SLOVENSKI STANDARD
SIST EN 2687:2005

01-april-2005

Aeronavtika - Aluminijeva zlitina AL-P7010 - T7451 - Plošča - 6 mm < a </= 160 mm

Aerospace series - Aluminium alloy AL-P7010- - T7451 - Plate - 6 mm < a </= 160 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7010-T7451 - Platten - 6 mm < a </= 160 mm

Série aérospatiale - Alliage d'aluminium AL-P7010- - T7451 - Tôle épaisse - 6 mm < a </= 160 mm

Ta slovenski standard je istoveten z: **EN 2687:2004**

ICS:

49.025.20	Aluminij	Aluminium

SIST EN 2687:2005 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2687

December 2004

ICS 49.025.20

English version

Aerospace series - Aluminium alloy AL-P7010- - T7451 - Plate - 6 mm < a ≤ 160 mm

Série aérospatiale - Alliage d'aluminium AL-P7010- - T7451 - Tôle épaisse - 6 mm < a ≤ 160 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7010- - T7451 - Platten - 6 mm < a ≤ 160 mm

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

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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.

CEN members are the national standards bodies of 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 United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 2687:2004: E

Contents

Page

Foreword

This document (EN 2687:2004) 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-
T7451
Plate
6 mm < *a* ≤ 160 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 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 AECMA Prestandard 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 Each	Others Total	Al
		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		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	T7451
	Heat treatment	470 °C ≤ θ ≤ 485 °C / WQ θ ≤ 40 °C + 1,5 % ≤ controlled stretched ≤ 3 %	470 °C ≤ θ ≤ 485 °C [a] / WQ θ ≤ 40 °C + 1,5 % ≤ controlled stretched ≤ 3 % + 115 °C ≤ θ ≤ 125 °C / 4 h ≤ t ≤ 24 h [a] + 165 °C ≤ θ ≤ 175 °C / 8 h ≤ t ≤ 18 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] + 165 °C ≤ θ ≤ 175 °C / 8 h ≤ t ≤ 18 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* ≤ 12,5		12,5 < *a* ≤ 25		25 < *a* ≤ 50			50 < *a* ≤ 75			
10	Thickness of cladding on each face			%	–		–		–			–			
11	Direction of test piece				L	LT	L	LT	L	LT	ST	L	LT	ST	
12	T	Temperature	θ	°C	Ambient		Ambient		Ambient			Ambient			
13		Proof stress	$R_{p0,2}$	MPa	≥ 430	≥ 430	≥ 430	≥ 430	≥ 430	≥ 430	≥ 400	≥ 435	≥ 435	≥ 400	
14		Strength	R_m	MPa	≥ 490	≥ 495	≥ 490	≥ 495	≥ 490	≥ 495	≥ 470	≥ 490	≥ 495	≥ 470	
15		Elongation	A	%	A_{50mm} ≥ 9	A_{50mm} ≥ 6	≥ 9	≥ 6	≥ 9	≥ 6	≥ 3 [b]	≥ 9	≥ 6	≥ 3 [b]	
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	T	Temperature	θ	°C	Ambient			Ambient			Ambient		
13		Proof stress	$R_{p0,2}$	MPa	≥ 420	≥ 420	≥ 390	≥ 405	≥ 405	≥ 375	≥ 390	≥ 390	≥ 365
14		Strength	R_m	MPa	≥ 480	≥ 490	≥ 460	≥ 465	≥ 475	≥ 445	≥ 455	≥ 460	≥ 435
15		Elongation	A	%	≥ 9	≥ 6	≥ 2,5 [c]	≥ 9	≥ 5	≥ 2,5 [c]	≥ 8	≥ 4	≥ 2,5 [c]
16		Reduction of area	Z	%	–								
17	Hardness				–								
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	–	See 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	–	See EN 4400-1.			
		6	σ = 240 MPa			
		7	t ≥ 20 d			
40	Fracture toughness (K_{IC})	–	See EN 4400-1.			
		2	The "capability clause" applies			
		7	Dimensions mm	L-T MPa $\sqrt{m}$	T-L MPa $\sqrt{m}$	S-L MPa $\sqrt{m}$
			25 < *a* ≤ 50	≥ 28	≥ 25	–
			50 < *a* ≤ 75	≥ 28	≥ 25	≥ 24
			75 < *a* ≤ 160	≥ 27	≥ 24	≥ 23
44	External defects	–	See EN 4400-1.			
47	Notch/yield ratio R_e/ $R_{p0,2}$	–	See EN 4400-1.			
49	Exfoliation corrosion	–	See EN 4400-1.			
		7	Exfoliation shall not be greater than that of grade EB			
61	Internal defects	–	See EN 4400-1.			
82	Batch uniformity	–	See EN 4400-1.			
95	Marking inspection	–	See EN 4400-1.			
96	Dimensional inspection	–	See EN 4400-1.			
98	Notes	–	[a] Artificial ageing may be carried out using the following alternative single stage method : heating to a temperature of 165 °C ≤ θ ≤ 175 °C at a rate not exceeding 20 °C / h and soaking at this temperature for 8 h ≤ t ≤ 18 h. [b] Or $A_{4D} \geq 3{,}5$ if required by the purchaser [c] Or $A_{4D} \geq 3$ if required by the purchaser			
99	Typical use	–	–			