
Aeronavtika - Jeklo X2NiCoMo18-8-5 (1.6359) - Indukcijsko taljeno v vakuumu in obločno pretaljeno v vakuumu - Topilno žarjeno in starano - Palice - a ali D ≤ 150 mm - 1750 MPa ≤ Rm ≤ 2000 MPa

Aerospace series - Steel X2NiCoMo18-8-5 (1.6359) - Vacuum induction melted and vacuum arc remelted - Solution treated and precipitation treated - Bar - a or D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

Luft- und Raumfahrt - Stahl X2NiCoMo18-8-5 (1.6359) - Vakuuminduktionserschmolzen und vakuumlichtbogenumgeschmolzen - Lösungsgeglüht und ausgelagert - Stangen - a or D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

[SIST EN 3528:2014](https://standards.iteh.ai/catalog/standards/sist/18e0e9e0-a6c5-44c5-a063-10c167867416/sist-en-3528-2014)

Série aérospatiale - Acier X2NiCoMo18-8-5 (1.6359) - Elaboré sous vide par induction et refondu par arc sous vide - Mis en solution et vieilli - Barres - a or D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

Ta slovenski standard je istoveten z: EN 3528:2013

ICS:

49.025.10 Jekla

Steels

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en

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EUROPEAN STANDARD

EN 3528

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2013

ICS 49.025.10

English Version

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vakuumlichtbogenumgeschmolzen - Lösungsgeglüht und
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This European Standard was approved by CEN on 11 February 2012.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
Foreword.....		3
Introduction.....		4
1	Scope	5
2	Normative references	5

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Foreword

This document (EN 3528:2013) 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of an identical text or by endorsement, at the latest by July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.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 3528:2013 (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 4500-005.

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1 Scope

This standard specifies the requirements relating to:

Steel X2NiCoMo18-8-5 (1.6359)
Vacuum induction melted and vacuum arc remelted
Solution treated and precipitation treated
Bar
 a or $D \leq 150$ mm
 $1\ 750\ \text{MPa} \leq R_m \leq 2\ 000\ \text{MPa}$

for aerospace applications.

NOTE Other common designation:
UNS: K92890,
Marage 250,
AECMA: FE-PA95,
ASD-STAN: FE-PM2701,
AIR: E-Z2NKD18,
BS: S 162.

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 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings)* ¹⁾

EN 2951, *Aerospace series — Metallic materials — Test method — Micrographic determination of content of non-metallic inclusions* ¹⁾

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 4500-005, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 005: Specific rules for steels*

EN 4700-002, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 002: Bar and section*

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

EN 3528:2013 (E)

1	Material designation		Steel X2NiCoMo18-8-5 (1.6359)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Mo	Ni	Al	Ti	Co	Fe
		min.	–	–	–	–	–	4,60	17,0	0,05	0,30	7,0	Base
		max.	0,03	0,10	0,10	0,010	0,010	5,20	19,0	0,15	0,60	8,5	
3	Method of melting		Vacuum induction melted and vacuum arc remelted										
4.1	Form		Bar										
4.2	Method of production		–										
4.3	Limit dimension(s)	mm	$a \text{ or } D \leq 150$										
5	Technical specification		EN 4700-002										

6.1	Delivery condition		Solution treated										
	Heat treatment		$790 \text{ }^\circ\text{C} \leq \theta \leq 840 \text{ }^\circ\text{C} / \text{AC}$										
6.2	Delivery condition code		W										
7	Use condition		Solution treated + precipitation treated										
	Heat treatment		Delivery condition $+ 465 \text{ }^\circ\text{C} \leq \theta \leq 495 \text{ }^\circ\text{C} / t \geq 3 \text{ h}$										

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Characteristics
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8.1	Test sample(s)		See EN 4700-002.												
8.2	Test piece(s)		See EN 4700-002.												
8.3	Heat treatment		Delivery condition Use condition												
9	Dimensions concerned	mm	$a \text{ or } D \leq 150$				$a \text{ or } D \leq 150^a$				$75 \leq a \text{ or } D \leq 150^a$				
10	Thickness of cladding on each face	%	–				–				–				
11	Direction of test piece		–				L				T				
12	Temperature	θ	°C	–				Ambient				Ambient			
13	Proof stress	$R_{p0,2}$	MPa	–				$\geq 1\ 650$				$\geq 1\ 650$			
14	T	Strength	R_m	MPa	–				$1\ 750 \leq R_m \leq 2\ 000$				$1\ 750 \leq R_m \leq 2\ 000$		
15		Elongation	A	%	–				≥ 6				≥ 4		
16		Reduction of area	Z	%	–				≥ 40				≥ 25		
17	Hardness		HBW ≤ 352				510 \leq HV ≤ 600				510 \leq HV ≤ 600				
18	Shear strength	R_c	MPa	–				–				–			
19	Bending	k	–	–				–				–			
20	Impact strength	KV	J	–				≥ 15				≥ 12			
21	Temperature	θ	°C	–											
22	Time		h	–											
23	Stress	σ_a	MPa	–											
24	Elongation	a	%	–											
25	Rupture stress	σ_R	MPa	–											
26	Elongation at rupture	A	%	–											
27	Notes (see line 98)		a												

34	Grain size	–	EN 4700-002	
		7	Dimension mm	Grain size number
			a or $D \leq 75$	$G \geq 6$; occasional $G \geq 4$ permitted
			$75 < a$ or $D \leq 150$	$G \geq 4$; occasional $G \geq 2$ permitted
44	External defects	–	EN 4700-002	
		1	Visual	
50	Cleanliness inclusion content (micro-cleanness)	–	EN 4700-002	
		1	See EN 2951.	
		7	EN 2951 - Category 5	
61	Internal defects	–	EN 4700-002	
		1	See EN 4050-4.	
		6	a or $D \leq 100$ mm may be tested either on the product or at an earlier stage of manufacture	
		7	EN 4050-4 - Class 5	
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95	Marking inspection	–	EN 4700-002	
96	Dimensional inspection	–	EN 4700-002	
98	Notes	–	^a $75 \text{ mm} \leq a$ or $D \leq 150$ mm may be tested in L or T direction.	
99	Typical use	–	–	