SLOVENSKI STANDARD
SIST EN 2094:2001

01-januar-2001

Aerospace series - Aluminium alloy AL-P7009-T74 - Die forgings 3 mm < or = a < or = 150 mm

Aerospace series - Aluminium alloy AL-P7009-T74 - Die forgings 3 mm < or = a < or = 150 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7009-T74 - Gesenkschmiedestücke 3 mm < oder = a < oder = 150 mm

Série aérospatiale - Alliage d'aluminium AL-P7009-T74 - Pieces matricées 3 mm < ou = a < ou = 150 mm

Ta slovenski standard je istoveten z: EN 2094:1992

ICS:

49.025.20 Aluminij Aluminium

SIST EN 2094:2001 en

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2094

September 1992

UDC : 669.715-4:621.73.043:629.7

Key words : Aircraft industry, die forgings, aluminium alloys, specifications, chemical composition, dimensions, characteristics

English version

Aerospace series
Aluminium alloy AL-P7009-T74
Die forgings
3 mm ⩽ a ⩽ 150 mm

Série aérospatiale
Alliage d'aluminium AL-P7009-T74
Pièces matricées
3 mm ⩽ a ⩽ 150 mm

Luft- und Raumfahrt
Aluminiumlegierung AL-P7009-T74
Gesenkschmiedestücke
3 mm ⩽ a ⩽ 150 mm

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

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat : Rue de Stassart, 36, B—1050 Bruxelles

Ref. Nr EN 2094 : 1992 E

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has successively 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of an identical text or by endorsement, at the latest by March 1993, and conflicting national standards shall be withdrawn at the latest by March 1993.

In accordance with the Common CEN/CENELEC Rules the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

For the use of this standard, see EN 2500-2.

1 Scope

This standard specifies the requirements relating to die forgings in aluminium alloy AL-P7009-, for use in the T74 [1] condition, 3 mm ≤ a ≤ 150 mm, for aerospace applications.

2 References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2004-1 Aerospace series - Test methods for aluminium and aluminium alloy products - Part 1 - Determination of electrical conductivity of wrought aluminium alloys [2]

EN 2082-3 Aerospace series - Aluminium alloys forging stock and forgings - Technical specification - Part 3 - Pre-production and production forgings

EN 2500-2 Aerospace series - Instructions for the drafting and use of metallic material standards - Part 2 - Specific requirements for aluminium, aluminium alloys and magnesium alloys [3].

1) Formerly designated T736.
2) Published as AECMA standard at the date of publication of this standard
3) Published as AECMA pre-standard at the date of publication of this standard

1	Material designation		Aluminium alloy AL-P7009-											
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ag	Ti	Others Each	Others Total	Al
		min.	-	-	0,6	-	2,1	0,10	5,5	0,25	-	-	-	Base
		max.	0,20	0,20	1,3	0,10	2,9	0,25	6,5	0,40	0,20	0,05	0,15	
3	Method of melting		-											
4	Form Method of production Limit dimensions (mm)		Die forgings - 3 ≤ a ≤ 150											
5	5.1 Technical specification		EN 2082-3											
	5.2 Dimensional standards		-											

6	6.1 Delivery condition and heat treatment	O1 460°C ≤ θ ≤ 470°C / AC	T74 460°C ≤ θ ≤ 470°C / WQ θ ≤ 80°C + 115°C ≤ θ ≤ 125°C / 20 h ≤ t ≤ 24 h + 167°C ≤ θ ≤ 173°C / 6 h ≤ t ≤ 18 h
	6.2 Delivery condition code	A	U
7	Use condition and heat treatment	T74	
		Delivery condition + 460°C ≤ θ ≤ 470°C / WQ θ ≤ 80°C + 115°C ≤ θ ≤ 125°C / 20 h ≤ t ≤ 24 h + 167°C ≤ θ ≤ 173°C / 6 h ≤ t ≤ 18 h	Delivery condition

Characteristics

8	Sample Test piece Heat treatment				Cut from the forgings in accordance with the drawing and/or inspection schedule (location and direction) - Use condition: T74									
9	Dimensions concerned			mm	3 ≤ a ≤ 75			75 < a ≤ 125			125 < a ≤ 150			
10	Thickness of cladding on each face			%	-									
11	Direction of test piece				L	LT	ST	L	LT	ST	L	LT	ST	
12	T	Temperature	θ	°C	Ambient temperature									
13	T	Proof stress	$R_{p0,2}$	MPa	≥ 450	≥ 440	≥ 430	≥ 420	≥ 410	≥ 400	≥ 390	≥ 380	≥ 380	
14	T	Strength	R_m	MPa	≥ 510	≥ 500	≥ 490	≥ 480	≥ 470	≥ 470	≥ 470	≥ 460	≥ 450	
15	T	Elongation	A	%	≥ 7	≥ 5	≥ 4	≥ 7	≥ 5	≥ 4	≥ 7	≥ 5	≥ 4	
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)				-									

32	Electrical conductivity	1	See EN 2004-1	
		6	Measurement on specimen for tensile test (flat machined surface if necessary)	
		7	$\gamma \geq 22{,}0$ MS/m	Acceptable
			$21{,}5$ MS/m $\leq \gamma < 22{,}0$ MS/m	Not acceptable unless a stress corrosion test gives satisfactory results
			$\gamma < 21{,}5$ MS/m	Not acceptable
39	Stress corrosion	2	In case of dispute or if $21{,}5$ MS/m $\leq \gamma < 22{,}0$ MS/m	
		3	$a \geq 20$ mm	
		6	$\sigma = 60\%\ R_{p0,2}$ min. $L / t = 20$ d	
44	External defects	-	See EN 2082-3	
51	Macrostructure	7	Grain flow : see EN 2082-3	
61	Internal defects	-	See EN 2082-3	
82	Batch uniformity	1	See EN 2082-3	
		7	Electrical conductivity	See EN 2082-3
		or		
		7	Hardness	145 HB (typical value)
				$\delta \leq 20$ HB per product / $\Delta \leq 30$ HB per batch
97	Designation		See relevant drawing	
98	Notes		-	
99	Typical use		-	