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**Aeronavtika - Jeklo FE-PM1503 (X3CrNiMoAl 13-8-2) - Indukcijsko taljeno v vakuumu in pretaljeno s taljivo elektrodo - Topilno žarjeno in izločevalno utrjeno - Palice za obdelavo - a ali  $D \leq 150$  mm -  $R_m \geq 1400$  MPa**

Aerospace series - Steel FE-PM1503 (X3CrNiMoAl 13-8-2) - Vacuum induction melted and consumable electrode remelted - Solution treated and precipitation treated - Bar for machining - a or  $D \leq 150$  mm -  $R_m \geq 1400$  MPa

Luft- und Raumfahrt - Stahl FE-PM1503 (X3CrNiMoAl 13-8-2) - Vakuuminduktionserschmolzen und mit selbstverzehrender Elektrode umgeschmolzen - Lösungsgeglüht und ausgelagert - Stangen zur Spanenden Bearbeitung - a oder  $D \leq 150$  mm -  $R_m \geq 1400$  MPa

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Série aérospatiale - Acier FE-PM1503 (X3CrNiMoAl 13-8-2) - Élaboré sous vide par induction et refondu à l'électrode consommable - Mis en solution et vieilli - Barres pour usinage - a ou  $D \leq 150$  mm -  $R_m \geq 1400$  MPa

**Ta slovenski standard je istoveten z: EN 3358:2020**

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**ICS:**

49.025.10      Jekla

Steels

**SIST EN 3358:2020**

**en,fr,de**

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EUROPEAN STANDARD

EN 3358

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2020

ICS 49.025.10

English Version

**Aerospace series - Steel FE-PM1503 (X3CrNiMoAl 13-8-2)  
- Vacuum induction melted and consumable electrode  
remelted - Solution treated and precipitation treated - Bar  
for machining - a or D ≤ 150 mm - Rm ≥ 1 400 MPa**

Série aérospatiale - Acier FE-PM1503 (X3CrNiMoAl 13-8-2) - Élaboré sous vide par induction et refondu à l'électrode consommable - Mis en solution et précipité - Barre pour usinage - a ou D ≤ 150 mm - Rm ≥ 1 400 MPa

Luft- und Raumfahrt - Stahl FE-PM1503 (X3CrNiMoAl 13-8-2) - Vakuuminduktionserschmolzen und mit selbstverzehrender Elektrode umgeschmolzen - Lösungsgeglüht und ausscheidungsgehärtet - Stange zur spanenden Bearbeitung - a oder D ≤ 150 mm - Rm ≥ 1 400 MPa

This European Standard was approved by CEN on 14 January 2019.

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.

[SIST EN 3358:2020](https://standards.jteha.com/catalog/standards/sis/7493318-2738-42cf-a891-934234987654/EN-3358-2020)

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

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

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## European foreword

This document (EN 3358:2020) 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.

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 July 2020, and conflicting national standards shall be withdrawn at the latest by July 2020.

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 organisations of the following countries are bound to implement this European Standard: 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 3358:2020 (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 FE-PM1503 (X3CrNiMoAl 13-8-2)  
Vacuum induction melted and consumable electrode remelted  
Solution treated and precipitation treated  
Bar for machining  
 $a$  or  $D \leq 150$  mm  
 $R_m \geq 1\,400$  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 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings)*

EN 4050-1, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 1: General requirements*

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

AMS 2315 G, *Determination of delta ferrite content*

ASTM A 604-07, *Standard practice for macrotech testing of consumable electrode remelted steel bars and billets*

## 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.

## EN 3358:2019 (E)

Table 1 — Requirements for steel FE-PM1503 (X3CrNiMoAl 13-8-2)

1	Material designation	Steel FE-PM1503 (X3CrNiMoAl 13-8-2)											
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Al	N <sub>2</sub>	Fe
		min.	—	—	—	—	—	12,25	2,00	7,50	0,90	—	Base
		max.	0,05	0,10	0,10	0,010	0,008	13,25	2,50	8,50	1,35	0,010	
3	Method of melting	Vacuum induction melted and consumable electrode remelted											
4.1	Form	Bar for machining											
4.2	Method of production	—											
4.3	Limit dimension(s)	mm	$a$ or $D \leq 150$										
5	Technical specification	See EN 4700-002.											

