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SIST EN 4291:2005

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 4291**

June 2005

ICS 49.025.20

English version

**Aerospace series - Aluminium alloy AL-P8090 - Forging stock**

Série aérospatiale - Alliage d'aluminium AL-P8090 -  
Produits destinés à la forge

Luft- und Raumfahrt - Aluminiumlegierung AL-P8090 -  
Schmiedevormaterial

This European Standard was approved by CEN on 22 April 2005.

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, 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 4291:2005) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-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 AECMA, 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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

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, 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 4500-2.

## 1 Scope

This standard specifies the requirements relating to:

Aluminium alloy AL-P8090-  
Forging stock

for aerospace application.

## 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 2082-2, *Aerospace series — Aluminium alloy forging stock and forgings — Technical specification — Part 2: Forging stock* <https://standards.iteh.ai/catalog/standards/sist/892b449e-38bb-432d-8e3b-fd66947850a4/sist-en-4291-2005>

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

EN 4500-2, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 2: Specific rules for aluminium, aluminium alloys and magnesium alloys.* <sup>1)</sup>

EN 6018, *Aerospace series — Test methods for metallic materials — Determination of density according to displacement method.* <sup>1)</sup>

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

## EN 4291:2005 (E)

1	Material designation		Aluminium alloy AL-P8090-												
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Li	Zr	Ti	Others		Al
													Each	Total	
		min.	–	–	1,0	–	0,6	–	–	–	2,2	0,04	–	–	–
max.	0,20 <sup>a</sup>	0,30 <sup>a</sup>	1,6	0,10	1,3	0,10	0,25	2,7	0,16	0,10	0,05 <sup>a</sup>	0,15			
3	Method of melting		–												
4.1	Form		Ingot or billet												
4.2	Method of production		Cast												
4.3	Limit dimension(s)	mm	a or D ≤ 500												
5	Technical specification		EN 2082-2												

6.1	Delivery condition	O3
	Heat treatment	–
6.2	Delivery condition code	U
7	Use condition	O3
	Heat treatment	Delivery condition

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Characteristics  
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8.1	Test sample(s)		Forged bar <sup>b</sup>												
8.2	Test piece(s)		See EN 2082-2. <a href="http://standards.iteh.ai/catalog/standards/sist/892b449e-38bb-432d-8a3b-fd66947850a4/sist-en-4291-2005">http://standards.iteh.ai/catalog/standards/sist/892b449e-38bb-432d-8a3b-fd66947850a4/sist-en-4291-2005</a>												
8.3	Heat treatment		T89 (See line 29)												
9	Dimensions concerned	mm	–												
10	Thickness of cladding on each face	%	–												
11	Direction of test piece		L				LT				ST				
12	Temperature	$\theta$	Ambient				Ambient				Ambient				
13	Proof stress	$R_{p0,2}$	≥ 330 <sup>c</sup>				≥ 305 <sup>c</sup>				≥ 300 <sup>c</sup>				
14	T Strength	$R_m$	≥ 430 <sup>c</sup>				≥ 420 <sup>c</sup>				≥ 380 <sup>c</sup>				
15	Elongation	A	≥ 3 <sup>c</sup>				≥ 3 <sup>c</sup>				≥ 1 <sup>c</sup>				
16	Reduction of area	Z	–												
17	Hardness		–												
18	Shear strength	$R_c$	–												
19	Bending	k	–												
20	Impact strength		–												
21	Temperature	$\theta$	–												
22	Time		h												
23	C Stress	$\sigma_a$	–												
24	C Elongation	a	–												
25	C Rupture stress	$\sigma_R$	–												
26	C Elongation at rupture	A	–												
27	Notes (see line 98)		a, b, c												

29	Reference heat treatment	–	Delivery condition + hand forged + 525 °C ≤ $\theta$ ≤ 535 °C / WQ $\theta$ ≤ 35 °C + 2 % ≤ cold deformed ≤ 5 % + 170 °C ≤ $\theta$ ≤ 185 °C / 20 h ≤ t ≤ 30 h
34	Grain size	–	G ≤ 0,5
44	External defects	–	See EN 2082-2.
61	Internal defects	–	See EN 2082-2.
68	Density	1	EN 6018
		2	The "capability clause" applies
		7	$\rho \leq 2,56 \text{ kg/dm}^3$
95	Marking inspection	–	See EN 2082-2.
96	Dimensional inspection	–	See EN 2082-2.
98	Notes	–	<sup>a</sup> Chemical analyses taken from the molten metal stream shall exhibit the following maximum impurity levels: Fe ≤ 0,06 %, Si ≤ 0,06 %, Na ≤ 9 ppm., Ca ≤ 120 ppm. <sup>b</sup> Forging dimensions and manufacturing parameters shall be as agreed between ingot supplier and forgemaster. <sup>c</sup> The "capability clause" applies.
99	Typical use	–	

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## EN 4291:2005 (E)

100	–	Product qualification	–	Qualification programme to be agreed between manufacturer and purchaser.
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