$				$100 \leq D_e \leq 150$							
10	Thickness of cladding on each face	%	–											
11	Direction of test piece		See EN 4800-006.											
12	Temperature	θ	°C	Ambient										
13	Proof stress	$R_{p0,2}$	MPa	≥ 920					≥ 870					
14	T Strength	R_m	MPa	$1\ 050 \leq R_m \leq 1\ 220$					$1\ 000 \leq R_m \leq 1\ 220$					
15	Elongation	A	%	≥ 9					≥ 9					
16	Reduction of area	Z	%	≥ 20					≥ 20					
17	Hardness		–											
18	Shear strength	R_c	MPa	–										
19	Bending	k	–	–										
20	Impact strength		–											
21	Temperature	θ	°C	–										
22	Time		h	–										
23	Stress	σ_a	MPa	–										
24	C Elongation	a	%	–										
25	Rupture stress	σ_R	MPa	–										
26	Elongation at rupture	A	%	–										
27	Notes (see line 98)		a											

30	Microstructure	–	See EN 4800-006.			
		7	Microstructure shall be resulting from processing in the alpha beta phase field. It shall consist of equiaxed and/or elongated primary alpha in a transformed beta matrix with no continuous network of alpha at prior grain boundaries. A microstructure showing a continuous network of alpha at prior beta grains boundaries is not acceptable			
44	External defects	–	See EN 4800-006.			
51	Macrostructure	–	See EN 4800-006.			
		7	detection of any of the following will be cause for rejection: porosity, beta segregation, evidence of overheating, unsealed ingot cavity, cracks or laps, hard alpha defects or dense metal inclusions			
		1	EN 2954-002			
		7	a or D_e mm	Maximum acceptable macrostructure	Not acceptable macrostructure	Macrostructure submitted for approval
		$50 < a$ or $D < 110$	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 4800-006.			
		2	Pre-production part unless otherwise specified			
		3	See inspection schedule.			
82	Batch uniformity (Material verification)	–	See EN 4800-006.			
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95	Marking inspection	–	See EN 4800-006.			
96	Dimensional inspection	–	See EN 4800-006.			
98	Notes	–	^a According to EN 2032-2.			
99	Typical use	–	–			