

**Aerospace series —  
Steel FE-PL1504  
(33CrMoV12) — Air  
melted — Softened —  
Forging stock —  
a or D ≤ 300 mm**

The European Standard EN 3527:2007 has the status of a  
British Standard

ICS 49.025.10

## National foreword

This British Standard was published by BSI. It is the UK implementation of EN 3527:2007.

The UK participation in its preparation was entrusted by Technical Committee ACE/61, Metallic materials for aerospace purposes, to Panel ACE/61/-/15, Steels.

A list of organizations represented on ACE/61/-/15 can be obtained on request to its secretary.

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English Version

**Aerospace series - Steel FE-PL1504 (33CrMoV12) - Air melted -  
Softened - Forging stock - a or D ≤ 300 mm**

Série aérospatiale - Acier FE-PL1504 (33CrMoV12) -  
Élaboré à l'air - Adouci - Produits destinés à la forge - a ou  
D ≤ 300 mm

Luft- und Raumfahrt - Stahl FE-PL1504 (33CrMoV12) -  
Lufterschmolzen - gegläht - Schmiedevormaterial - a oder  
D ≤ 300 mm

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

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## **Foreword**

This document (EN 3527:2007) 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.

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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-PL1504 (33CrMoV12)  
Air melted  
Softened  
Forging stock  
 $a$  or  $D \leq 300$  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 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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1) Published as ASD Prestandard at the date of publication of this standard.

# EN 3527:2007

1	Material designation		Steel FE-PL1504 (33CrMoV12)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	V	Sn	Fe
		min.	0,29	0,10	0,40	–	–	2,80	0,70	–	0,15	–	Base
		max.	0,36	0,40	0,70	0,020	0,020	3,30	1,20	0,30	0,35	0,030	
3	Method of melting		Air melted										
4.1	Form		Forging stock										
4.2	Method of production		–										
4.3	Limit dimension(s)	mm	$a$ or $D \leq 300$										
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		–										

## Characteristics

8.1	Test sample(s)		See EN 2157-2.													
8.2	Test piece(s)		See EN 2157-2.													
8.3	Heat treatment		Softened					See line 29								
9	Dimensions concerned	mm	$a$ or $D \leq 300$													
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		–						$\geq 1\ 000$					
14	T	Strength	$R_m$	MPa		–						$1\ 200 < R_m < 1\ 350$				
15		Elongation	A	%		–						$\geq 10$				
16		Reduction of area	Z	%		–						–				
17		Hardness		$\leq 248$ HB					$352 \leq HB \leq 405$							
18	Shear strength	$R_c$	MPa		–						–					
19	Bending	k	–		–						–					
20	Impact strength		–					$KV \geq 40$ J; Notch direction T; ( $KV \geq 30$ J) <sup>a</sup>								
21	Temperature	$\theta$	°C		–							–				
22	Time		h		–							–				
23	C	Stress	$\sigma_a$	MPa		–						–				
24		Elongation	a	%		–						–				
25		Rupture stress	$\sigma_R$	MPa		–						–				
26		Elongation at rupture	A	%		–						–				
27	Notes (see line 98)		a													

29	Reference heat treatment	-	Hardened and tempered 910 °C ≤ θ ≤ 950 °C / OQ + θ ≥ 565 °C
34	Grain size	-	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 ≤ 100 mm be tested either on the product or at an earlier stage of manufacturing
		7	Class 2
95	Marking inspection	-	See EN 2157-2.
96	Dimensional inspection	-	See EN 2157-2.
98	Notes	-	<sup>a</sup> Value in brackets after blank nitriding 490 °C ≤ θ ≤ 520 °C / t = 24 h. The "capability clause" may be applied by agreement between manufacturer and purchaser.
99	Typical use	-	-

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





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