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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kätesaadavaks 09.01.2013.	Date of Availability of the European standard is 09.01.2013.
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ICS 49.025.10

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EUROPEAN STANDARD

EN 3528

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2013

ICS 49.025.10

English Version

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

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 ou D ≤ 150 mm -
1 750 MPa ≤ Rm ≤ 2 000 MPa

Luft- und Raumfahrt - Stahl X2NiCoMo18-8-5 (1.6359) -
Vakuuminduktionserschmolzen und
vakuumlichtbogen geschmolzen - Lösungsgeglüht und
ausgelärgert - Stangen - a oder D ≤ 150 mm - 1 750 MPa ≤
Rm ≤ 2 000 MPa

This European Standard was approved by CEN on 11 February 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.

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

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

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.

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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 4500-005.

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
 $a \text{ or } D \leq 150 \text{ mm}$
 $1\ 750 \text{ MPa} \leq R_m \leq 2\ 000 \text{ MPa}$

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).

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 or D ≤ 150											
5	Technical specification			EN 4700-002											

6.1	Delivery condition			Solution treated									
	Heat treatment			790 °C ≤ θ ≤ 840 °C / AC									
6.2	Delivery condition code			W									
7	Use condition			Solution treated + precipitation treated									
	Heat treatment			Delivery condition + 465 °C ≤ θ ≤ 495 °C / t ≥ 3 h									

Characteristics

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 or D ≤ 150			a or D ≤ 150 a			75 ≤ a or D ≤ 150 a			
10	Thickness of cladding on each face		%	—			—			—			
11	Direction of test piece			—			L			T			
12	T	Temperature	θ	°C	—			Ambient			Ambient		
13		Proof stress	R _{p0,2}	MPa	—			≥ 1 650			≥ 1 650		
14	C	Strength	R _m	MPa	—			1 750 ≤ R _m ≤ 2 000			1 750 ≤ R _m ≤ 2 000		
15		Elongation	A	%	—			≥ 6			≥ 4		
16		Reduction of area	Z	%	—			≥ 40			≥ 25		
17	Hardness			HBW ≤ 352			510 ≤ HV ≤ 600			510 ≤ HV ≤ 600			
18	Shear strength	R _c	MPa	—			—			—			
19	Bending		k	—	—			—			—		
20	Impact strength		KV	J	—			≥ 15			≥ 12		
21	C	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									