



# SLOVENSKI STANDARD

## SIST EN 3451:2017

01-oktober-2017

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**Aeronavtika - Titan TI-P99002 - Toplotno neobdelan - Materiali za kovanje razreda 2 za kaljene kovane izdelke - a ali D < ali= 300 mm**

Aerospace series - Titanium TI-P99002 - Not heat treated - Grade 2 forging stock, for annealed forgings - a or D <or= 300 mm

Luft- und Raumfahrt - Titan TI-P99002 - Nicht wärmebehandelt - Grade 2 Schmiedevormaterial Für geglühte Schmiedestücke - a oder D ≤ 300 mm

Série aérospatiale - Titane TI-P99002 - Non traité - Demi-produits de grade 2 destinés à la forge pour pièces forgées à l'état recuit - a ou D ≤ 300 mm

<https://standards.iteh.ai/catalog/standards/sist/9636638d-68b3-4b17-813f-05b98700cc95/sist-en-3451-2017>

**Ta slovenski standard je istoveten z: EN 3451:2017**

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**ICS:**

49.025.30 Titan Titanium

**SIST EN 3451:2017 en,fr,de**

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EUROPEAN STANDARD

EN 3451

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2017

ICS 49.025.30

English Version

## Aerospace series - Titanium TI-P99002 - Not heat treated - Grade 2 forging stock, for annealed forgings - a or D ≤ 300 mm

Série aérospatiale - Titane TI-P99002 - Non traité -  
Demi-produits de grade 2 destinés à la forge pour  
pièces forgées à l'état recuit - a ou D ≤ 300 mm

Luft- und Raumfahrt - Titan TI-P99002 - Nicht  
wärmebehandelt - Grade 2 Schmiedevormaterial für  
geglühte Schmiedestücke - a oder D ≤ 300 mm

This European Standard was approved by CEN on 14 May 2017.

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.

**iTeh STANDARD PREVIEW**

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 3451:2017) 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 European 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 February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 organizations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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**EN 3451:2017 (E)**

## **Introduction**

This European 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 European Standard has been prepared in accordance with EN 4500-004.

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## 1 Scope

This European Standard specifies the requirements relating to:

Titanium TI-P99002  
Not heat treated  
Grade 2 forging stock, for annealed forgings  
 $a$  or  $D \leq 300$  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 2858-2, *Aerospace series — Titanium and titanium alloys — Forging stock and forgings — Technical specification — Part 2: Forging stock*

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*

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## EN 3451:2017 (E)

-		Material designation	Titanium TI-P99002							
2	Chemical composition %	Element	O <sub>2</sub>	N <sub>2</sub>	H <sub>2</sub>	Fe	C	Others		Ti
		min.	-	-	-	-	-	-	-	Base
		max.	0,25	0,05	100 *	0,25	0,08	0,10 <sup>a</sup>	0,60 <sup>a</sup>	
3	Method of melting	Grade 2								
4.1	Form	Forging stock								
4.2	Method of production	-								
4.3	Limit dimension(s)	mm	a or D ≤ 300							
5	Technical specification	EN 2858-2								

6.1	Delivery condition	Not heat treated							
	Heat treatment	-							
6.2	Delivery condition code	U							
7	Use condition	Delivery condition							
	Heat treatment	-							

**iTeh STANDARD PREVIEW**  
Characteristics  
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8.1	Test sample(s)	See EN 2858-2.							
8.2	Test piece(s)	Heat treated before machining							
8.3	Heat treatment	See line 29.							
9	Dimensions concerned	mm							-
10	Thickness of cladding on each face	%							-
11	Direction of test piece	See EN 2858-2.							
12	Temperature	$\theta$	°C	Ambient					
13	Proof stress	R <sub>p0,2</sub>	MPa	≥ 290					
14	T Strength	R <sub>m</sub>	MPa	≥ 390					
15	Elongation	A	%	≥ 20					
16	Reduction of area	Z	%	≥ 30					
17	Hardness	-							
18	Shear strength	R <sub>c</sub>	MPa	-					
19	Bending	k	-	-					
20	Impact strength	-							
21	Temperature	$\theta$	°C	-					
22	Time	h		-					
23	Stress	$\sigma_a$	MPa	-					
24	C Elongation	a	%	-					
25	Rupture stress	$\sigma_R$	MPa	-					
26	Elongation at rupture	A	%	-					
27	Notes (see line 98)	*, a							



29	Reference heat treatment	-	Annealed $600\text{ °C} \leq \theta \leq 800\text{ °C} / t \geq 30\text{ min} / \text{AC}$ or cool in inert atmosphere
44	External defects	-	See EN 2858-2.
61	Internal defects	-	See EN 2858-2.
82	Batch uniformity (Material verification)	-	See EN 2858-2.
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95	Marking inspection	-	-
96	Dimensional inspection	-	-
98	Notes	-	* a p.p.m. Determination not required for routine acceptance.
	Typical use	-	-