



# SLOVENSKI STANDARD SIST EN 3476:2009

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Ta slovenski standard je istoveten z: EN 3476:2006

**ICS:**

49.025.10      Jekla      Steels

**SIST EN 3476:2009**      en,de

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EUROPEAN STANDARD

EN 3476

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2006

ICS 49.025.10

English Version

## Aerospace series - Steel FE-PL1501 (30CrMo12) - Air melted - Softened - Forging stock - a or D ≤ 300 mm

Série aérospatiale - Acier FE-PL1501 (30CrMo12) - Élaboré  
à l'air - Adouci - Produit destiné à la forge - a ou D ≤ 300  
mm

Luft- und Raumfahrt - Stahl FE-PL1501 (30CrMo12) -  
Lufterschmolzen - Weichgeglüht - Schmiedevormaterial - a  
oder D ≤ 300 mm

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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 United Kingdom.

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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

## Foreword

This document (EN 3476:2006) 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 June 2007, and conflicting national standards shall be withdrawn at the latest by June 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, 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-PL1501 (30CrMo12)  
Air melted  
Softened  
Forging stock  
 $a$  or  $D \leq 300$  mm

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 2003-14, *Aerospace series — Test methods for steel products — Part 14: Hardenability test by end quenching (Jominy test)*. <sup>1)</sup>

EN 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings)*. <sup>1)</sup>

EN 2157-2, *Aerospace series — Steel — Forging stock and forgings — Technical specification — Part 2: Forging stock*.

EN 4050-1, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 1: General requirements*. <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>

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<sup>1)</sup> Published as ASD Prestandard at the date of publication of this standard.

## EN 3476:2006 (E)

1	Material designation		Steel FE-PL1501 (30CrMo12)								
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Fe
		min.	0,28	0,10	0,40	–	–	2,80	0,30	–	Base
		max.	0,35	0,40	0,70	0,025	0,020	3,30	0,50	0,30	
3	Method of melting		Air melted								
4.1	Form		Forging stock								
4.2	Method of production		–								
4.3	Limit dimension(s)	mm	a or D ≤ 300								
5	Technical specification		EN 2157-2								

6.1	Delivery condition		Softened								
	Heat treatment		–								
6.2	Delivery condition code		U								
7	Use condition		Delivery condition								
	Heat treatment		–								

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Characteristics  
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8.1	Test sample(s)		See EN 2157-2.									
8.2	Test piece(s)		See EN 2157-2.									
8.3	Heat treatment		Delivery condition						See line 29.			
9	Dimensions concerned	mm	a or D ≤ 300						–			
10	Thickness of cladding on each face	%	–						–			
11	Direction of test piece		–						L			
12	Temperature	$\theta$	°C		–						Ambient	
13	Proof stress	$R_{p0,2}$	MPa		–						≥ 850	
14	T Strength	$R_m$	MPa		–						1 050 ≤ $R_m$ ≤ 1 250	
15	Elongation	A	%		–						≥ 10	
16	Reduction of area	Z	%		–						–	
17	Hardness		≤ 277 HB						311 ≤ HB ≤ 375 <sup>a, b</sup>			
18	Shear strength	$R_c$	MPa		–						–	
19	Bending	k	–		–						–	
20	Impact strength		–						KV ≥ 35J; Notch direction T; (KV ≥ 20 J) <sup>c</sup>			
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)		a, b, c									

29	Reference heat treatment	–	Hardened and tempered 860 °C ≤ $\theta$ ≤ 920 °C / OQ + $\theta$ ≥ 560 °C / OQ						
31	Hardenability (Jominy test)	1	EN 2003-14						
		5	$\theta = 875 \text{ °C} \pm 5 \text{ °C}$						
		7	Distance in mm	1,5	5	9	15	25	40
			HRC max.	57	57	57	57	55	54
HRC min.	49	48	47	46	46	45			
34	Grain size	–	See EN 2157-2.						
		5	See line 29.						
		7	G ≥ 5						
44	External defects	–	See EN 2157-2.						
50	Cleanliness/inclusion content (micro-cleanness)	–	See EN 2157-2.						
		7	Category 1						
61	Internal defects	–	See EN 2157-2.						
		1	EN 4050-1						
		6	a or $D \leq 100 \text{ mm}$ may be tested either on the product or at an earlier stage of manufacturing						
		7	Class 2						
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95	Marking inspection	–	See EN 2157-2.						
96	Dimensional inspection	–	See EN 2157-2.						
98	Notes	–	<p>a HV for a or <math>D \leq 5 \text{ mm}</math></p> <p>b Surface hardness after nitriding: HV ≥ 800</p> <p>c Value in brackets after blank nitriding: 490 °C ≤ <math>\theta</math> ≤ 510 °C / t = 24 h</p>						
99	Typical use	–	–						

## EN 3476:2006 (E)

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