

### SLOVENSKI STANDARD SIST EN 3333:2005

01-november-2005

Aerospace series - Aluminium alloy AL-P7475-T762 - Sheet and strip - 0,6 mm <a <6 mm

Aerospace series - Aluminium alloy AL-P7475-T762 - Sheet and strip - 0,6 mm <a <6 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7475-T762 - Bieche und Bänder - 0,6 mm <a <6 mm

Série aérospatiale - Alliage d'aluminium AL-P7475-T762 - Tôles et bandes - 0,6 mm <a <6 mm

Ta slovenski standard je istoveten z: EN 3333:2005

ICS:

49.025.20 Aluminij Aluminium

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**SIST EN 3333:2005** 

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SIST EN 3333:2005 https://standards.iteh.ai/catalog/standards/sist/d494d71c-f92a-4604-a8d2-5f3f12eef1ed/sist-en-3333-2005 EUROPEAN STANDARD NORME EUROPÉENNE

**EUROPÄISCHE NORM** 

**EN 3333** 

June 2005

ICS 49.025.20

#### English version

# Aerospace series - Aluminium alloy AL-P7475-T762 - Sheet and strip - 0,6 mm ≤a ≤6 mm

Série aérospatiale - Alliage d'aluminium AL-P7475-T762 - Tôles et bandes - 0.6 mm ≤a ≤6 mm

Luft- und Raumfahrt - Aluminiumlegierung AL-P7475-T762 - Bleche und Bänder - 0,6 mm ≤a ≤6 mm

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

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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.

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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 3333:2005) 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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.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.

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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-T762 Sheet and strip  $0.6 \text{ mm} \le a \le 6 \text{ mm}$ 

for aerospace application.

### 2 Normative references ANDARD PREVIEW

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. N 3333:2005

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EN 4258, Aerospace series — Metallic materials sixt 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)

<sup>1)</sup> Published as AECMA Prestandard at the date of publication of this standard.

1	Material designation	Aluminium alloy AL-P7475-															
2	Chemical	Element		Element	Element	ant	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Oth	Others	
	composition	composition		31	-	ŭ	IVIII	Wig	OI .	211	''	Each	Total	Al			
	%	min.		-	1	1,2	-	1,9	0,18	5,2	-	-	1	Base			
		max.		0,10	0,12	1,9	0,06	2,6	0,25	6,2	0,06	0,05	0,15	Dasc			
3	Method of melting								-								
4.1	Form							Sh	eet and st	trip							
4.2	Method of production			Rolled													
4.3	Limit dimension(s) mm			0,6 ≤ <i>a</i> ≤ 6													
5	Technical specification							E	EN 4400-2	2							

6.1	Delivery condition	F	0	T761				
	Heat treatment	-	-	+ 460 °C ≤ θ≤ 485 °C ° / WQ θ≤ 40 °C + 115 °C ≤ θ≤ 125 °C / 3 h≤ t≤ 6 h + 158 °C ≤ θ≤ 178 °C / 14 h≤ t≤ 70 h				
6.2	Delivery condition code	F	Α	Р				
7	Use condition	T762						
	Heat treatment	Delivery condition + $460 ^{\circ}\text{C} \le \theta \le 485 ^{\circ}\text{C}^{\text{b}} / \text{WQ } \theta \le 40 ^{\circ}\text{C}$ 1 Teh STAND + 115 $^{\circ}\text{C} \le \theta \le 125 ^{\circ}\text{C} / 3 ^{\circ}\text{h} \le 125 ^{\circ}\text{C} / 3 ^{\circ}\text{C} / 3 ^{\circ}\text{h} \le 125 ^{\circ}\text{C} / 3 ^{\circ}\text{C} / 3 ^{\circ}\text{h} \le 125 ^{\circ}\text{C} / 3 ^{$						

## (standards.iteh.ai)

8.1 Test sample(s) SIST EN 3333:2015 See EN 4400-						4400-2. 71c-1922-4604-28d2-					
8.2	Te	est piece(s)		nep.	5f3f12eef1ed/sist-en-33 <b>See EN)</b> 4400-2.						
8.3	Не	eat treatment			Delivery condition: O				Use condition: T762 °		
9	Di	mensions concerne	ed	mm	0,6 ≤ <i>a</i> ≤ 1,6	1,6 < <i>a</i> ≤ 2,3	2,3 < a ≤ 3,2	3,2 < a ≤ 6	0,6 ≤ <i>a</i> ≤ 1,0	1,0 < <i>a</i> ≤ 6	
10	Th ea	ickness of cladding ich face	on	%		-	_		-		
11	Di	rection of test piece	;			L	Т		LT		
12		Temperature	θ	°C	Ambient				Ambient		
13		Proof stress	R <sub>p0,2</sub>	MPa	≤ 137	≤ 1	37	≤ 144	≥ 410		
14	Т	Strength	R <sub>m</sub>	MPa	≤ 248	≤ 2	262	≤ 268	≥ 490		
15		Elongation	Α	%	A <sub>50 mm</sub> ≥ 10				A <sub>50 mm</sub> ≥ 7	A <sub>50 mm</sub> ≥ 9	
16		Reduction of area	Z	%		-					
17	Hardness				-				-		
19	Bending k -			-	1: $\alpha = 180^{\circ}$ 1,5: $\alpha = 180^{\circ}$ 2: $\alpha = 180^{\circ}$ 2,5: $\alpha = 180^{\circ}$			2,5: α = 180°	-		
20	0 Impact strength				-						
21	Temperature θ °C			°C	-						
22		Time		h				-			
23	23 C Stress σ <sub>a</sub> MPa –										
24			-								
25		Rupture stress	$\sigma_{\text{R}}$	MPa	-						
26		Elongation at rupture	Α	%	-						
27	No	otes (see line 98)						a, t	э, с		

