

BS EN 3983:2013



BSI Standards Publication

**Aerospace series — Aluminium  
alloy AL-P7050- — T7651 —  
Plate —  $6 \text{ mm} < a \leq 160 \text{ mm}$**

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**National foreword**

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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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English Version

**Aerospace series - Aluminium alloy AL-P7050- - T7651 - Plate -  
6 mm < a ≤ 160 mm**

Série aérospatiale - Alliage d'aluminium AL-P7050- - T7651  
- Tôles épaisses - 6 mm < a ≤ 160 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7050- -  
T7651 - Platten - 6 mm < a ≤ 160 mm

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## Foreword

This document (EN 3983:2013) 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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

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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 European Standard specifies the requirements relating to:

Aluminium alloy AL-P7050-  
T7651  
Plate  
 $6 \text{ mm} < a \leq 160 \text{ mm}$

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

EN 4400-1, *Aerospace series — Aluminium and aluminium alloy wrought products — Technical specification — Part 1: Plate*<sup>1)</sup>

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>

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1) Published as ASD-STAN Prestandard at the date of publication of this standard. <http://www.asd-stan.org/>

BS EN 3983:2013  
EN 3983:2013 (E)

1	Material designation		Aluminium alloy AL-P7050- T7651											
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Zr	Ti	Others		Al
		min.	–	–	2,0	–	1,9	–	5,7	0,08	–	–	–	
		max.	0,12	0,15	2,6	0,10	2,6	0,04	6,7	0,15	0,06	0,05	0,15	Base
3	Method of melting		–											
4.1	Form		Plate											
4.2	Method of production		Rolled											
4.3	Limit dimension(s)	mm	6 < a ≤ 160											
5	Technical specification		EN 4400-1											

6.1	Delivery condition		W51					T7651				
	Heat treatment		470 °C ≤ θ ≤ 485 °C / WQ θ ≤ 40 °C + 1,5 % ≤ controlled stretched ≤ 3 % + θ = ambient					470 °C ≤ θ ≤ 485 °C / WQ θ ≤ 40 °C + 1,5 % ≤ controlled stretched ≤ 3 % + 115 °C ≤ θ ≤ 125 °C / 4 h ≤ t ≤ 24 h <sup>a</sup> + 157 °C ≤ θ ≤ 175 °C / 8 h ≤ t ≤ 20 h <sup>a</sup>				
6.2	Delivery condition code		W					U				
7	Use condition		T7651					T7651				
	Heat treatment		Delivery condition + 115 °C ≤ θ ≤ 125 °C / 4 h ≤ t ≤ 24 h <sup>a</sup> + 157 °C ≤ θ ≤ 175 °C / 8 h ≤ t ≤ 20 h <sup>a</sup>					Delivery condition				

Characteristics

8.1	Test sample(s)		See EN 4400-1.								
8.2	Test piece(s)		See EN 4400-1.								
8.3	Heat treatment		Use condition								
9	Dimensions concerned	mm	6 < a ≤ 12,5			12,5 < a ≤ 50			50 < a ≤ 75		
10	Thickness of cladding on each face	%	–			–			–		
11	Direction of test piece		L	LT	L	LT	L	LT	ST		
12	Temperature	θ °C	Ambient			Ambient			Ambient		
13	Proof stress	R <sub>p0,2</sub> MPa	≥ 455	≥ 455	≥ 455	≥ 455	≥ 455	≥ 455	≥ 455	≥ 415	
14	T Strength	R <sub>m</sub> MPa	≥ 525	≥ 525	≥ 525	≥ 525	≥ 525	≥ 525	≥ 525	≥ 485	
15	Elongation	A <sub>50mm</sub> %	≥ 9	≥ 8	≥ 9	≥ 8	≥ 8	≥ 7	≥ 2,5 <sup>b</sup>		
16	Reduction of area	Z %	–								

