SLOVENSKI STANDARD
SIST EN 2681:2005

01-april-2005

Aeronavtika - Aluminijeva zlitina AL-P7010 - T74 - Prosto in utopno kovani izkovki - a </= 150 mm

Aerospace series - Aluminium alloy AL-P7010- - T74 - Hand and die forgings - a </= 150 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7010- - T74 - Freiform- und Gesenkschmiedestücke - a </= 150 mm

Série aérospatiale - Alliage d'aluminium AL-P7010- - T74 - Pieces forgées et matricées - a </= 150 mm

Ta slovenski standard je istoveten z: **EN 2681:2004**

ICS:

49.025.20	Aluminij	Aluminium

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EUROPEAN STANDARD

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EN 2681

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English version

Aerospace series - Aluminium alloy AL-P7010- - T74 - Hand and die forgings - a ≤ 150 mm

Série aérospatiale - Alliage d'aluminium AL-P7010- - T74 - Pièces forgées et matricées - a ≤ 150 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7010- - T74 - Freiform- und Gesenkschmiedestücke - a ≤ 150 mm

This European Standard was approved by CEN on 15 July 2004.

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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.

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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

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Foreword

This document (EN 2681:2004) 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of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

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.

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-P7010-
T74
Hand and die forgings
$a \leq 150$ 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 4258, *Aerospace series – Metallic materials – General organization of standardization – Links between types of EN standards and their use*

EN 4287, *Aerospace series – Aluminium alloy AL-P7010- – Forging stock* [1)]

EN 4400-7, *Aerospace series – Aluminium and aluminium- and magnesium- alloys – Technical specification – Part 7: Aluminium alloy forgings* [2)]

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* [1)]

1) Published as AECMA Prestandard at the date of publication of this standard
2) In preparation at the date of publication of this standard

1	Material designation		Aluminium alloy AL-P7010-													
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Zr	Ti	Others		Al	
													Each	Total		
		min.	–	–	1,5	–	2,1	–	–	5,7	0,10	–	–	–	Base	
		max.	0,12	0,15	2,0	0,10	2,6	0,05	0,05	6,7	0,16	0,06	0,05	0,15		
3	Method of melting		–													
4.1	Form		Hand and die forgings													
4.2	Method of production		Forged from forging stock to EN 4287													
4.3	Limit dimension(s)	mm	$a \leq 150$													
5	Technical specification		EN 4400-7													

6.1	Delivery condition	T74
	Heat treatment	470 °C ≤ θ ≤ 480 °C / WQ 60 °C ≤ θ ≤ 80 °C + 105 °C ≤ θ ≤ 120 °C / 8 h ≤ t ≤ 24 h [a] + 170 °C ≤ θ ≤ 180 °C / 8 h ≤ t ≤ 16 h [a]
6.2	Delivery condition code	U
7	Use condition	T74
	Heat treatment	Delivery condition

Characteristics

8.1	Test sample(s)			See EN 4400-7.													
8.2	Test piece(s)			See EN 4400-7.													
8.3	Heat treatment			Use condition													
9	Dimensions concerned		mm	$a \leq 75$			$75 < a \leq 100$			$100 < a \leq 125$			$125 < a \leq 150$				
10	Thickness of cladding on each face		%	–			–			–			–				
11	Direction of test piece			L	LT	ST	L	LT	ST	L	LT	ST	L	LT	ST		
12	T	Temperature	θ	°C	Ambient			Ambient			Ambient			Ambient			
13	T	Proof stress	$R_{p0,2}$	MPa	≥ 430	≥ 420	≥ 410	≥ 425	≥ 410	≥ 400	≥ 420	≥ 400	≥ 390	≥ 410	≥ 390	≥ 380	
14	T	Strength	R_m	MPa	≥ 500	≥ 490	≥ 480	≥ 490	≥ 480	≥ 470	≥ 485	≥ 470	≥ 460	≥ 480	≥ 465	≥ 450	
15	T	Elongation	A	%	≥ 7	≥ 4	≥ 4	≥ 7	≥ 4	≥ 3	≥ 7	≥ 4	≥ 3	≥ 7	≥ 3	≥ 3	
16	T	Reduction of area	Z	%	–												
17	Hardness			–													
18	Shear strength		R_c	MPa	–												
19	Bending		k	–	–												
20	Impact strength			–													
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]													

32	Electrical conductivity	–	See EN 4400-7.	
		7	$\gamma \geq 22{,}3$ MS/m [b]	Acceptable if $R_{p\,0.2}$ LT ≤ $R_{p\,0.2}$ min. LT + 70 MPa, but if the purchaser also requires the stress corrosion test to be carried out (line 39), the results of this, if different, shall take precedence over those of this electrical conductivity test.
			$\gamma < 22{,}3$ MS/m [b]	Not acceptable
39	Stress corrosion	–	See EN 4400-7.	
		2	The "capability clause" may apply or the test shall be carried out to meet the requirements of line 32 as the reference method. The results of this stress corrosion test shall take precedence over those of the electrical conductivity test.	
		6	$\sigma = 240$ MPa	
		7	$t \geq 20$ d	
40	Fracture toughness (K_{1c})	–	See EN 4400-7.	
		7	Dimensions mm	L - T MPa $\sqrt{m}$ / T - L MPa $\sqrt{m}$ / S - L MPa $\sqrt{m}$
			$a \leq 75$	≥ 29 / ≥ 26 / ≥ 23
			$75 < a \leq 100$	≥ 28 / ≥ 25 / ≥ 23
			$100 < a \leq 150$	≥ 27 / ≥ 24 / ≥ 23
44	External defects	–	See EN 4400-7.	
47	Notch / yield ratio R_e / $R_{p\,0.2}$	–	See EN 4400-7.	
51	Macrostructure	–	See EN 4400-7.	
61	Internal defects	–	See EN 4400-7.	
82	Batch uniformity	–	See EN 4400-7.	
		7	Electrical conductivity	See EN 4400-7.
		or		
		7	Hardness	HB: 140 (typical value); δ ≤ 20 per product; Δ ≤ 30 per batch
95	Marking inspection	–	See EN 4400-7.	
96	Dimensional inspection	–	See EN 4400-7.	
98	Notes	–	[a] Artificial ageing may be carried out using the following alternative single stage method : heating to a temperature of 167 °C ≤ θ ≤ 177 °C at a rate not exceeding 20 °C / h and soaking at this temperature for 10 h ≤ t ≤ 14 h. [b] If the electrical conductivity acceptance criteria are not met, the material may be given additional artificial ageing at 170 °C ≤ θ ≤ 180 °C or re-heat treated according to line 6.1. In either case, the material shall be re-tested as a completely new batch. If all the requirements of this material standard are then met, the batch shall be accepted.	
99	Typical use	–	–	