



SLOVENSKI STANDARD
SIST EN 3969:2009

01-maj-2009

Aeronavtika - Jeklo FE-PL1507 (40CrMoV12) - Taljeno - Žarjeno - Material za kovanje - a ali $D \leq 350$ mm

Aerospace series - Steel FE-PL1507 (40CrMoV12) - Air melted - Annealed - Forging stock - a or $D \leq 350$ mm

Luft- und Raumfahrt - Stahl FE-PL1507 (40CrMoV12) - Lufterschmolzen - Geglüht - Schmiedevormaterial - a oder $D \leq 350$ mm

Série aérospatiale - Acier FE-PL1507 (40CrMoV12) - Elaboré à l'air - Recuit - Produits destinés à la forge - a ou $D \leq 350$ mm

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Ta slovenski standard je istoveten z: EN 3969:2006

ICS:

49.025.10 Jekla Steels

SIST EN 3969:2009 **en,de**

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EUROPEAN STANDARD

EN 3969

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2006

ICS 49.025.05

English Version

Aerospace series - Steel FE-PL1507 (40CrMoV12) - Air melted - Annealed - Forging stock - a or D \leq 350 mm

Série aérospatiale - Acier FE-PL1507 (40CrMoV12) -
Élaboré à l'air - Recuit - Produits destinés à la forge - a ou
D \leq 350 mm

Luft- und Raumfahrt - Stahl FE-PL1507 (40CrMoV12) -
Lufterschmolzen - Geglüht - Schmiedevormaterial - a oder
D \leq 350 mm

This European Standard was approved by CEN on 18 October 2006.

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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 3969:2006) 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-PL1507 (40CrMoV12)
Air melted
Annealed
Forging stock
 a or $D \leq 350$ mm

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 2003-7, *Aerospace series — Steel — Test methods — Part 7: Macrographic test.* ¹⁾

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

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

EN 2957, *Aerospace series — Method of preparation of forged samples.* ¹⁾

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⁾

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

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1	Material designation		Steel FE-PL1507 (40CrMoV12)										
2	Chemical composition %	Element	C	Si	Mn	P ^a	S	Cr	Mo	Ni	Sn ^a	V	Fe
		min.	0,35	0,10	0,40	–	–	3,00	0,80	–	–	0,15	Base
		max.	0,43	0,35	0,70	0,020	0,020	3,50	1,10	0,30	0,025	0,25	
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 ≤ 350										
5	Technical specification		EN 2157-2										

6.1	Delivery condition		Annealed										
	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.				Reforged sample in accordance with EN 2957 or cut from forging stock						
8.2	Test piece(s)		See EN 2157-2.				Heat treated before machining with $D_e \leq 50$ mm						
8.3	Heat treatment		Delivery condition				See line 29.						
9	Dimensions concerned	mm	a or D ≤ 350				a or D ≤ 350						
10	Thickness of cladding on each face	%	–				–						
11	Direction of test piece		–				L or LT						
12	Temperature	θ	°C		–				Ambient				
13	Proof stress	$R_{p0.2}$	MPa		–				≥ 1 030				
14	T Strength	R_m	MPa		–				1 250 ≤ R_m ≤ 1 400				
15	Elongation	A	%		–				≥ 10				
16	Reduction of area	Z	%		–				≥ 35				
17	Hardness		≤ 277 HB				375 ≤ HB ≤ 401						
18	Shear strength	R_c	MPa		–				–				
19	Bending	k	–		–				–				
20	Impact strength		–				KV ≥ 25 J ; Notch direction T ^{b, c}						
21	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, b, c										

29	Reference heat treatment	–	Hardened and tempered 910 °C ≤ θ ≤ 950 °C / t ≥ 1 h / OQ + temper θ ≥ 600 °C / t ≥ 1 h / OQ or AC ^d
44	External defects	–	See EN 2157-2.
50	Cleanliness/inclusion content (micro-cleanness)	–	See EN 2157-2.
		7	Category 1
51	Macrostructure	1	EN 2003-7
		2	1 per cast
		3	A transverse slice selected at a convenient stage of manufacture from a location corresponding to the top of the ingot.
		5	Non heat treated
		7	Sample shall be free from unsoundness, seams and detrimental segregation.
95	Marking inspection	–	See EN 2157-2.
96	Dimensional inspection	–	See EN 2157-2.
98	Notes	–	^a P + Sn ≤ 0,025 ^b Value after blank nitriding: 500 °C ± 10 °C / t = 24 h. The "capability clause" applies. ^c IZOD is optional test and shall achieve 20ft.lbf minimum. ^d Actual heat treatment temperature and time shall be reported on the inspection and test report.
99	Typical use	–	Low alloy general purpose steel; suitable for nitriding

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