continued

9	Dimensions concerned	mm	75 < a ≤ 100			100 < a ≤ 125			125 < a ≤ 160		
10	Thickness of cladding on each face	%	–			–			–		
11	Direction of test piece		L	LT	ST	L	LT	ST	L	LT	ST
12	Temperature	θ °C	Ambient			Ambient			Ambient		
13	Proof stress	R <sub>p0,2</sub> MPa	≥ 445	≥ 445	≥ 410	≥ 440	≥ 440	≥ 400	≥ 430	≥ 430	≥ 400
14	T Strength	R <sub>m</sub> MPa	≥ 515	≥ 515	≥ 480	≥ 510	≥ 510	≥ 475	≥ 505	≥ 505	≥ 470
15	Elongation	A %	≥ 6	≥ 5	≥ 2 <sup>c</sup>	≥ 6	≥ 5	≥ 2 <sup>c</sup>	≥ 5	≥ 4	≥ 1,5 <sup>d</sup>
16	Reduction of area	Z %	–								
17	Hardness	HBW	–								
18	Shear strength	R <sub>c</sub> MPa	–								
19	Bending	k	–								
20	Impact strength		–								
21	Temperature	θ °C	–								
22	Time	h	–								
23	Stress	σ <sub>a</sub> MPa	–								
24	C Elongation	a %	–								
25	Rupture stress	σ <sub>R</sub> MPa	–								
26	Elongation at rupture	A %	–								
27	Notes (see line 98)		a, b, c, d								



32	Electrical conductivity	–	EN 4400-1			
		7	$\gamma \geq 22,5$ MS/m	Acceptable		
			$21,5$ MS/m $\leq \gamma < 22,5$ MS/m	Acceptable if $R_{p0,2}$ LT $\leq R_{p0,2}$ min. LT + 70 MPa or if stress corrosion test is acceptable.		
			$\gamma < 21,5$ MS/m	Not acceptable		
39	Stress corrosion	–	EN 4400-1			
		2	The "capability clause" applies			
		6	$\sigma = 175$ MPa			
		7	$t \geq 20$ d			
40	Fracture toughness ( $K_{1c}$ )	–	EN 4400-1			
		7	Dimensions	L-T	T-L	S-L
			mm	MPa $\sqrt{m}$	MPa $\sqrt{m}$	MPa $\sqrt{m}$
			$25 < a \leq 50$	$\geq 28$	$\geq 26$	–
			$50 < a \leq 75$	$\geq 26$	$\geq 25$	$\geq 22$
			$75 < a \leq 100$	$\geq 26$	$\geq 24$	$\geq 22$
			$100 < a \leq 125$	$\geq 25$	$\geq 24$	$\geq 22$
$125 < a \leq 160$	$\geq 25$	$\geq 23$	$\geq 22$			
44	External defects	–	EN 4400-1			
47	Notch/yield ratio $R_e/R_{p0,2}$	–	EN 4400-1			
49	Exfoliation corrosion	–	EN 4400-1			
		7	Exfoliation corrosion shall not be greater than that of grade EB.			
61	Internal defects	–	EN 4400-1			
82	Batch uniformity	–	EN 4400-1			
95	Marking inspection	–	EN 4400-1			
96	Dimensional inspection	–	EN 4400-1			
98	Notes	–	<p>a Artificial ageing may be carried out using the following alternative single stage method: heating to a temperature of <math>157\text{ °C} \leq \theta \leq 175\text{ °C}</math> at a rate not exceeding <math>20\text{ °C/h}</math> and soaking at this temperature for <math>8\text{ h} \leq t \leq 20\text{ h}</math>.</p> <p>b Alternatively <math>A_4 \geq 3</math> if required by the purchaser.</p> <p>c Alternatively <math>A_4 \geq 2,5</math> if required by the purchaser.</p> <p>d Alternatively <math>A_4 \geq 2</math> if required by the purchaser.</p>			
99	Typical use	–	–			

100	-	Product qualification	-	EN 4400-1
				Qualification programme to be agreed between manufacturer and purchaser.



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