Aerospace series — Steel FE-PM2701 (X2NiCoMo18-8-5) — Vacuum induction melted and vacuum arc remelted — Solution treated and precipitation treated — Forgings — a or D ≤ 150 mm — 1 750 MPa ≤ Rm ≤ 2 000 MPa

ICS 49.025.10

National foreword

This British Standard is the UK implementation of EN 3529:2010.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Aerospace series - Steel FE-PM2701 (X2NiCoMo18-8-5) - Vacuum induction melted and vacuum arc remelted - Solution treated and precipitation treated - Forgings - a or D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

Série aérospatiale - Acier FE-PM2701 (X2NiCoMo18-8-5) - Élaboré sous vide et refondu par arc sous vide - Mis en solution et vieilli - Pièces forgées et pièces matricées - a ou D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

Luft- und Raumfahrt - Stahl FE-PM2701 (X2NiCoMo18-8-5) - Vakuuminduktionserschmolzen und mit selbstverzehrender Elektrode im Vakuum umgeschmolzen - Lösungsgeglüht und ausgelagert - Schmiedestücke - a oder D ≤ 150 mm - 1 750 MPa ≤ Rm ≤ 2 000 MPa

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Foreword

This document (EN 3529:2010) 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of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

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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 4500-5.

1 Scope

This standard specifies the requirements relating to:

Steel FE-PM2701 (X2NiCoMo18-8-5)
Vacuum induction melted and vacuum arc remelted
Solution treated and precipitation treated
Forgings
a or $D \leq 150$ mm
$1\,750\ \text{MPa} \leq R_m \leq 2\,000\ \text{MPa}$

for aerospace applications.

2 Normative references

The following referenced documents are indispensable for the application 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 3530, *Aerospace series — Steel FE-PA95 — Softened — Reference heat treatment: solution treated and precipitation treated — Forging stock — $D_e \leq 200$ mm* 1)

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use*

EN 4500-5, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 5: Specific rules for steels* 1)

EN 4700-006, *Aerospace series — Steel and heat resisting alloys — Wrought product — Technical specification — Part 006: Pre-production and production forgings* 1)

1) Published as ASD Prestandard at the date of publication of this standard.

1	Material designation		Steel FE-PM2701 (X2NiCoMo18-8-5)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Mo	Ni	Al	Co	Ti	Fe
		min.	–	–	–	–	–	4,6	17,0	0,05	7,0	0,30	Base
		max.	0,03	0,10	0,10	0,010	0,010	5,2	19,0	0,15	8,5	0,60	
3	Method of melting		Vacuum induction melted and vacuum arc remelted										
4.1	Form		Forgings										
4.2	Method of production		Forged from forging stock										
4.3	Limit dimension(s)	mm	*a* or *D* ≤ 150										
5	Technical specification		EN 4700-006										

6.1	Delivery condition	Solution treated	Solution treated and precipitation treated
	Heat treatment	790 °C ≤ θ ≤ 840 °C / AC	790 °C ≤ θ ≤ 840 °C / AC + 465 °C ≤ θ ≤ 495 °C / t ≥ 3 h / AC
6.2	Delivery condition code	W	U
7	Use condition	Solution treated and precipitation treated	Delivery condition
	Heat treatment	Delivery condition + 465 °C ≤ θ ≤ 495 °C / t ≥ 3 h / AC	–

Characteristics

8.1	Test sample(s)			See EN 4700-006.			
8.2	Test piece(s)			See EN 4700-006.			
8.3	Heat treatment			Solution treated	Use condition		
9	Dimensions concerned		mm	*a* or *D* ≤ 150	*a* or *D* ≤ 150	75 < *a* or *D* ≤ 150	
10	Thickness of cladding on each face		%	–	–	–	
11	Direction of test piece			–	L	T	
12	T	Temperature	θ	°C	–	Ambient	Ambient
13	T	Proof stress	$R_{p0,2}$	MPa	–	≥ 1 650	≥ 1 650
14	T	Strength	R_m	MPa	–	1 750 ≤ R_m ≤ 2 000	1 750 ≤ R_m ≤ 2 000
15	T	Elongation	A	%	–	≥ 6	≥ 4
16	T	Reduction of area	Z	%	–	≥ 40	≥ 25
17	Hardness				HB ≤ 352	510 ≤ HV ≤ 600	510 ≤ HV ≤ 600
18	Shear strength		R_c	MPa	–	–	–
19	Bending		k	–	–	–	–
20	Impact strength		kV	J	–	≥ 15; Notch direction T	≥ 12; Notch direction L
21	C	Temperature	θ	°C	–		
22	C	Time		h	–		
23	C	Stress	σ_a	MPa	–		
24	C	Elongation	a	%	–		
25	C	Rupture stress	σ_R	MPa	–		
26	C	Elongation at rupture	A	%	–		
27	Notes (see line 98)				–		

34	Grain size	–	See EN 4700-006.	
		7	Dimension mm	Grain size number
			a or *D* ≤ 75	G ≥ 6; occasional G ≥ 4 permitted
			75 < *a* or *D* ≤ 150	G ≥ 4; occasional G ≥ 2 permitted
44	External defects	–	See EN 4700-006.	
		7	Visual	
51	Macrostructure	–	See EN 4700-006.	
		2	Grain flow on first article	
61	Internal defects	1	EN 4700-006	
		6	*a or D* ≤ 100 mm may be tested either on the product or at an earlier stage of manufacture	
		7	Class 5	
82	Batch uniformity (Material verification)	–	See EN 4700-006.	
95	Marking inspection	–	See EN 4700-006.	
96	Dimensional inspection	–	See EN 4700-006.	
98	Notes	–	–	
99	Typical use	–	–	

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

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