SLOVENSKI STANDARD
SIST EN 2815:2009

01-november-2009

Aeronavtika - Jeklo FE-PM1802 (X5CrNiCu15-5) - Pretaljeno s talilno elektrodo - Ģarjeno v topilu in utrjeno - Palice za obdelavo - a ali D Ò200 mm - Rm Ó965 MPa

Aerospace series - Steel FE-PM1802 (X5CrNiCu15-5) - Consumable electrode remelted - Solution treated and precipitation treated - Bar for machining - a or D Ò200 mm - Rm Ó 965 MPa

Luft- und Raumfahrt - Stahl FE-PM1802 (X5CrNiCu15-5) - Mit selbstverzehrender Elektrode umgeschmolzen - Lºsungsgegl¿ht und ausgelagert - Stangen zur spanenden Bearbeitung - a oder D Ò200 mm - Rm Ó965 MPa

S®rie a®rospatiale - Acier FE-PM1802 (X5CrNiCu15-5) - Refondu ¨ l'®lectrode consommable - Mis en solution et vieilli - Barres pour usinage - a ou D Ò200 mm - Rm Ó 965 MPa

Ta slovenski standard je istoveten z: **EN 2815:2009**

ICS:

49.025.10	Jekla	Steels

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EUROPEAN STANDARD

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English Version

Aerospace series - Steel FE-PM1802 (X5CrNiCu15-5) - Consumable electrode remelted - Solution treated and precipitation treated - Bar for machining - a or D ≤ 200 mm - Rm ≥ 965 MPa

Série aérospatiale - Acier FE-PM1802 (X5CrNiCu15-5) - Refondu à l'électrode consommable - Mis en solution et vieilli - Barres pour usinage - a ou D ≤ 200 mm - Rm ≥ 965 MPa

Luft- und Raumfahrt - Stahl FE-PM1802 (X5CrNiCu15-5) - Mit selbstverzehrender Elektrode umgeschmolzen - Lösungsgeglüht und ausgelagert - Stangen zur spanenden Bearbeitung - a oder D ≤ 200 mm - Rm ≥ 965 MPa

This European Standard was approved by CEN on 1 August 2009.

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

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Foreword

This document (EN 2815:2009) 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of an identical text or by endorsement, at the latest by March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

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.

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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-PM1802 (X5CrNiCu15-5)
Consumable electrode remelted
Solution treated and precipitation treated
Bar for machining
a or *D* ≤ 200 mm
R_m ≥ 965 MPa

for aerospace applications.

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).* [1)]

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

EN 4436, *Aerospace series — Steel — Test methods — Determination of δ ferrite content.* [1)]

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

EN 4700-002, *Aerospace series — Steel and heat resisting alloy — Wrought products — Technical specification — Part 002: Bar and section.* [1)]

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

1	Material designation		Steel FE-PM1802 (X5CrNiCu15-5)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb + Ta	Fe
		min.	–	–	–	–	–	14,0	–	3,5	2,5	5 × C	Base
		max.	0,07	1,00	1,00	0,030	0,015	15,5	0,50	5,5	4,5	0,45	
3	Method of melting		Consumable electrode remelted										
4.1	Form		Bar										
4.2	Method of production		–										
4.3	Limit dimension(s)	mm	*a* or *D* ≤ 200										
5	Technical specification		EN 4700-002										

6.1	Delivery condition	Solution treated	Solution treated and precipitation treated
	Heat treatment	1 025 °C ≤ θ ≤ 1 055 °C / t ≥ 30 min / AC or OQ + cool to θ ≤ 30 °C	1 025 °C ≤θ≤ 1 055 °C / t ≥ 30 min / AC or OQ + cool to θ ≤ 30 °C + 580 °C ≤ θ ≤ 610 °C / t ≥ 4 h / AC
6.2	Delivery condition code	W	U
7	Use condition	Solution treated and precipitation treated	Delivery condition
	Heat treatment	Delivery condition + 580 °C ≤ θ ≤ 610 °C / t ≥ 4 h / AC	–

Characteristics

8.1	Test sample(s)				See EN 4700-002.			
8.2	Test piece(s)				See EN 4700-002.			
8.3	Heat treatment				Solution treated		Use condition	
9	Dimensions concerned			mm	–	*a* or *D* ≤ 75	75 < *a* or *D* ≤ 200	
10	Thickness of cladding on each face			%	–	–	–	
11	Direction of test piece				–	L	L	T
12	T	Temperature	θ	°C	–	Ambient	Ambient	Ambient
13	T	Proof stress	$R_{p0,2}$	MPa	–	≥ 790	≥ 790	≥ 790
14	T	Strength	R_m	MPa	–	≥ 965	≥ 965	≥ 965
15	T	Elongation	A	%	–	≥ 12	≥ 12	≥ 9
16	T	Reduction of area	Z	%	–	≥ 45	≥ 45	≥ 35
17	Hardness				≤ 363 HB	302 ≤ HB ≤ 363	302 ≤ HB ≤ 363	302 ≤ HB ≤ 363
18	Shear strength		R_c	MPa	–	–	–	–
19	Bending		k	–	–	–	–	–
20	Impact strength		KV	J	–	≥ 100; Notch direction T	≥ 100; Notch direction T	≥ 70; Notch direction L
21	C	Temperature	θ	°C	–			
22	C	Time		h	–			
23	C	Stress	σ_a	MPa	–			
24	C	Elongation	a	%	–			
25	C	Rupture stress	σ_R	MPa	–			
26	C	Elongation at rupture	A	%	–			
27	Notes (see line 98)				–			

30	Microstructure	–	EN 4436		
		2	One per cast		
		3	Corresponding to ingot top		
		7	The δ ferrite content shall not exceed 2 %		
34	Grain size	–	See EN 4700-002.		
		7	G ≥ 5		
44	External defects	–	See EN 4700-002.		
		1	Visual		
50	Cleanliness/inclusion content (micro-cleanness)	–	See EN 4700-002.		
		7	Category 4		
51	Macrostructure	–	See EN 4700-002.		
		7	Class	Condition	Severity
			1	Freckles	A
			2	White spots	A
			3	Radial segregation	A
			4	Ring pattern	B
61	Internal defects	–	See EN 4700-002.		
		6	*a* or *D* ≤ 100 mm may be tested either on the product or at an earlier stage of manufacturing.		
		7	Class 3		
95	Marking inspection	–	See EN 4700-002.		
96	Dimensional inspection	–	See EN 4700-002.		
98	Notes	–	–		
99	Typical use	–	–		