
Aeronavtika - Jeklo X4CrNiMo16-5-1 (1.4418) - Taljeno - Utrjeno in mehko žarjeno - Izkovki - De ≤ 200 mm - 1150 MPa ≤ Rm ≤ 1300 MPa

Aerospace series - Steel X4CrNiMo16-5-1 (1.4418) - Air melted - Hardened and tempered - Forgings - De ≤ 200 mm - 1150 MPa ≤ Rm ≤ 1300 MPa

Luft- und Raumfahrt - Stahl X4CrNiMo16-5-1 (1.4418) - Lufterschmolzen - Gehärtet- und angelassen - Schmiedestücke - De ≤ 200 mm - 1150 MPa ≤ Rm ≤ 1300 MPa

Série aérospatiale - Acier X4CrNiMo16-5-1 (1.4418) - Élaboré à l'air - Trempé et revenu - Pièces forgées ou matricées - De ≤ 200 mm - 1150 MPa ≤ Rm ≤ 1300 MPa

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Ta slovenski standard je istoveten z: prEN 4627

ICS:

49.025.10	Jekla	Steels
77.140.85	Železni in jekleni kovani izdelki	Iron and steel forgings

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en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 4627

May 2021

ICS 49.025.10

Will supersede EN 4627:2014

English Version

**Aerospace series - Steel X4CrNiMo16-5-1 (1.4418) - Air
melted - Hardened and tempered - Forgings - $De \leq 200$ mm
- $1\ 150\ \text{MPa} \leq R_m \leq 1\ 300\ \text{MPa}$**

Série aérospatiale - Acier X4CrNiMo16-5-1 (1.4418) -
Élaboré à l'air - Trempé et revenu - Pièces forgées ou
matricées - $De \leq 200$ mm - $1\ 150\ \text{MPa} \leq R_m \leq 1\ 300$
MPa

Luft- und Raumfahrt - Stahl X4CrNiMo16-5-1 (1.4418)
- Lufterschmolzen - Gehärtet- und angelassen -
Schmiedestücke - $De \leq 200$ mm - $1\ 150\ \text{MPa} \leq R_m \leq 1$
300 MPa

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard 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.

This draft European Standard was established by CEN 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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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 4627:2021) 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 will supersede EN 4627:2014.

This document is a technical revision of EN 4627:2014.

This document is currently submitted to the CEN Enquiry.

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prEN 4627:2021 (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 document specifies the requirements relating to:

- Steel X4CrNiMo16-5-1 (1.4418);
- Air melted;
- Hardened and tempered;
- Forgings;
- $D_e \leq 200$ mm;
- $1\ 150\ \text{MPa} \leq R_m \leq 1\ 300\ \text{MPa}$;

for aerospace applications.

NOTE Other common designations:

- AIR: Z 8 CND 17-04.
- Only the chemical composition of this document are considered.

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 2950, *Aerospace series - Test method - Wrought heat resisting alloys Semi-finished products and parts - Conditions for macrographic and micrographic examination - Atlas of structures and defects*

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 4629, *Aerospace series - Steel X4CrNiMo16-5-1 (1.4418) - Air melted - Softened - Forging stock - $D_e \leq 300$ mm*

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

EN ISO 643, *Steels - Micrographic determination of the apparent grain size (ISO 643)*

AMS 2315, *Determination of delta ferrite content*¹⁾

¹⁾ Published by SAE International (US) Society of Automotive Engineers (<http://www.sae.org/>).

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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:

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

4 Requirements

See Table 1.

