

BS EN 2278:2014



BSI Standards Publication

**Aerospace series — Steel
X12CrNiMoV12-3 (1.4933) —
900 MPa ≤ Rm ≤ 1 100 MPa
— Bars — De ≤ 150 mm**

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National foreword

This British Standard is the UK implementation of EN 2278:2014.

The UK participation in its preparation was entrusted to Technical Committee ACE/61/-/15, Steels for Aerospace Purposes.

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

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Published by BSI Standards Limited 2014

ISBN 978 0 580 86329 5
ICS 49.025.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2014.

Amendments/corrigenda issued since publication

Date	Text affected
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ICS 49.025.10

English Version

**Aerospace series - Steel X12CrNiMoV12-3 (1.4933) - 900 MPa ≤
Rm ≤ 1 100 MPa - Bars - De ≤ 150 mm**Série aérospatiale - Acier X12CrNiMoV12-3 (1.4933) - 900
MPa ≤ Rm ≤ 1 100 MPa - Barres - De ≤ 150 mmLuft- und Raumfahrt - Stahl X12CrNiMoV12-3 (1.4933) -
900 MPa ≤ Rm ≤ 1 100 MPa - Stangen - De ≤ 150 mm

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Foreword

This document (EN 2278:2014) 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.

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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 4500-005.

1 Scope

This European Standard specifies the requirements relating to:

Steel X12CrNiMoV12-3 (1.4933)
 $900 \text{ MPa} \leq R_m \leq 1\,100 \text{ MPa}$
Bars
 $D_e \leq 150 \text{ mm}$

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 4500-005, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 005: Specific rules for steels*

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

1	Material designation		Steel X12CrNiMoV12-3 (1.4933)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	V	N	Fe
		min.	0,08	–	0,50	–	–	11,0	1,50	2,00	0,25	0,020	Base
		max.	0,13	0,35	0,90	0,030	0,025	12,5	2,00	3,00	0,40	0,040	
3	Method of melting		Air melted										
4.1	Form		Bars										
4.2	Method of production		–										
4.3	Limit dimension(s)	mm	$D_e \leq 150$										
5	Technical specification		EN 4700-002										

6.1	Delivery condition		Softened					Hardened and tempered				
	Heat treatment		–					1 020 °C ≤ θ ≤ 1 050 °C ^a / OQ or AC + $\theta \geq 640$ °C				
6.2	Delivery condition code		A					U				
7	Use condition		Hardened and tempered					Delivery condition				
	Heat treatment		Delivery condition + 1 020 °C ≤ θ ≤ 1 050 °C ^a / OQ or AC + $\theta \geq 640$ °C					–				

Characteristics

8.1	Test sample(s)		See EN 4700-002.											
8.2	Test piece(s)		See EN 4700-002.											
8.3	Heat treatment		Softened					Hardened and tempered						
9	Dimensions concerned	mm	$D_e \leq 150$											
10	Thickness of cladding on each face	%	–											
11	Direction of test piece		–					L or T ^b						
12	Temperature	θ	°C	Ambient										
13	Proof stress	$R_{p0,2}$	MPa	–					≥ 750					
14	T Strength	R_m	MPa	–					900 ≤ R_m ≤ 1 100					
15	Elongation	A	%	–					≥ 14 ^c					
16	Reduction of area	Z	%	–					≥ 40					
17	Hardness		HBW ≤ 311					269 ≤ HBW ≤ 331						
18	Shear strength	R_c	MPa	–										
19	Bending	k	–	–										
20	Impact strength		–					≥ 30 J at 20 °C Notch direction T						
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											

34	Grain size	–	See EN 4700-002.
		7	$G \geq 5$ some 3 permitted
44	External defects	–	See EN 4700-002.
		1	Visual
50	Cleanliness/inclusion content	–	See EN 4700-002.
		7	Category 2
61	Internal defects	–	See EN 4700-002.
		7	$D_e \leq 75$ mm – class 3 75 mm $< D_e \leq 150$ mm – class 2
95	Marking inspection	–	See EN 4700-002.
96	Dimensional inspection	–	See EN 4700-002.
98	Notes	–	<p>a For optimum corrosion resistance 990 °C $\leq \theta \leq 1\ 030$ °C is recommended.</p> <p>b 75 mm $\leq D_e \leq 150$ mm may be tested in L or T direction.</p> <p>c $A \geq 10$ % if material is cold worked.</p>
99	Typical use	–	–

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

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