
Aeronavtika - Toplotno odporna zlitina FE-PA2602 (X4NiCrTiMoV26-15) - Topilno žarjena in izločevalno utrjena - Izkovki - De ≤ 100 mm - Rm ≥ 850 MPa

Aerospace series - Heat resisting alloy FE-PA2602 (X4NiCrTiMoV26-15) - Solution treated and precipitation treated - Forgings - De ≤ 100 mm - Rm ≥ 850 MPa

Luft- und Raumfahrt - Hochwarmfeste Legierung FE-PA2602 (X4NiCrTiMoV26-15) - Lösungsgeglüht und ausgehärtet - Schmiedestücke - De ≤ 100 mm - Rm ≥ 850 MPa

Série aérospatiale - Acier résistant à chaud FE-PA2602 (X4NiCrTiMoV26-15) - Mis en solution et précipité - Pièces forgées et pièces matriçées - De ≤ 100 mm - Rm ≥ 850 MPa

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EUROPEAN STANDARD

EN 2174

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2017

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English Version

**Aerospace series - Heat resisting alloy FE-PA2602
(X4NiCrTiMoV26-15) - Solution treated and precipitation
treated - Forgings - $De \leq 100$ mm - $Rm \geq 850$ MPa**

Série aérospatiale - Acier résistant à chaud FE-PA2602
(X4NiCrTiMoV26-15) - Mis en solution et précipité -
Pièces forgées et pièces matricées - $De \leq 100$ mm - Rm
 ≥ 850 MPa

Luft- und Raumfahrt - Hochwarmfeste Legierung FE-
PA2602 (X4NiCrTiMoV26-15) - Lösungsgeglüht und
ausgehärtet - Schmiedestücke - $De \leq 100$ mm - $Rm \geq$
850 MPa

This European Standard was approved by CEN on 4 September 2017.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents	Page
European foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Requirements	5

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European foreword

This document (EN 2174:2017) 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 June 2018 and conflicting national standards shall be withdrawn at the latest by June 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 2174:2017 (E)

Introduction

This European 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 European Standard has been prepared in accordance with EN 4500-003.

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1 Scope

This European Standard specifies the requirements relating to:

Heat resisting alloy FE-PA2602 (X4NiCrTiMoV26-15)
 Solution treated and precipitation treated
 Forgings
 $D_e \leq 100$ mm
 $R_m \geq 850$ MPa

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 4314, *Aerospace series — Heat resisting alloy FE-PA2602 (X4NiCrTiMoV26-15) — Non heat treated, forging stock — a or $D \leq 250$ mm*

EN 4500-003, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 003: Specific rules for heat resisting alloys*

EN 4700-006, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 006: Pre-production and production forgings*

3 Requirements

See Table 1.

EN 2174:2017 (E)

Table 1 — Requirements for heat resisting alloy FE-PA2602

1	Material designation		Heat resisting alloy FE-PA2602 (X4NiCrTiMoV26-15)														
2	Chemical composition %	Element	C	Si	Mn	P	S	Al	B	Cr	Mo	Ni	Ti	V	Pb	Fe	
		min.	-	-	-	-	-	-	-	30 ^a	13,5	1,00	24,0	1,70	0,10	-	Base
		max.	0,060	0,50	2,00	0,020	0,015	0,35	100 ^a	16,0	1,50	27,0	2,10	0,50	20 ^a		
3	Method of melting		Consumable electrode remelted														
4.1	Form		Forgings														
4.2	Method of production		Forged from forging stock EN 4314														
4.3	Limit dimension(s)	mm	$D_e \leq 100$														
5	Technical specification		EN 4700-006														

6.1	Delivery condition		Solution treated				Solution treated and precipitation treated			
	Heat treatment		$\theta = 980 \text{ }^\circ\text{C} \pm 10 \text{ }^\circ\text{C}/t \geq 1 \text{ h/AC}$ or faster				$\theta = 980 \text{ }^\circ\text{C} \pm 10 \text{ }^\circ\text{C}/t \geq 1 \text{ h/AC}$ or faster + $\theta = 720 \text{ }^\circ\text{C} \pm 10 \text{ }^\circ\text{C}$ (heating from $\theta = 550 \text{ }^\circ\text{C}$ to $\theta = 710 \text{ }^\circ\text{C}$ in $t \geq 1 \text{ h}$)/ $t = 16 \text{ h/AC}$			
6.2	Delivery condition code		W				U			
7	Use condition		Solution treated and precipitation treated				Delivery condition			
	Heat treatment		Delivery condition + $\theta = 720 \text{ }^\circ\text{C} \pm 10 \text{ }^\circ\text{C}$ (heating from $\theta = 550 \text{ }^\circ\text{C}$ to $\theta = 710 \text{ }^\circ\text{C}$ in $t \geq 1 \text{ h}$)/ $t = 16 \text{ h/AC}$				-			

Characteristics
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8.1	Test sample(s)		See EN 4700-006.				See EN 4700-006.									
8.2	Test piece(s)		See EN 4700-006:2174:2018				See EN 4700-006.									
8.3	Heat treatment		Solution treated				Use condition									
9	Dimensions concerned	mm	$D_e \leq 200$				$D_e \leq 100$									
10	Thickness of cladding on each face	%	-				-									
11	Direction of test piece		-				EN 4700-006									
12	Temperature	θ	°C	-				Ambient								
13	Proof stress	$R_{p0,2}$	MPa	-				≥ 580								
14	T Strength	R_m	MPa	-				≥ 850								
15	Elongation	A	%	-				≥ 20								
16	Reduction of area	Z	%	-				-								
17	Hardness		$\leq 217 \text{ HB}$				$\geq 235 \text{ HB}$									
18	Shear strength	R_c	MPa	-				-								
19	Bending	k	-	-				-								
20	Impact strength		-				-									
21	Temperature	θ	°C	-				650^b								
22	Time		h	-				$t_R \geq 30$								
23	Stress	σ_a	MPa	-				-								
24	C Elongation	a	%	-				-								
25	Rupture stress	σ_R	MPa	-				410								
26	Elongation at rupture	A	%	-				$\geq 3,5$								
27	Notes (see line 98)		a, b													

34	Grain size	-	See EN 4700-006.		
		7	Grain size number		% for area
			G ≥ 5		≥ 95
			3 ≤ G < 5		≤ 5
			G < 3		Not acceptable
44	External defects	-	See EN 4700-006.		
		1	Only penetrant flaw detection is required		
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95	Marking inspection	-	See EN 4700-006.		
96	Dimensional inspection	-	See EN 4700-006.		
98	Notes	-	a	p.p.m.	
			b	Combined notched and unnotched test piece. Rupture shall occur in the unnotched part.	
99	Typical use	-	-		