
Aeronavtika - Toplotno odporna zlitina NiCr19Fe19Nb5Mo3 (2.4668), žarjena v topilu in utrjena - Palice in profili, De ≤ 200 mm

Aerospace series - Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668) solution treated and precipitation treated - Bar and section, De ≤ 200 mm

Luft- und Raumfahrt - Hochwarmfeste Legierung NiCr19Fe19Nb5Mo3 (2.4668) lösungsgeglüht und ausgehärtet - Stangen und Profile, De ≤ 200 mm

Série aérospatiale - Alliage résistant à chaud NiCr19Fe19Nb5Mo3 (2.4668) mis en solution et précipité - Barres et profilés, De ≤ 200 mm

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Ta slovenski standard je istoveten z: EN 4376:2016

ICS:

49.025.01 Materiali za letalsko in Materials for aerospace
vesoljsko gradnjo na splošno construction in general

SIST EN 4376:2016

en,fr,de

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EUROPEAN STANDARD

EN 4376

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2016

ICS 49.025.01

English Version

Aerospace series - Heat resisting alloy
NiCr19Fe19Nb5Mo3 (2.4668) solution treated and
precipitation treated - Bar and section, $D_e \leq 200$ mm

Série aérospatiale - Alliage résistant à chaud
NiCr19Fe19Nb5Mo3 (2.4668) mis en solution et
précipté - Barres et profilés, $D_e \leq 200$ mm

Luft- und Raumfahrt - Hochwarmfeste Legierung
NiCr19Fe19Nb5Mo3 (2.4668) lösungsgeglüht und
ausgehärtet - Stangen und Profile, $D_e \leq 200$ mm

This European Standard was approved by CEN on 28 June 2014.

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iTeh STANDARD PREVIEW

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
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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European Foreword

This document (EN 4376:2016) 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 September 2016, and conflicting national standards shall be withdrawn at the latest by September 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.

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EN 4376:2016 (E)

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 4500-3.

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1 Scope

This European Standard specifies the requirements relating to:

Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668)
Solution treated and precipitation treated
Bar and section
 $D_e \leq 200$ 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 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings)*

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use*

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

EN 4700-2, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 002: Bar and section*

EN 4376:2016 (E)

1	Material designation		Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668)									
2	Chemical composition %	Element	C	Si	Mn	P	S	Al	B	Co	Cr	Cu
		min.	0,02	-	-	-	-	0,20	20*)	-	17,0	-
		max.	0,80	0,35	0,35	0,015	0,015	0,80	60*)	1,00	21,0	0,30
		Element	Fe	Mg	Mo	Nb + Ta	Ti	Ag	Bi	Ca	Pb	Ni
		min.	16,5	-	2,80	4,80	0,70	-	-	-	-	Base
		max.	20,5	0,010	3,30	5,50	1,15	5*)	1*)	0,010	5*)	
3	Method of melting		Consumable electrode remelted									
4.1	Form		Bar and section									
4.2	Method of production		Wrought									
4.3	Limit dimension(s)	mm	$D_e \leq 200$									
5	Technical specification		EN 4700-2									

6.1	Delivery condition		Solution treated	Solution treated and precipitation treated
	Heat treatment		$940^\circ\text{C} \leq \theta \leq 980^\circ\text{C}/t = 1 \text{ h/AC}$ or faster (standards.itech.ai) SIST EN 4376:2016 https://standards.itech.ai/catalog/standards/sist/c9b503ef-0279-4956-86ad-a31151cd8b61/sist-en-4376-2016	$940^\circ\text{C} \leq \theta \leq 980^\circ\text{C}/t = 1 \text{ h/AC}$ or faster $+ \theta = 720^\circ\text{C} \pm 10^\circ\text{C}/t = 8 \text{ h/FC}$ at $50^\circ\text{C per h} \leq \theta \leq 60^\circ\text{C per h}^{1)}$ to $\theta = 620^\circ\text{C} \pm 10^\circ\text{C}/t = 8 \text{ h/AC}$
6.2	Delivery condition code		W	U
7	Use condition		Solution treated and precipitation treated	Delivery condition
	Heat treatment		Delivery condition $+ \theta = 720^\circ\text{C} \pm 10^\circ\text{C}/t = 8 \text{ h/FC}$ at $50^\circ\text{C per h} \leq \theta \leq 60^\circ\text{C per h}^{1)}$ to $\theta = 620^\circ\text{C} \pm 10^\circ\text{C}/t = 8 \text{ h/AC}$	-

Characteristics

8.1	Test sample(s)		See EN 4700-2
8.2	Test piece(s)		See EN 4700-2
8.3	Heat treatment		Use condition
9	Dimension concerned	mm	$D_e \leq 200$

10	Thickness of cladding on each face		%	-			
11	Direction of test piece			L ²⁾		LT ²⁾	
12	Temperature	θ	°C	Ambient	650	Ambient	650
13	Proof stress	$R_{p0,2}$	MPa	1 035	860	1 035	860
14	Strength	R_m	MPa	1 270	1 000	1 240	960
15	Elongation	A	%	≥ 10	≥ 9	≥ 10	≥ 9
16	Reduction of area	Z	%	≥ 15	≥ 15	≥ 8	≥ 8
17	Hardness			≥ 331 HB			
18	Shear strength	R_c	MPa	-			
19	Bending	k	-	-			
20	Impact strength			-			
21	Temperature	θ	°C	650 ³⁾			
22	Time	t_R	h	SIST EN 4376:2016 https://standards.itech.ai/catalog/standards/sist/c9b503ef-0279-4956-86ed-a31151ed8b61/sist-en-4376-2016 $t_R \geq 23$			
23	Stress	σ_a	MPa	-			
24	Elongation	a	%	-			

25	Rupture stress	σ_R	MPa	690			
26	Elongation at rupture	A	%	≥ 5			
27	Notes (see line 98)			*) 1) 2) 3)			
30	Microstructure		-	See EN 4700-2			
			2	The "capability clause" applies			
			7	Homogeneous structure - No pronounced segregation			
34	Grain size		-	See EN 4700-2			
			7	G ≥ 3, 1 ≤ G < 3 accepted up to 5 % max. area			
44	External defects		-	See EN 4700-2			
51	Macrostructure		-	See EN 4700-2			