6.1	Delivery condition	Solution treated	Solution treated and precipitation treated
	Heat treatment	$900\text{ °C} \leq \theta \leq 950\text{ °C}/t \geq 30\text{ min}/\text{AC}, \text{OQ}$ or $\text{WQ}$ + cool to $\theta \leq 15\text{ °C}$	$900\text{ °C} \leq \theta \leq 950\text{ °C}/t \geq 30\text{ min}/\text{AC}, \text{OQ}$ or $\text{WQ}$ + cool to $\theta \leq 15\text{ °C}$ $530\text{ °C} \leq \theta \leq 550\text{ °C}/t = 4\text{ h}/\text{AC}$
6.2	Delivery condition code	W	U
7	Use condition	Solution treated and precipitation treated	Delivery condition
	Heat treatment	Delivery condition $530\text{ °C} \leq \theta \leq 550\text{ °C}/t = 4\text{ h}/\text{AC}$	—

Characteristics  
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8.1	Test sample(s)	See EN 4700-002.												
8.2	Test piece(s)	See EN 4700-002.												
8.3	Heat treatment	Delivery condition						Use condition						
9	Dimensions concerned	mm	$a$ or $D \leq 150$						$a$ or $D \leq 150$					
10	Thickness of cladding on each face	%	—						—					
11	Direction of test piece	—						L						
12	Temperature	$\theta$	°C						Ambient					
13	Proof stress	$R_{p0,2}$	MPa						$\geq 1\ 310$					
14	Strength	$R_m$	MPa						$\geq 1\ 400$					
15	Elongation	$A$	%						$\geq 9$					
16	Reduction of area	$Z$	%						$\geq 45$					
17	Hardness (HB)	$\leq 363$						$\geq 400$						
18	Shear strength	$R_c$	MPa						—					
19	Bending	$k$	—						—					
20	Impact strength	—												
21	Temperature	$\theta$	°C						—					
22	Time	h						—						
23	Stress	$\sigma_a$	MPa						—					
24	Elongation	$a$	%						—					
25	Rupture stress	$\sigma_R$	MPa						—					
26	Elongation at rupture	$A$	%						—					
27	Notes (see line 98)	—												



30	Microstructure	—	See EN 4700-002.		
		1	See AMS 2315 G.		
		7	The $\delta$ -ferrite content shall not exceed 2 %.		
34	Grain size	—	See EN 4700-002.		
		7	Dimension (mm)	Grain size number	% of area
			$a$ or $D \leq 80$	$G \geq 5$	$\geq 95$
				$3 \leq G \leq 5$	$\leq 5$
		$G < 3$	Not acceptable		
		$80 < a$ or $D \leq 150$	$G \geq 4$	$\geq 95$	
			$3 \leq G \leq 4$	$\geq 5$	
$G < 3$	Not acceptable				
44	External defects	—	See EN 4700-002.		
50	Cleanliness/inclusion content	—	See EN 4700-002.		
		7	Category 5		
51	Macrostructure	—	See EN 4700-002.		
		1	See ASTM A 604-07.		
		7	Class	Condition	Severity
			1	Freckles	A
			2	White spots	A
3	Radial segregation		A		
4	Ring pattern	B			
61	Internal defects	—	See EN 4700-002.		
		1	See EN 4050-1.		
		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	—	—		
99	Typical use	—	—		
100	—	Product qualification	—	See EN 2043.	
			—	Qualification programme to be agreed between manufacturer and purchaser.	