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SIST EN 2816:2019

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EUROPEAN STANDARD

EN 2816

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2019

ICS 49.025.10

English Version

**Aerospace series - Steel FE-PM1802 (X5CrNiCu15-5) -
Consumable electrode remelted - Solution treated and
precipitation treated - Forgings - a or D ≤ 200 mm - Rm ≥
965 MPa**

Série aérospatiale - Acier FE-PM1802 (X5CrNiCu15-5) -
Refondu à l'électrode consommable - Mis en solution et
vieilli - Pièces forgées et pièces matricées - a ou D ≤
200 mm - Rm ≥ 965 MPa

Luft- und Raumfahrt - Stahl FE-PM1802 (X5CrNiCu15-
5) - Mit selbstverzehrender Elektrode umgeschmolzen
- Lösungsgeglüht und ausgelagert - Schmiedestücke - a
oder D ≤ 200 mm - Rm ≥ 965 MPa

This European Standard was approved by CEN on 30 December 2018.

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

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

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European foreword

This document (EN 2816:2019) 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 European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.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 2816:2019 (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-PM1802 (X5CrNiCu15-5)
Consumable electrode remelted
Solution treated and precipitation treated
Forgings
 a or $D \leq 200$ mm
 $R_m \geq 965$ 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 2157-3, *Aerospace series — Steel — Forging stock and forgings — Technical specification — Part 3: Pre production and production forgings*

EN 3364, *Aerospace series — Steel FE-PM1802 (X5CrNiCu15-5) — Consumable electrode remelted, softened, forging stock a or $D \leq 300$ mm*

3 Terms and definitions (standards.iteh.ai)

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 FE-PM1802 (X5CrNiCu15-5)

1	Material designation	Steel FE-PM1802 (X5CrNiCu15-5)												
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Nb + Ta	Fe	
		min.	—	—	—	—	—	14,0	—	3,5	2,5	5 × C	Base	
		max.	0,07	1,00	1,00	0,030	0,015	15,5	0,50	5,5	4,5	0,45		
3	Method of melting	Consumable electrode remelted												
4.1	Form	Forgings												
4.2	Method of production	Forged from forging stock EN 3364												
4.3	Limit dimension(s)	mm	a or $D \leq 200$											
5	Technical specification	EN 2157-3												

6.1	Delivery condition	Solution treated	Solution treated and precipitation treated
	Heat treatment	$1\ 025\ ^\circ\text{C} \leq \theta \leq 1\ 055\ ^\circ\text{C} / t \geq 30\ \text{min/AC}$ or OQ + cool to $\theta \leq 30\ ^\circ\text{C}$	$1\ 025\ ^\circ\text{C} \leq \theta \leq 1\ 055\ ^\circ\text{C} / t \geq 30\ \text{min/AC}$ or OQ + cool to $\theta \leq 30\ ^\circ\text{C}$ + $580\ ^\circ\text{C} \leq \theta \leq 610\ ^\circ\text{C} / t \geq 4\ \text{h/AC}$
6.2	Delivery condition code	W	U
7	Use condition	Solution treated and precipitation treated	Delivery condition
	Heat treatment	Delivery condition	—

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Characteristics

8.1	Test sample(s)	See EN 2157-3															
8.2	Test piece(s)	See EN 2157-3															
8.3	Heat treatment	Solution treated															
9	Dimensions concerned	mm	a or $D \leq 200$				a or $D \leq 75$			$75 \leq a$ or $D \leq 200$							
10	Thickness of cladding on each face	%	—														
11	Direction of test piece	—															
12	Temperature	θ	°C		—				Ambient			Ambient		Ambient			
13	Proof stress	$R_{p0,2}$	MPa		—				≥ 790			≥ 790		≥ 790			
14	T Strength	R_m	MPa		—				≥ 965			≥ 965		≥ 965			
15	Elongation	A	%		—				≥ 12			≥ 12		≥ 9			
16	Reduction of area	Z	%		—				≥ 45			≥ 45		≥ 35			
17	Hardness	$\leq 363\ \text{HB}$															
18	Shear strength	R_c	MPa		—				—			—		—			
19	Bending	k	—		—				—			—		—			
20	Impact strength	—															
21	C	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)	—															

34	Grain size	—	See EN 2157-3
		7	See EN 2157-3
44	External discontinuities	—	$G \geq 5$
82	Batch uniformity	—	See EN 2157-3
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95	Marking inspection	—	See EN 2157-3
96	Dimensional inspection	—	See EN 2157-3
98	Notes	—	—
99	Typical use	—	—