7   y ≥ 22,7 MS/m   Acceptable if R <sub>xy</sub> ≥ 470 MPa and/or if exhibitation corrosion tests meet the acceptable of inchirals see line 49.   40   Fracture toughness (K,)   -   See EN 4400.2.						EN 3333:2005 (E)			
22.0 MS/m < y < 22.7 MS/m   Acceptable if R <sub>y23</sub> ≤ 470 MFa and/or if extolation corrosion fests meet the acceptance center's see line 48.  Practure toughness (K.)	32	2 Electrical conductivity		- See EN 4400-2.					
See EN 4400-2.   See		•		γ≥ 22,7 MS/m	Acceptable				
Fracture toughness (K,)				22,0 MS/m ≤ γ < 22,7 MS/m	Acceptable if I tests meet the	$R_{p0,2} \le 470$ MPa and/or if exfoliation corrosion acceptance criteria: see line 49.			
5   T762 *				γ < 22,0 MS/m		Not acceptable			
T-L   MPa vm   1.0 ≤ a ≤ 3.2   ≥ 95   3.2 < a ≤ 6   ≥ 85   ≥ 85	40	Fracture toughness (K <sub>c</sub> )	-		See EN	4400-2.			
Authority   Aut			5		T76	62 °			
3,2 < a < 6   > 85			7						
External defects				1,0 ≤ <i>a</i> ≤ 3,2		≥ 95			
Notchyleid ratio (R <sub>2</sub> /R <sub>202</sub> )   - See EN 4400-2.				3,2 < <i>a</i> ≤ 6		≥ 85			
Exfoliation corrosion	44	External defects	_		See EN	4400-2.			
2 The "capability clause" shall apply unless testing is required to determine acceptance: see line 32 In that case, frequency of testing shall be agreed between the manufacturer and purchaser.  7 Exfoliation corrosion shall not be greater than that of grade EB.  iTeh STANDARD PREVIEW (standards.iteh.ai)  SISTEN 33332005  https://standards.iteh.ai/siteh.ai/catalog/standards/stst/d494d71c-f92a-4604-a8d2-55B12eefled/sist-en-3333-2005  bithips://standards.iteh.ai/catalog/standards/stst/d494d71c-f92a-4604-a8d2-55B12eefled/sist-en-3333-2005  Marking inspection - See EN 4400-2.  96 Dimensional inspection - See EN 4400-2.  97 This temperature range may be extended to 525 °C (particularly to facilitate the use of a confinuous solution heat treatments are applied to the rolling inpot of sheet/stip to avoid incipient melting (overheating).  18 It is recommended that material in the O delivery condition shall not be formed, stretched and/or straightened in excess of approximately 3 % before solution heat treatment are quenching by the purchaser, facture toughness tests may be carried out on material in the tempers. However, although 1761 and 1762 properties should be similar, it should be recognised that the latter may be affected by the purchaser facine out on material in the tempers. However, although 1761 and 1762 properties should be similar, it should be recognised that the latter may be affected by the purchaser facine out on material in the tempers. However, although 1761 and 1762 properties should be similar, it should be recognised that the latter may be affected by the purchaser facine out on material in the tempers. However, although 1761 and 1762 properties should be similar, it should be recognised that the latter may be affected by the purchaser facine out on material in the tempers. However, although 1761 and 1762 properties should be similar, it should be recognised that the latter may be affected by the purchaser facine and accordingly. Tries properties cannot be guaranteed by the manufacturer.	47	Notch/yield ratio (R <sub>e</sub> /R <sub>p0,2</sub> )	_		See EN	4400-2.			
iTeh STANDARD PREVIEW (standards.iteh.ai)  SISTEN 33332005 https://stancards.iteh.ai/ai/assit/deyadr1c-f92a-4604-a8d2-58fl 2eefl ed/sist-en-3333-2005  https://stancards.iteh.ai/assit/deyadr1c-f92a-4604-a8d2-58fl 2eefl ed/sist-en-3333-2005  Marking inspection - See EN 4400-2.  96 Dimensional inspection - See EN 4400-2.  97 Notes - "This temperature range may be extended to \$25 °C (particularly to facilitate the use of a continuous solution heat treatment furnace) with the provisor that appropriate prior homogenisation heat treatments are applied to the rolling ingot and/or sheet/strip to avoid more development of survivorsheating).  10 It is recommended that material in the O delivery condition shall not be formed, stretched and/or straightened in excess of approximately 3 % before solution heat treatment and use of the provision of the provisio	49	Exfoliation corrosion	-		See EN	4400-2.			