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Table 1 — Requirements for steel X4CrNiMo16-5-1 (1.4418) — Forgings

1	Material designation	Steel X4CrNiMo16-5-1 (1.4418)										
2	Chemical composition %	Element	C	Si	Mn	p b	S b	N	Cr	Mo	Ni	Fe
		min.	—	—	—	—	—	0,020	15,00	0,80	4,00	Base
		max.	0,06	0,70	1,50	0,030	0,005	—	17,00	1,50	6,00	
3	Method of melting	Air melted										
4.1	Form	Forgings										
4.2	Method of production	Forged from forging stock EN 4629										
4.3	Limit dimension(s)	mm	$D_e \leq 200$									
5	Technical specification	EN 4700-006										

6.1	Delivery condition	Annealed					Hardened + Tempered					
	Heat treatment	—					1 010 °C ≤ θ ≤ 1 060 °C/PQ, OQ or WQ ^c + Tempered 375 °C ≤ θ ≤ 405 °C ^d Or Tempered 480 °C ≤ θ ≤ 550 °C					
6.2	Delivery condition code	A					U					
7	Use condition	Hardened					Delivery condition					
	Heat treatment	Delivery condition + 1 010 °C ≤ θ ≤ 1 060 °C/PQ, OQ or WQ ^c + Tempered 375 °C ≤ θ ≤ 405 °C Or Tempered 480 °C ≤ θ ≤ 550 °C					—					

Characteristics

8.1	Test sample(s)	EN 4700-006 Procedure A, B, C or D		EN 4700-006 Procedure A or B (separately forged)		EN 4700-006 Procedure C (integral) and Procedure D (machined from forging)					
8.2	Test piece(s)	See EN 4700-006.				See EN 4700-006.					
8.3	Heat treatment	Annealed		Use condition		Use condition					
9	Dimensions concerned	mm	$D \leq 200$		$25 \leq a$ or $D \leq 30$		$D \leq 200$				
10	Thickness of cladding on each face	%	—								
11	Direction of test piece			L		L		LT			
12	Temperature	θ	°C	Ambient		Ambient		Ambient		Ambient	
13	Proof stress	$R_{p0,2}$	MPa	—		≥ 900		≥ 900			
14	Strength	R_m	MPa	—		1 150 ≤ R_m ≤ 1 300		1 150 ≤ R_m ≤ 1 300			
15	Elongation	A	%	—		≥ 14		≥ 14		≥ 8	
16	Reduction of area	Z	%	—		—		—		—	
17	Hardness	HBW	≤ 293		341 ≤ HBW ≤ 401		341 ≤ HBW ≤ 401				
18	Shear strength	R_c	MPa	—							
19	Bending	k	—								
20	Impact strength ^a	KV	J	—		≥ 100 J at 20 °C Notch direction $T \geq 60$ J at - 30 °C Notch direction T (see line 98)		≥ 100 J at 20 °C Notch direction $T \geq 60$ J at - 30 °C Notch direction T (see line 98)		≥ 50 J at 20 °C Notch direction $L \geq 20$ J at - 30 °C Notch direction L (see line 98)	
21	Temperature	θ	°C	—							
22	Time	h		—							
23	Stress	σ_a	MPa	—							
24	Elongation	a	%	—							
25	Rupture stress	σ_R	MPa	—							
26	Elongation at rupture	A	%	—							
27	Notes (see line 98)	a, b, c, d									

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30	Microstructure	—	EN 4700-006
		1	See AMS 2315.
		7	The δ ferrite content shall not exceed 5 %, and austenite shall not exceed 10 %.
34	Grain size	—	EN 4700-006
		1	See EN ISO 643.
		7	$G \geq 5$
44	External imperfections Visual testing (VT)	—	EN 4700-006
50	Inclusion content	—	EN 4700-006
		1	See EN 2951.
		7	Category 2
51	Macrostructure (grain flow)	—	EN 4700-006
		1	See EN 2950.
61	Internal imperfections Ultrasonic testing (UT)	—	EN 4700-006
		1	See EN 4050-4.
		7	Class 2
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95	Marking inspection	—	EN 4700-006
96	Dimensional inspection	—	EN 4700-006
98	Notes	—	<p>a After agreement between manufacturer and purchaser a more stringent impact strength should be required (e.g. ≥ 50 J at -40 °C direction L and ≥ 20 J at -40 °C direction T),</p> <p>b For specific welding applications (e.g. high power beam), and after agreement between manufacturer and purchaser, $S + P$ should be equal or less than 0,023 %.</p> <p>c Air quenching may be used for $D_e \leq 20$ mm.</p> <p>d The temperature range may be increased subject to agreement between the customer and the supplier.</p>
99	Typical use	—	—