BS EN 4377:2015

BSI Standards Publication

Aerospace series — Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668) — Non heat treated — Forging stock — a or D ≤ 300 mm

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National foreword

This British Standard is the UK implementation of EN 4377:2015.

The UK participation in its preparation was entrusted to Technical Committee ACE/61/-/48, Heat Resisting Alloys for Aerospace Purposes.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

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EN 4377

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English Version

Aerospace series - Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668) - Non heat treated - Forging stock - a or D ≤ 300 mm

Série aérospatiale - Alliage résistant à chaud NiCr19Fe19Nb5Mo3 (2.4668) - Non traité - Produits destinés à la forge - a ou D ≤ 300 mm

Luft- und Raumfahrt - Hochwarmfeste Legierung NiCr19Fe19Nb5Mo3 (2.4668) - Schmiedezustand - Schmiedevormaterial - a oder D ≤ 300 mm

This European Standard was approved by CEN on 8 November 2014.

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

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

Contents

European foreword

This document (EN 4377:2015) 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 European 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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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.

1 Scope

This European Standard specifies the requirements relating to:

Heat resisting alloy NiCr19Fe19Nb5Mo3 (2.4668)
Non heat treated
Forging stock
a or $D \leq 300$ 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)*

prEN 2860-02, *Aerospace series — Heat resisting alloys — Forging stock and forgings — Technical specification — Part 2: Forging stock* [1)]

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*

1) Published as ASD-STAN Prestandard at the date of publication of this standard (www.asd-stan.org).

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.	0,080	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		Forging stock									
4.2	Method of production		–									
4.3	Limit dimension(s)	mm	a or $D \leq 300$									
5	Technical specification		prEN 2860-02									

6.1	Delivery condition	Non heat treated
	Heat treatment	–
6.2	Delivery condition code	U
7	Use condition	Delivery condition
	Heat treatment	–

Characteristics

8.1	Test sample(s)			See prEN 2860-02				
8.2	Test piece(s)			See prEN 2860-02				
8.3	Heat treatment			See line 29				
9	Dimensions concerned		mm	$D_e \leq 200$				
10	Thickness of cladding on each face		%	–				
11	Direction of test piece			L 1)		LT 1)		
12	T	Temperature	θ °C	Ambient	650	Ambient	650	
13	T	Proof stress	$R_{p0,2}$ MPa	1 035	860	1 035	860	
14	T	Strength	R_m MPa	1 270	1 000	1 240	960	
15	T	Elongation	A %	≥ 10	≥ 9	≥ 10	≥ 9	
16	T	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	C	Temperature	θ °C	650 2)				
22	C	Time	h	$t_R \geq 23$				
23	C	Stress	σ_a MPa	–				
24	C	Elongation	a %	–				
25	C	Rupture stress	σ_R MPa	690				
26	C	Elongation at rupture	A %	≥ 5				
27	Notes (see line 98)			*) 1) 2)				

29	Reference heat treatment	–	Solution treated and precipitation treated 940 °C ≤ θ ≤ 980 °C/t = 1/AC or faster + θ =720 °C ± 10 °C/t = 8 h/FC at 50 °C per h ≤ θ ≤ 60 °C per h [3)] to θ = 620 °C ± 10 °C/t = 8 h/AC
44	External defects	–	See prEN 2860-02.
51	Macrostructure	–	See prEN 2860-02.
		7	No harmful defects.
61	Internal defects	–	See prEN 2860-02.
		7	Class 3
95	Marking inspection	–	See prEN 2860-02.
96	Dimensional inspection	–	See prEN 2860-02.
98	Notes	–	*) p.p.m. 1) If test results in LT direction are successful, L test direction is not requested. 2) Combined notched-unnotched test piece. 3) If the rate of furnace cooling is outside this range then the precipitation time at 620 °C ± 10 °C shall be increased to ≥ 18 h.
99	Typical use	–	–

100	–	Product qualification	–	See EN 2043.
				Qualification programme to be agreed between manufacturer and purchaser.

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