BS EN 3982:2015

BSI Standards Publication

Aerospace series — Aluminium alloy AL-P7050 — AlZn6CuMgZr — T7451 — Plates — 6 mm < a ≤ 160 mm

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 3982:2015.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2015

ISBN 978 0 580 81515 7

ICS 49.025.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2015.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3982

November 2015

ICS 49.025.20

English Version

Aerospace series - Aluminium alloy AL-P7050 - AlZn6CuMgZr - T7451 - Plates - 6 mm < a ≤ 160 mm

Série aérospatiale - Alliage d'aluminium AL-P7050 - AlZn6CuMgZr - T7451 - Tôles épaisses - 6 mm < a ≤ 160 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7050 - AlZn6CuMgZr - T7451 - Platten - 6 mm < a ≤ 160 mm

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 3982:2015 E

Contents

Page

European foreword

This document (EN 3982:2015) 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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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-P7050-
AlZn6CuMgZr
T7451
Plates
6 mm < *a* ≤ 160 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* [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).

1	Material designation		Aluminium alloy AL-P7050 — AlZn6CuMgZr - T7451											
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Zr	Ti	Others		Al
												Each	Total	
		min.	–	–	2,0	–	1,9	–	5,7	0,08	–	–	–	Base
		max.	0,12	0,15	2,6	0,10	2,6	0,04	6,7	0,15	0,06	0,05	0,15	
3	Method of melting		–											
4.1	Form		Plate											
4.2	Method of production		Rolled											
4.3	Limit dimension(s)	mm	$6 < a \leq 160$											
5	Technical specification		EN 4400-1											

6.1	Delivery condition	W51	T7451
	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 [a] + 157 °C ≤ θ ≤ 175 °C / 12 h ≤ t ≤ 30 h [a]
6.2	Delivery condition code	W	U
7	Use condition	T7451	T7451
	Heat treatment	Delivery condition + 115 °C ≤ θ ≤ 125 °C / 4 h ≤ t ≤ 24 h [a] + 157 °C ≤ θ ≤ 175 °C / 12 h ≤ t ≤ 30 h [a]	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	$6 < a \leq 12,5$			$12,5 < a \leq 50$			$50 < a \leq 75$			
10	Thickness of cladding on each face		%	–			–			–			
11	Direction of test piece			L	LT		L	LT		L	LT	ST	
12	T	Temperature	θ	°C	Ambient			Ambient			Ambient		
13		Proof stress	$R_{p0,2}$	MPa	≥ 440	≥ 440		≥ 440	≥ 440		≥ 435	≥ 435	≥ 405
14		Strength	R_m	MPa	≥ 510	≥ 510		≥ 510	≥ 510		≥ 505	≥ 505	≥ 470
15		Elongation	A	%	A_{50mm} ≥ 9	A_{50mm} ≥ 8		≥ 9	≥ 8		≥ 8	≥ 7	≥ 2,5 [b]
16		Reduction of area	Z	%	–								

continued

9	Dimensions concerned		mm	$75 < a \leq 100$			$100 < a \leq 125$			$125 < a \leq 160$				
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			Ambient			Ambient			
13		Proof stress	$R_{p0,2}$	MPa	≥ 425	≥ 425	≥ 400	≥ 420	≥ 420	≥ 395	≥ 415	≥ 415	≥ 395	
14		Strength	R_m	MPa	≥ 495	≥ 495	≥ 470	≥ 490	≥ 490	≥ 460	≥ 485	≥ 485	≥ 460	
15		Elongation	A	%	≥ 8	≥ 5	≥ 2,5 [b]	≥ 8	≥ 5	≥ 2,5 [b]	≥ 7	≥ 4	≥ 2 [c]	
16		Reduction of area	Z	%	–									
17	Hardness		HBW	–	–									
18	Shear strength		R_c	MPa	–									
19	Bending		k	–	–									
20	Impact strength				–									
21	C	Temperature	θ	°C	–									
22		Time		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, b, c									

32	Electrical conductivity	–	EN 4400-1			
		7	$\gamma \geq 23{,}0$ MS/m	Acceptable		
			22,0 MS/m $\leq \gamma <$ 23,0 MS/m	Acceptable if $R_{p0,2}$ LT $\leq R_{p0,2}$ min. LT + 70 MPa or if stress corrosion test is acceptable.		
			$\gamma <$ 22,0 MS/m	Not acceptable		
39	Stress corrosion	–	EN 4400-1			
		2	The "capability clause" applies			
		6	σ = 240 MPa			
		7	t ≥ 20 d			
40	Fracture toughness (K_{1c})	–	EN 4400-1			
		7	Dimensions mm	LT MPa $\sqrt{m}$	TL MPa $\sqrt{m}$	SL MPa $\sqrt{m}$
			25 < *a* ≤ 50	≥ 32	≥ 27	–
			50 < *a* ≤ 75	≥ 30	≥ 26	≥ 23
			75 < *a* ≤ 100	≥ 28	≥ 25	≥ 23
			100 < *a* ≤ 125	≥ 27	≥ 24	≥ 23
			125 < *a* ≤ 160	≥ 26	≥ 24	≥ 23
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	–	[a] Artificial ageing may be carried out using the following alternative single stage method: heating to a temperature of 157 °C ≤ θ ≤175 °C at a rate not exceeding 20 °C/h and soaking at this temperature for 12 h ≤ t ≤ 30 h. [b] Alternatively $A_{4D} \geq 3$ if required by the purchaser. [c] Alternatively $A_{4D} \geq 2{,}5$ if required by the purchaser.			
99	Typical use	–	–			

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

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™