



# SLOVENSKI STANDARD SIST EN 3531:2009

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Ta slovenski standard je istoveten z: EN 3531:2007

**ICS:**  
49.025.10      Jekla      Steels

**SIST EN 3531:2009**      en,de

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EUROPEAN STANDARD

**EN 3531**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2007

ICS 49.025.10

English Version

**Aerospace series - Steel FE-PM2701 (X2NiCoMo18-8-5) -  
Vacuum induction melted and vacuum arc remelted - Solution  
treated and precipitation treated - Sheet and strip -  $a \leq 6$  mm - 1  
750 MPa  $\leq R_m \leq 2\ 000$  MPa**

Série aérospatiale - Acier FE-PM2701 (X2NiCoMo18-8-5) -  
Élaboré sous vide et refondu par arc sous vide - Mis en  
solution et vieilli - Tôles et bandes -  $a \leq 6$  mm - 1 750 MPa  
 $\leq R_m \leq 2\ 000$  MPa

Luft- und Raumfahrt - Stahl FE-PM2701 (X2NiCoMo18-8-5)  
- Vakuuminduktionserschmolzen und mit  
selbstverzehrender Elektrode im Vakuum umgeschmolzen  
- Lösungsgeglüht und ausgelagert - Bleche und Bänder -  $a$   
 $\leq 6$  mm - 1 750 MPa  $\leq R_m \leq 2\ 000$  MPa

This European Standard was approved by CEN on 5 October 2006.

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 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 Management Centre has the same status as the official versions.

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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

**EN 3531:2007 (E)****Foreword**

This document (EN 3531:2007) 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 September 2007, and conflicting national standards shall be withdrawn at the latest by September 2007.

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

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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 4500-5.

## 1 Scope

This standard specifies the requirements relating to:

Steel FE-PM2701 (X2NiCoMo18-8-5)  
Vacuum induction melted and vacuum arc remelted  
Solution treated and precipitation treated  
Sheet and strip  
 $a \leq 6 \text{ mm}$   
 $1\,750 \text{ MPa} \leq R_m \leq 2\,000 \text{ MPa}$

for aerospace applications.

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## 2 Normative references

The following referenced documents are indispensable for the application 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 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings)*.<sup>1)</sup>

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

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

EN 4500-5, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 5: Specific rules for steels*.<sup>1)</sup>

EN 4700-1, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 1: Plate, sheet and strip*.<sup>1)</sup>

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1) Published as ASD Prestandard at the date of publication of this standard.

## EN 3531:2007 (E)

1	Material designation		Steel FE-PM2701 (X2NiCoMo18-8-5)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Mo	Ni	Al	Co	Ti	Fe
		min.	–	–	–	–	–	4,6	17,0	0,05	7,0	0,30	Base
		max.	0,03	0,10	0,10	0,010	0,010	5,2	19,0	0,15	8,5	0,60	
3	Method of melting		Vacuum induction melted and vacuum arc remelted										
4.1	Form		Sheet										
4.2	Method of production		Rolled										
4.3	Limit dimension(s)	mm	$a \leq 6$										
5	Technical specification		EN 4700-1										

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

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Characteristics  
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8.1	Test sample(s)		See EN 4700-1.												
8.2	Test piece(s)		See EN 4700-1												
8.3	Heat treatment		Solution treated												
9	Dimensions concerned	mm	$a \leq 6$				$a \leq 3$				$3 < a \leq 6$				
10	Thickness of cladding on each face	%	–												
11	Direction of test piece		–				L				L				
12	Temperature	$\theta$	°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	%		–				$A_{50mm} \geq 3$				$\geq 4$		
16	Reduction of area	Z	%		–				–				–		
17	Hardness		$\leq 372\ \text{HB}$				$510 \leq \text{HV} \leq 600$				$510 \leq \text{HV} \leq 600$				
18	Shear strength	$R_c$	MPa		–				–				–		
19	Bending	k	–		$3; \alpha = 180^\circ$				–				–		
20	Impact strength		–												
21	Temperature	$\theta$	°C		–										
22	Time		h		–										
23	Stress	$\sigma_a$	MPa		–										
24	Elongation	a	%		–										
25	Rupture stress	$\sigma_R$	MPa		–										
26	Elongation at rupture	A	%		–										
27	Notes (see line 98)		–												

34	Grain size	–	See EN 4700-1.
		7	$G \geq 4$
44	External defects	–	See EN 4700-1.
		1	Visual
50	Cleanliness/inclusion content (micro-cleanness)	–	See EN 4700-1.
		1	EN 2951
		7	Category 5
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95	Marking inspection	–	See EN 4700-1.
96	Dimensional inspection	–	See EN 4700-1.
98	Notes	–	–
99	Typical use	–	–

## EN 3531:2007 (E)

100	-	Product qualification	-	See EN 2043.
				Qualification programme to be agreed between manufacturer and purchaser.
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