



SLOVENSKI STANDARD

SIST EN 3335:2005

01-november-2005

Aerospace series - Aluminium alloy AL-P7475-O2 - Sheet for superplastic forming (SPF) - 0,8 mm <a <6 mm

Aerospace series - Aluminium alloy AL-P7475-O2 - Sheet for superplastic forming (SPF) - 0,8 mm <a <6 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7475-O2 - Bleche für superplastische Formgebung (SPF) - 0,8 mm <a <6 mm

Série aérospatiale - Alliage d'aluminium AL-P7475-O2 - Tôles pour formage superplastique (FSP) - 0,8 mm <a <6 mm

Ta slovenski standard je istoveten z: EN 3335:2005

ICS:

49.025.20 Aluminij Aluminium

SIST EN 3335:2005 en

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EUROPEAN STANDARD

EN 3335

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2005

ICS 49.025.20

English version

Aerospace series - Aluminium alloy AL-P7475-O2 - Sheet for superplastic forming (SPF) - $0,8 \text{ mm} \leq a \leq 6 \text{ mm}$

Série aérospatiale - Alliage d'aluminium AL-P7475-O2 -
Tôles pour formage superplastique (FSP) - $0,8 \text{ mm} \leq a \leq 6$
mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7475-O2 -
Bleche für superplastische Formgebung (SPF) - $0,8 \text{ mm} \leq a$
 $\leq 6 \text{ mm}$

This European Standard was approved by CEN on 22 April 2005.

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.

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

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

Foreword

This document (EN 3335:2005) 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 December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

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, 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.

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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-P7475-
O2
Sheet for superplastic forming (SPF)
 $0,8 \text{ mm} \leq a \leq 6 \text{ mm}$

for aerospace application.

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 4400-2, *Aerospace series — Aluminium and aluminium alloy wrought products — Technical specification — Part 2: Sheet and strip.*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.

EN 3335:2005 (E)

1	Material designation		Aluminium alloy AL-P7475-										
2	Chemical composition %	Element	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
		min.	-	-	1,2	-	1,9	0,18	5,2	-	-	-	
		max.	0,10	0,12	1,9	0,06	2,6	0,25	6,2	0,06	0,05	0,15	Base
3	Method of melting		-										
4.1	Form		Sheet										
4.2	Method of production		Rolled and thermomechanically processed to enhance superplastic forming capability										
4.3	Limit dimension(s)	mm	$0,8 \leq a \leq 6$										
5	Technical specification		EN 4400-2										

6.1	Delivery condition	O2 ^a										
	Heat treatment	Thermomechanically processed to enhance superplastic forming capability										
6.2	Delivery condition code	F										
7	Use condition	O2 ^b										
	Heat treatment	Delivery condition										

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Characteristics
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8.1	Test sample(s)		See EN 4400-2.											
8.2	Test piece(s)		See EN 4400-2. https://standards.iteh.ai/catalog/standards/sist/549226e5c4b9/sist-en-3335-2005											
8.3	Heat treatment		T762 (see line 29) ^c											
9	Dimensions concerned	mm	$0,8 \leq a \leq 6$											
10	Thickness of cladding on each face	%	-											
11	Direction of test piece		L					LT						
12	Temperature	θ	°C	Ambient					Ambient					
13	Proof stress	$R_{p0,2}$	MPa	≥ 410 ^c					≥ 410 ^c					
14	T Strength	R_m	MPa	≥ 490 ^c					≥ 490 ^c					
15	Elongation	A	%	$A_{50\text{ mm}} \geq 9$ ^c					$A_{50\text{ mm}} \geq 9$ ^c					
16	Reduction of area	Z	%	-										
17	Hardness		-											
18	Shear strength	R_c	MPa	-										
19	Bending	k	-	-										
20	Impact strength		-											
21	Temperature	θ	°C	-										
22	Time		h	-										
23	C 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											

29	Reference heat treatment	–	Delivery condition °C + 460 °C ≤ θ ≤ 485 °C / WQ θ ≤ 40 °C + 115 °C ≤ θ ≤ 125 °C / 3 h ≤ t ≤ 6 h + 158 °C ≤ θ ≤ 168 °C / 14 h ≤ t ≤ 20 h			
30	Microstructure	–	See EN 4400-2.			
		2	One sample per batch unless agreement is reached between the manufacturer and purchaser that the "capability clause" may apply.			
		4	The sample shall be taken from a region of the test specimen tested at line 63 representing a level of strain to be agreed between manufacturer and purchaser.			
		6	The sample shall be examined in the un-etched condition.			
		7	Intergranular cavitation acceptance levels shall be agreed between manufacturer and purchaser			
32	Electrical conductivity	–	See EN 4400-2.			
		5	T762 (see line 29)			
		7	$\gamma \geq 22,5$ MS/m	Acceptable		
			$22,0$ MS/m ≤ γ < 22,5 MS/m	Acceptable if $R_{p0,2} \leq 470$ MPa		
			$\gamma < 22,0$ MS/m	Not acceptable		
34	Grain size	–	See EN 4400-2.			
		2	One sample per batch unless agreement is reached between the manufacturer and purchaser that the "capability clause" may apply.			
		7	G > 9			
44	External defects	–	See EN 4400-2.			
63	Superplastic forming capability	–	See EN 4400-2.			
		2	Two samples per direction per batch			
		4	Superplastic forming capability shall be assessed by an elevated temperature tensile test.			
		5	SIST EN 3335:2005 Delivery condition: O2			
		6	– Testing temperature: 510 °C ≤ θ ≤ 520 °C			
			– Soaking time: 15 min ≤ t ≤ 45 min			
		7	Elongation	AL_o	%	≥ 300
95	Marking inspection	–	See EN 4400-2.			
96	Dimensional inspection	–	See EN 4400-2.			
98	Notes	–	^a Cold working or straightening only acceptable when strain ≤ 3 %. ^b The properties of the superplastically formed parts are defined by the drawing. ^c This heat treatment and specified minimum mechanical properties relate to release testing by the manufacturer. The minimum mechanical properties may not necessarily be achieved in superplastically formed components.			
99	Typical use	–	Superplastically formed components.			

