
Aeronavtika - Jeklo X4CrNiMo16-5-1 - Taljeno na zraku - Utrjeno in mehko žarjeno - Pločevina in plošče - $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq 1050 \text{ MPa}$

Aerospace series - Steel X4CrNiMo16-5-1 - Air melted - Hardened and tempered - Sheets and plates - $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq 1050 \text{ MPa}$

Luft- und Raumfahrt - Stahl X4CrNiMo16-5-1 - Lufterschmolzen - Gehärtet- und angelassen - Bleche und Platten - $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq 1050 \text{ MPa}$

Série aérospatiale - Acier X4CrNiMo16-5-1 - Élaboré à l'air - Trempé et revenu - Tôles et plaques - $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq 1050 \text{ MPa}$

Ta slovenski standard je istoveten z: EN 4890:2022

ICS:

49.025.10	Jekla	Steels
77.140.50	Ploščati jekleni izdelki in polizdelki	Flat steel products and semi-products

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EUROPEAN STANDARD

EN 4890

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2022

ICS 49.025.10

English Version

Aerospace series - Steel X4CrNiMo16-5-1 - Air melted -
Hardened and tempered - Sheets and plates - $0,3 \text{ mm} \leq a \leq$
 50 mm - $900 \text{ MPa} \leq R_m \leq 1\ 050 \text{ MPa}$

Série aérospatiale - Acier X4CrNiMo16-5-1 - Élaboré à
l'air - Trempé et revenu - Tôles et plaques - $0,3 \text{ mm}$
 $\leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq 1\ 050 \text{ MPa}$

Luft- und Raumfahrt - Stahl X4CrNiMo16-5-1 -
Lufterschmolzen - Gehärtet- und angelassen - Bleche
und Platten - $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$ - $900 \text{ MPa} \leq R_m \leq$
 $1\ 050 \text{ MPa}$

This European Standard was approved by CEN on 13 March 2022.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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

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European foreword

This document (EN 4890:2022) 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-STAN, 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 November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

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 document: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 4890:2022 (E)

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.

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1 Scope

This European Standard specifies the requirements relating to:

Steel X4CrNiMo16-5-1
Air melted
Hardened and tempered
Sheets and plates
 $0,3 \text{ mm} \leq a \leq 50 \text{ mm}$
 $900 \text{ MPa} \leq R_m \leq 1\ 050 \text{ MPa}$

for aerospace applications.

ASD-STAN designation: FE-PM 3504.

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 2951, *Aerospace series — Metallic materials — Micrographic determination of content of non-metallic inclusions*

EN 4050-4, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 4: Acceptance criteria*

EN 4700-001, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 001: Plate, sheet and strip*

3 Terms and definitions

No terms and definitions are listed in this document.

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

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Requirements

According to Table 1.

Table 1 — Requirements for Steel X4CrNiMo16-5

1	Material designation		Steel X4CrNiMo16-5									
2	Chemical composition %	Element	C	Si	Mn	P	S	N	Cr	Mo	Ni	Fe
		min.	—	—	—	—	—	0,02	15,00	0,80	4,00	Base
		max.	0,06	0,70	1,50	0,040	0,015	0,08	17,00	1,50	6,00	
3	Method of melting		Air melted									
4.1	Form		Sheets and plates									
4.2	Method of production		Hot rolled									
4.3	Limit dimension(s)	mm	$0,3 \leq a \leq 50$									
5	Technical specification		EN 4700-001									

6.1	Delivery condition		Softened					Hardened and tempered				
	Heat treatment		—					$1\ 010\ ^\circ\text{C} \leq \theta \leq 1\ 060\ ^\circ\text{C}$ AC or AQ, OQ or PQ + Tempered $580\ ^\circ\text{C} \leq \theta \leq 650\ ^\circ\text{C}$ Or process according to manufacturer and purchaser agreement				
6.2	Delivery condition code		A					U				
7	Use condition		Hardened and tempered					Hardened and tempered				
	Heat treatment		Delivery condition $+ 1\ 010\ ^\circ\text{C} \leq \theta \leq 1\ 060\ ^\circ\text{C}$ AC or AQ or OQ + Tempered $580\ ^\circ\text{C} \leq \theta \leq 650\ ^\circ\text{C}$ or For tempering before process according to manufacturer and purchaser agreement					Delivery condition				

Characteristics

8.1	Test sample(s)		According to EN 4700-001.									
8.2	Test piece(s)		According to EN 4700-001.									
8.3	Heat treatment		Softened					Delivery condition				
9	Dimensions concerned	mm	$a \leq 50$	$0,3 \leq a \leq 2$	$2 < a \leq 25$	$25 < a \leq 50$	$a \leq 50$					
10	Thickness of cladding on each face	%	—	—	—	—	—					
11	Direction of test piece		—	L	L	L	L	LT				
12	Temperature	θ	$^\circ\text{C}$	—	Ambient	Ambient	—	—				
13	Proof stress	$R_{p0,2}$	MPa	—	≥ 700	≥ 700	≥ 700	≥ 700				
14	T Strength	R_m	MPa	—	$900 \leq R_m \leq 1\ 050$	$900 \leq R_m \leq 1\ 050$	$900 \leq R_m \leq 1\ 050$	$900 \leq R_m \leq 1\ 050$				
15	Elongation	A	%	—	$A_{50\ \text{mm}} \geq 8$	$A_{5,65\ \sqrt{S_0}} \geq 16$	$A_{5,65\ \sqrt{S_0}} \geq 16$	$A_{5,65\ \sqrt{S_0}} \geq 12$				
16	Reduction of area	Z	%	—	—	—	—	—				
17	Hardness		$\leq 255\ \text{HB}$		—	$280 \leq \text{HV} \leq 320$	$280 \leq \text{HV} \leq 320$	$280 \leq \text{HV} \leq 320$				
18	Shear strength	R_c	MPa	—	—	—	—	—				
19	Bending	k	—	—	$k = 2; \alpha = 180^\circ;$ 2 for L; 2 for T	$k = 2; \alpha = 180^\circ;$ 2 for L; 2 for T	—	—				
20	Impact strength	KV	—	—	—	$\geq 120\ \text{J}$ at $20\ ^\circ\text{C}$ Notch Direction T $\geq 70\ \text{J}$ at $-40\ ^\circ\text{C}$ Notch direction T (with $a \geq 12\ \text{mm}$)	$\geq 120\ \text{J}$ at $20\ ^\circ\text{C}$ Notch Direction T $\geq 70\ \text{J}$ at $-40\ ^\circ\text{C}$ Notch direction T	L				
21	Temperature	θ	$^\circ\text{C}$	—								
22	Time		h	—								
23	Stress	σ_a	MPa	—								
24	C Elongation	a	%	—								
25	Rupture stress	σ_R	MPa	—								
26	Elongation at rupture	A	%	—								
27	Notes (see line 98)		—									

30	Microstructure	—	According to EN 4700-001.
		7	The δ -ferrite content shall not exceed 5 %
34	Grain size	—	According to EN 4700-001.
		7	$G \geq 5$
44	External imperfection (visual testing - VT)	—	According to EN 4700-001.
50	Inclusion content	—	According to EN 4700-001.
		7	According to EN 4700-001.
61	Internal imperfections (ultrasonic testing - UT)	—	—
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95	Marking inspection	—	According to EN 4700-001.
96	Dimensional inspection	—	According to EN 4700-001.
98	Notes	—	—
99	Typical use	—	—

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100	—	Product qualification	—	—
				Qualification programme to be agreed between manufacturer and purchaser.

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