



# SLOVENSKI STANDARD SIST EN 2503:2020

01-februar-2020

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**Aeronavtika - Jeklo X5CrNoMoCuNb14-5 (1.4594) - 930 MPa ≤ Rm ≤ 1080 MPa -  
Izkovki - De ≤ 150 mm**

Aerospace series - Steel X5CrNoMoCuNb14-5 (1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa -  
Forgings - De ≤ 150 mm

Luft- und Raumfahrt - Stahl X5CrNoMoCuNb14-5 (1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa  
- Gesenk- und Freiformschmiedestücke - De ≤ 150 mm

Série aérospatiale - Acier X5CrNoMoCuNb14-5 (1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa -  
Pièces forgées ou matricées - De ≤ 150 mm

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**Ta slovenski standard je istoveten z: EN 2503:2019**

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**ICS:**

49.025.10	Jekla	Steels
77.140.85	Železni in jekleni kovani izdelki	Iron and steel forgings

**SIST EN 2503:2020**

**en,fr,de**

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EUROPEAN STANDARD

EN 2503

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2019

ICS 49.025.10

English Version

## Aerospace series - Steel X5CrNoMoCuNb14-5 (1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa - Forgings - De ≤ 150 mm

Série aérospatiale - Acier X5CrNoMoCuNb14-5  
(1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa - Pièces forgées  
ou matricées - De ≤ 150 mm

Luft- und Raumfahrt - Stahl X5CrNoMoCuNb14-5  
(1.4594) - 930 MPa ≤ Rm ≤ 1 080 MPa - Gesenk- und  
Freiformschmiedestücke - De ≤ 150 mm

This European Standard was approved by CEN on 4 February 2019.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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: Rue de la Science 23, B-1040 Brussels

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## European foreword

This document (EN 2503:2019) 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 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2020, and conflicting national standards shall be withdrawn at the latest by June 2020.

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

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EN 2503:2019 (E)

## 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 4500-005.

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## 1 Scope

This document specifies the requirements relating to:

Steel X5CrNoMoCuNb14-5 (1.4594)  
 $930 \text{ MPa} \leq R_m \leq 1\,080 \text{ MPa}$   
Forgings  
 $D_e \leq 150 \text{ mm}$

for aerospace applications.

ASD-STAN designation: FE-PM66.

## 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 2157-1, *Aerospace series — Steel — Forging stock and forgings — Technical specification — Part 1: General requirements*

## 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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Requirements

See Table 1.

## EN 2503:2019 (E)

Table 1 — Requirements for steel X5CrNoMoCuNb14-5 (1.4594)

1	Material designation	Steel X5CrNoMoCuNb14-5 (1.4594)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Nb	Cu
		min.		-	-	-	-	13,2	1,2	5,0	0,10	1,2
		max.	0,07	0,60	1,00	0,035	0,025	14,7	2,0	5,8	0,40	2,0
3	Method of melting	Air melted										
4.1	Form	Forgings										
4.2	Method of production	-										
4.3	Limit dimension(s)	mm	$D_e \leq 150$									
5	Technical specification	EN 2157-1										

6.1	Delivery condition	Solution annealed, primary hardened and precipitation hardened										
	Heat treatment	$1\ 000\ ^\circ\text{C} \leq \theta \leq 1050\ ^\circ\text{C}/t \geq 30\ \text{min}/\text{Air quenched}^a$ $+ 740\ ^\circ\text{C} \leq \theta \leq 760\ ^\circ\text{C}/t = 2\ \text{h}/\text{Air cool}^a$ $+ 530\ ^\circ\text{C} \leq \theta \leq 550\ ^\circ\text{C}/t = 2\ \text{h}/\text{Air cool}^a$										
6.2	Delivery condition code	-										
7	Use condition	Solution annealed, primary hardened and precipitation hardened										
	Heat treatment	Delivery condition										

## Characteristics

8.1	Test sample(s)	Bar : $D = 16\ \text{mm}$											
8.2	Test piece(s)												
8.3	Heat treatment	Use condition					Reference (see line 29) <sup>b</sup>						
9	Dimensions concerned	mm	$\leq 150$										
10	Thickness of cladding on each face	%											
11	Direction of test piece	L											
12	Temperature	$\theta$	$^\circ\text{C}$									Ambient	
13	Proof stress	$R_{p0,2}$	$\text{MPa}^*$					$\geq 780$					
14	T Strength	$R_m$	$\text{MPa}^*$					$930 \leq R_m \leq 1\ 080$					
15	Elongation	$A$	$\%$									$\geq 15$	
16	Reduction of area	$Z$	$\%$									-	
17	Hardness	$277 \leq \text{HB} \leq 341$											
18	Shear strength	$R_c$	$\text{MPa}^*$									-	
19	Bending	$k$	-									-	
20	Impact strength (J)	$\geq 40$											
21	Temperature	$\theta$	$^\circ\text{C}$									-	
22	Time	h		-									
23	Stress	$\sigma_a$	$\text{MPa}^*$									-	
24	C Elongation	$a$	$\%$									-	
25	Rupture stress	$\sigma_R$	$\text{MPa}^*$									-	
26	Elongation at rupture	$A$	$\%$									-	
27	Notes (see line 98)	*, a, b											



29	Reference heat treatment	-	Solution annealed and precipitation hardened (950 ± 10) °C/t = 30 min/Air cool <sup>a</sup> (450 ± 10) °C/t = 2 h/Air cool <sup>a</sup>
95	Marking inspection	-	-
96	Dimensional inspection	-	-
98	Notes	-	* 1 MPa = 1 N/mm <sup>2</sup> a Cool to $\theta \leq 30$ °C b Optional test
99	Typical use	-	Precipitation hardening stainless steel
100	-	Product qualification	-
			Qualification programme to be agreed between manufacturer and purchaser.

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