iTeh STANDARD PREVIEW (standards.iteh.ai)  SIST EN 3333-2005 https://stancards liteh.ai/catalog/standards/sist/d494d71c-f92a-4604-a8d2-55ff12cef1ed/sist-en-3333-2005  Marking inspection - See EN 4400-2  Dimensional inspection - See EN 4400-2  Notes - "This temperature range may be extended to 525 °C (particularly to facilitate the use of a continuous solution heat treatment furnace) with the provisor that appropriate prior homogenisation heat treatments are applied to the rolling ingot and/or sheetistrip to avoid incipient melting (overheating).  It is recommended that material in the O delivery condition shall not be formed, stretched and/or straightened in excess of approximately 3 % before solution heat treatment and the coarse grain.  Due to possible problems of test piece distortion after solution heat treatment and the coarse grain.  Due to possible problems of test piece distortion after solution heat treatment and the coarse grain.  Total condition, in which case tensile tests may be carried out on material in the Total condition, in which case tensile tests may be carried out on material in the coarse grain.  Total condition, in which case tensile tests shall be carried out on material in the coarse grain.  Total condition, in which case tensile tests may be carried out on material in the coarse grain.  Total condition, in which case tensile tests may be carried out on material in the coarse grain.  En grain and the streament and the coarse grain.			2	The "capability clause" shall app In that case, frequency of testin	oly unless testing ng shall be agree	is required to determine acceptance: see line 32. d between the manufacturer and purchaser.			
Standards.iteh.ai			7	Exfoliation corr	osion shall not b	e greater than that of grade EB.			
96 Dimensional inspection  - See EN 4400-2.  98 Notes  - This temperature range may be extended to 525 °C (particularly to facilitate the use of a continuous solution heat treatment furnace) with the proviso that appropriate prior homogenisation heat treatments are applied to the rolling ingot and/or sheet/strip to avoid incipient melting (overheating).  b It is recommended that material in the O delivery condition shall not be formed, stretched and/or straightened in excess of approximately 3 % before solution heat treatment, in order to avoid the development of coarse grain.  c Due to possible problems of test piece distortion after solution heat treatment and quenching by the purchaser, fracture toughness tests may be carried out on material in the T761 condition, in which case tensile tests shall be carried out in both T761 and T762 tempers. However, although T761 and T762 properties should be similar, it should be recognised that the latter may be affected by the purchaser's processing and practices and accordingly, T762 properties cannot be guaranteed by the manufacturer.	05	https://stand	ards.	(standards.ite SIST EN 3333:200: iteh.ai/catalog/standards/sist/d-	eh.ai)  5 494d71c-f92a- 3-2005	4604-a8d2-			
Possible problems of test piece distortion after solution heat treatment and quenching by the purchaser, fracture toughness tests may be carried out on material in the T761 condition, in which case tensile tests shall be carried out in both T761 and T762 properties should be similar, it should be recognised that the latter may be guaranteed by the manufacturer.									
continuous solution heat treatment furnace) with the proviso that appropriate prior homogenisation heat treatments are applied to the rolling ingot and/or sheet/strip to avoid incipient melting (overheating).  It is recommended that material in the O delivery condition shall not be formed, stretched and/or straightened in excess of approximately 3 % before solution heat treatment, in order to avoid the development of coarse grain.  Due to possible problems of test piece distortion after solution heat treatment and quenching by the purchaser, fracture toughness tests may be carried out on material in the T761 condition, in which case tensile tests shall be carried out in both T761 and T762 tempers. However, although T761 and T762 properties should be similar, it should be recognised that the latter may be affected by the purchaser's processing and practices and accordingly, T762 properties cannot be guaranteed by the manufacturer.			_						
99 Typical use	98	Notes	_	continuous solution heat homogenisation heat treatm incipient melting (overheatin lit is recommended that ma and/or straightened in exceto avoid the development of Due to possible problems quenching by the purchasel T761 condition, in which tempers. However, althoug recognised that the latter means treatment of the solution in the s	treatment furnaments are applied and). terial in the O do so of approximation of test piece r, fracture toughr ase tensile tests phonomers and T761 and T7 ay be affected by	ce) with the proviso that appropriate prior of to the rolling ingot and/or sheet/strip to avoid elivery condition shall not be formed, stretched ely 3 % before solution heat treatment, in order distortion after solution heat treatment and ness tests may be carried out on material in the shall be carried out in both T761 and T762 62 properties should be similar, it should be the purchaser's processing and practices and,			
	99	Typical use	_		_	-			

100	_	3333:2005 (E) 		See EN 4400-2.
				Qualification programme to be agreed between manufacturer and purchaser.
		http		eh STANDARD PREVIEW (standards.iteh.ai)  SISTEN 33332005  ndards.iteh.ai/catalog/standards/sist/d494d71c-l92a-4604-a8d2-513f12eefl ed/sist-en-3333-2005