



BSI Standards Publication

Aerospace series — Aluminium alloy AL-P2024 — AlCu4Mg1 — T3511 — Extruded bars and sections — $1,2 \text{ mm} \leq D_e \leq 160 \text{ mm}$ with peripheral coarse grain control

National foreword

This British Standard is the UK implementation of EN 2633:2015. It supersedes BS EN 2633:1994 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/61/-/24, Light Alloys for Aerospace Purposes.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments/corrigenda issued since publication

Date	Text affected
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EUROPEAN STANDARD

EN 2633

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2015

ICS 49.025.20

Supersedes EN 2633:1993

English Version

**Aerospace series - Aluminium alloy AL-P2024 - AlCu4Mg1
- T3511 - Extruded bars and sections - $1,2 \text{ mm} \leq De \leq 160$
mm with peripheral coarse grain control**

Série aérospatiale - Alliage d'aluminium AL-P2024 -
AlCu4Mg1 - T3511 - Barres et profilés filés - $1,2 \text{ mm} \leq$
 $De \leq 160 \text{ mm}$ avec contrôle de la zone périphérique à
gros grains

Luft- und Raumfahrt - Aluminiumlegierung AL-P2024 -
AlCu4Mg1 - T3511 - Stranggepresste Stangen und
Profile - $1,2 \text{ mm} \leq De \leq 160 \text{ mm}$ mit Kontrolle der
Grobkornrandzone

This European Standard was approved by CEN on 14 March 2013.

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COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 2633:2015) 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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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.

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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-P2024
AlCu4Mg1
T3511
Extruded bar and section
 $1,2 \text{ mm} \leq D_e \leq 160 \text{ mm}$
with peripheral coarse grain control

for aerospace applications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 4050-4, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 4: Acceptance criteria*

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

EN 4400-3, *Aerospace series — Aluminium and aluminium alloy wrought products — Technical specification — Part 3: Bar and section*¹⁾

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 ASD-STAN Prestandard at the date of publication of this standard (www.asd-stan.org).

BS EN 2633:2015
EN 2633:2015 (E)

1	Material designation		Aluminium alloy AL-P2024 — AlCu4Mg1 - T3511											
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr + Ti	Others		Al
												Each	Total	
		min.	–	–	3,8	0,30	1,2	–	–	–	–	–	–	–
max.	0,50	0,50	4,9	0,9	1,8	0,10	0,25	0,15	0,20	0,05	0,15			
3	Method of melting													
4.1	Form		Bars and sections											
4.2	Method of production		Extruded											
4.3	Limit dimension(s)	mm	$1,2 \leq D_e \leq 160$											
5	Technical specification		EN 4400-3											

6.1	Delivery condition		T3511										
	Heat treatment		$490 \text{ °C} \leq \theta \leq 500 \text{ °C} / \text{WQ } \theta \leq 40 \text{ °C}$ + 1 % \leq controlled stretched \leq 3 % and minor straightening allowable + $\theta = \text{ambient} / t \geq 5 \text{ d}$										
6.2	Delivery condition code		U										
7	Use condition		T3511										
	Heat treatment		Delivery condition										

Characteristics

8.1	Test sample(s)		See EN 4400-3.											
8.2	Test piece(s)		See EN 4400-3.											
8.3	Heat treatment		Use condition											
9	Dimensions concerned	mm	$1,2 \leq D_e \leq 2,0$	$2,0 < D_e \leq 10$	$10 < D_e \leq 25$	$25 < D_e \leq 75$	$75 < D_e \leq 100$	$100 < D_e \leq 160$						
10	Thickness of cladding on each face	%	–											
11	Direction of test piece		L											
12	Temperature	θ	°C	Ambient										
13	Proof stress	$R_{p0,2}$	MPa	≥ 330	≥ 340	≥ 340	≥ 350	≥ 345	≥ 325					
14	Strength	R_m	MPa	≥ 440	≥ 460	≥ 460	≥ 480	≥ 470	≥ 450					
15	Elongation	A	%	≥ 12 (or $A_{50\text{mm}} \geq 11$)	≥ 11 (or $A_{50\text{mm}} \geq 11$)	≥ 10	≥ 10	≥ 10	≥ 8					
16	Reduction of area	Z	%	–	–	–	–	–	–					
17	Hardness	HBW	–	–										
18	Shear strength	R_c	MPa	–										
19	Bending	k	–	–										
20	Impact strength	K	J	–										
21	Temperature	θ	°C	–										
22	Time	t	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											

44	External defects	-	EN 4400-3		
61	Internal defects	-	EN 4400-3		
		1	See EN 4050-4.		
		7	$28 \text{ mm} \leq D_e \leq 60 \text{ mm}$ - Class 3 $D_e > 60 \text{ mm}$ - Class 2		
82	Batch uniformity	-	EN 4400-3		
		7	Electrical conductivity	$\gamma = 18 \text{ MS/m}$ (typical value)	
		or			
		7	Hardness	120 HBW (typical value)	
$\delta \leq 16 \text{ HBW}$ per product	$\Delta \leq 24 \text{ HBW}$ per batch				
87	Extrusion back-end defect	-	EN 4400-3		
88	Peripheral coarse grain	-	EN 4400-3		
		7	Level A		
95	Marking inspection	-	EN 4400-3		
96	Dimensional inspection	-	EN 4400-3		
98	Notes	-	^a Bar only.		
99	Typical use	-	-		

100	-	Product qualification	-	EN 4400-3				
	46	Fatigue	-	EN 4400-3				
			7	σ max. (MPa)	Number of cycles	R	K_t	Direction
				420	$\geq 10^4$	0.1	1.7	L
				265	$\geq 10^5$			
				150	$\geq 10^6$			
	100	$\geq 10^7$						

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