SLOVENSKI STANDARD
SIST EN 2213:2012

01-september-2012

Aeronavtika - Jeklo FE-PL1505 (15CrMoV6) - Taljeno - Utrjeno in mehko žarjeno - Palice - De ≤ 16 mm - 980 MPa ≤ Rm ≤ 1180 MPa

Aerospace series - Steel FE-PL1505 (15CrMoV6) - Air melted - Hardened and tempered - Bars - De ≤ 16 mm - 980 MPa ≤ Rm ≤ 1 180 MPa

Luft- und Raumfahrt - Stahl FE-PL1505 (15CrMoV6) - Lufterschmolzen - Gehärtet und angelassen - Stangen - De ≤ 16 mm - 980 MPa ≤ Rm ≤ 1 180 MPa

Série aérospatiale - Acier FE-PL1505 (15CrMoV6) - Élaboré à l'air - Trempé et revenu - Barres - De ≤ 16 mm - 980 MPa ≤ Rm ≤ 1 180 MPa

Ta slovenski standard je istoveten z: EN 2213:2012

ICS:

49.025.10 Jekla Steels

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EUROPEAN STANDARD

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English Version

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

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Foreword

This document (EN 2213:2012) 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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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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 European Standard specifies the requirements relating to:

Steel FE-PL1505 (15CrMoV6)
Air melted
Hardened and tempered
Bars
$D_e \leq 16$ mm
980 MPa ≤ R_m ≤ 1 180 MPa

for aerospace applications.

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 4500-5, *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 alloys — Wrought products — Technical specification — Part 002: Bar and section*

EN ISO 642, *Steel — Hardenability test by end quenching (Jominy test) (ISO 642)*

[1)] Published as ASD-STAN pre-standard at the date of publication of this standard by Aerospace and Defence Industries Association of Europe-Standardization (ASD-STAN), (www.asd-stan.org).

1	Material designation		Steel FE-PL1505 (15CrMoV6)								
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	V	Fe
		min.	0,12	–	0,80	–	–	1,25	0,80	0,20	Base
		max.	0,18	0,20	1,10	0,020	0,015	1,50	1,00	0,30	
3	Method of melting		Air melted								
4.1	Form		Bars								
4.2	Method of production		–								
4.3	Limit dimension(s)	mm	$D_e \leq 16$								
5	Technical specification		EN 4700-002								

6.1	Delivery condition	Annealed	Hardened and tempered
	Heat treatment	–	955 °C ≤ θ ≤ 995 °C / AC + 615 °C ≤ θ ≤ 655 °C [a]
6.2	Delivery condition code	A	U
7	Use condition	Hardened and tempered	Delivery condition
	Heat treatment	Delivery condition 955 °C ≤ θ ≤ 995 °C / AC + 615 °C ≤ θ ≤ 655 °C [a]	–

Characteristics

8.1	Test sample(s)				See EN 4700-002.	
8.2	Test piece(s)				See EN 4700-002.	
8.3	Heat treatment				Annealed	Hardened and tempered
9	Dimensions concerned			mm	$D_e \leq 16$	
10	Thickness of cladding on each face			%	–	
11	Direction of test piece				L	
12	T	Temperature	θ	°C	Ambient	
13	T	Proof stress	$R_{p0,2}$	MPa	–	≥ 780
14	T	Strength	R_m	MPa	–	980 ≤ R_m ≤ 1 180
15	T	Elongation	A	%	–	≥ 12 [b]
16	T	Reduction of area	Z	%	–	–
17	Hardness				$HB \leq 197$	291 ≤ HB ≤ 350
18	Shear strength		R_c	MPa	–	
19	Bending		k	–	–	
20	Impact strength		KV	J	–	≥ 30
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)				a, b	

31	Hardenabilty (Jominy test)	–	See EN 4700-002.						
		1	EN ISO 642						
		7	The "capability clause" applies						
			Distance in mm	1,5	5	9	15	25	40
			HRC min.	38	37	35	32	31	29
34	Grain size	–	See EN 4700-002.						
		7	$G \geq 5$						
44	External defects	–	See EN 4700-002.						
		1	Visual						
50	Cleanliness/inclusion content (Micro cleanness)	–	See EN 4700-002.						
		1	EN 2951						
		7	Category 1						
51	Macrostructure (Grain flow)	–	See EN 4700-002.						
61	Internal defects	–	See EN 4700-002.						
		7	Class 3, see EN 4050-4.						
95	Marking inspection	–	See EN 4700-002.						
96	Dimensional inspection	–	See EN 4700-002.						
98	Notes	–	[a] The range of temperature of tempering shall be adjusted on the wire rod if the bar is made from cold working [b] In case of cold working transformation, elongation could be 10 % minimum.						
99	Typical use	–	–						