SLOVENSKI STANDARD
SIST EN 4884:2023

01-marec-2023

Aeronavtika - Jeklo X3CrNiMoAl (1.4534) - Indukcijsko taljeno v vakuumu in pretaljeno s taljivo elektrodo - Topilno žarjena in izločevalno utrjena - Palice za obdelavo - a ali D ≤ 200 mm - 1200 MPa ≤ Rm ≤ 1350 MPa

Aerospace series - Steel X3CrNiMoAl (1.4534) - Vacuum induction melted and consumable electrode remelted - Solution treated and precipitation treated - Bars for machining - a or D ≤ 200 mm - 1 200 MPa ≤ Rm ≤ 1 350 MPa

Luft- und Raumfahrt - Stahl X3CrNiMoAl (1.4534) - Vakuuminduktionserschmolzen und mit selbstverzehrender Elektrode umgeschmolzen - Lösungsgeglüht und ausscheidungsgehärtet - Stangen für die Bearbeitung - a oder D ≤ 200 mm - 1 200 MPa ≤ Rm ≤ 1 350 MPa

Série aérospatiale - Acier X3CrNiMoAl (1.4534) - Élaboré sous vide par induction et refondu à l'électrode consommable - Mis en solution et précipité - Barres pour usinage - a ou D ≤ 200 mm - 1 200 MPa ≤ Rm ≤ 1 350 MPa

Ta slovenski standard je istoveten z: **EN 4884:2022**

ICS:

49.025.10	Jekla	Steels
77.140.60	Jeklene palice in drogovi	Steel bars and rods

SIST EN 4884:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 4884

December 2022

ICS 49.025.10

English Version

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

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Ref. No. EN 4884:2022 E

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European foreword

This document (EN 4884:2022) 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 document 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2023, and conflicting national standards shall be withdrawn at the latest by June 2023.

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Introduction

This document 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 document has been prepared in accordance with EN 4500-005.

1 Scope

This document specifies the requirements relating to:

Steel X3CrNiMoAl (1.4534)

Vacuum induction melted and consumable electrode remelted

Solution treated and precipitation treated

Bars for machining

a or $D \leq 200$ mm

$1\,200 \text{ MPa} \leq R_m \leq 1\,350 \text{ MPa}$

for aerospace applications.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4700-002, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 002: Bars and sections*

AMS 2315, *Determination of Delta Ferrite Content* [1)]

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

4 Requirements

See Table 1.

[1)] Published by: SAE International (US), https://www.sae.org/.

Table 1 — Requirements for steel X3CrNiMoAl (1.4534)

1	Material designation		Steel X3CrNiMoAl (1.4534)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Al	N[2]	Fe
		min.	—	—	—	—	—	12,25	2,0	7,5	0,90	—	Base
		max.	0,05	0,10	0,10	0,010	0,008	13,25	2,5	8,5	1,35	0,010	
3	Method of melting		Vacuum induction melted and consumable electrode remelted										
4.1	Form		Bars for machining										
4.2	Method of production		—										
4.3	Limit dimension(s)	mm	a or $D \leq 200$										
5	Technical specification		EN 4700-002										

6.1	Delivery condition	Solution treated	Solution treated and precipitation treated
	Heat treatment	900 °C ≤ θ ≤ 950 °C/t ≥ 30 min/AC, OQ, WQ or PQ + cool to θ ≤ 15 °C	900 °C ≤ θ ≤ 950 °C/t ≥ 30 min/AC, OQ, WQ or PQ + cool to θ ≤ 15 °C 550 °C ≤ θ ≤ 570 °C/t = 4 h/AC or WQ
6.2	Delivery condition code	W	U
7	Use condition	Solution treated and precipitation treated	Delivery condition
	Heat treatment	Delivery condition + 540 °C ≤ θ ≤ 560 °C/t ≥ 4 h/AC	—

Characteristics

8.1	Test sample(s)				See EN 4700-002.			
8.2	Test piece(s)				See EN 4700-002.			
8.3	Heat treatment				Solution treated	Use condition		
9	Dimensions concerned			mm	a or $D \leq 200$	a or $D \leq 75$	75 < a or $D \leq 200$	
10	Thickness of cladding on each face			%	—	—	—	
11	Direction of test piece				—	L	L	T
12	T	Temperature	θ	°C	—	Ambient	Ambient	Ambient
13	T	Proof stress	$R_{p0,2}$	MPa	—	≥ 1 150	≥ 1 150	≥ 1 150
14	T	Strength	R_m	MPa	—	1 200 ≤ R_m ≤ 1 350 MPa	1 200 ≤ R_m ≤ 1 350 MPa	1 200 ≤ R_m ≤ 1 350 MPa
15	T	Elongation	A	%	—	≥ 10	≥ 10	≥ 10
16	T	Reduction of area	Z	%	—	≥ 50	≥ 50	≥ 45
17	Hardness				≤ 363 HBW	38 ≤ HRC ≤ 43 [a]	38 ≤ HRC ≤ 43 [a]	
18	Shear strength		R_c	MPa	—	—	—	
19	Bending		k	—	—	—	—	
20	Impact strength		KV	J	—	At ambient temperature KV ≥ 60 J Notch direction T at −30 °C KV ≥ 30 J Notch direction T	At ambient temperature KV ≥ 60 J Notch direction L at −30 °C KV ≥ 30 J Notch direction L	At ambient temperature KV ≥ 30 J Notch direction T at −30 °C KV ≥ 15 J Notch direction T
21	C	Temperature	θ	°C	—			
22	C	Time		h	—			
23	C	Stress	σ_a	MPa	—			
24	C	Elongation	a	%	—			
25	C	Rupture stress	σ_R	MPa	—			
26	C	Elongation at rupture	A	%	—			
27	Notes (see line 98)				a			

30	Microstructure	—	See EN 4700-002.		
		1	See AMS 2315.		
		7	The δ ferrite content shall not exceed 3 %.		
34	Grain size	—	See EN 4700-002.		
		7	a or D < 150 mm	$G \geq 6$ with occasional grains as large as $G = 4$ permissible	
			a or $D \geq 150$ mm	$G \geq 5$ with occasional grains as large as $G = 4$ permissible	
44	External imperfections (visual testing - VT)	—	See EN 4700-002.		
		1	Visual testing (VT)		
50	Inclusion content	—	See EN 4700-002.		
		7	Category 3		
51	Macrostructure		See EN 4700-002.		
			Class	Condition	Severity
			1	Freckles	*A*
			2	White spots	*A*
			3	Radial segregation	*A*
			4	Ring pattern	*B*
61	Internal imperfections (ultrasonic testing - UT)	—	See EN 4700-002.		
		6	a or $D \leq 100$ mm may be tested either on the product or at an earlier stage of manufacturing		
		7	Class 3		
95	Marking inspection	—	See EN 4700-002.		
96	Dimensional inspection	—	See EN 4700-002.		
98	Notes	—	a The hardness values determined may deviate from the requirements of the material data sheet if the values of the relevant tensile test conform to the requirements of the material data sheet.		
99	Typical use	—	—		

100	—	Product qualification	—	—
				The qualification programme shall be agreed between manufacturer and purchaser.