BRITISH STANDARD

BS EN
3490:2007

Aerospace series — Steel FE-PM3901 (X15CrNi17-3) — Air melted — Hardened and tempered — Bar for machining — De ≤ 200 mm — 900 MPa ≤ Rm ≤ 1 100 MPa

The European Standard EN 3490:2007 has the status of a British Standard

ICS 49.025.10

BSI
British Standards

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 3490:2007.

The UK participation in its preparation was entrusted by Technical Committee ACE/61, Metallic materials for aerospace purposes, to Panel ACE/61/-/15, Steels.

A list of organizations represented on ACE/61/-/15 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.

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 30 April 2007

ISBN 978 0 580 50554 6

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 3490

March 2007

ICS 49.025.10

English Version

Aerospace series - Steel FE-PM3901 (X15CrNi17-3) - Air melted - Hardened and tempered - Bar for machining - De ≤ 200 mm - 900 MPa ≤ Rm ≤ 1 100 MPa

Série aérospatiale - Acier FE-PM3901 (X15CrNi17-3) - Élaboré à l'air - Trempé et revenu - Barres pour usinage - De ≤ 200 mm - 900 MPa ≤ Rm ≤ 1 100 MPa

Luft- und Raumfahrt - Stahl FE-PM3901 (X15CrNi17-3) - Lufterschmolzen - Gehärtet und angelassen - Stangen zur spanenden Bearbeitung - De ≤ 200 mm - 900 MPa ≤ Rm ≤1 100 MPa

This European Standard was approved by CEN on 5 October 2006.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This document (EN 3490:2007) 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 2007, and conflicting national standards shall be withdrawn at the latest by September 2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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-PM3901 (X15CrNi17-3)
Air melted
Hardened and tempered
Bar for machining
$D_e \leq 200$ mm
900 MPa $\leq R_m \leq$ 1 100 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 2043, *Aerospace series — Metallic materials — General requirements for semi-finished product qualification (excluding forgings and castings).* [1)]

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

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

EN 4436, *Aerospace series — Steel — Test methods — Determination of δ ferrite content.* [1)]

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

EN 4700-2, *Aerospace series — Steel and heat resisting alloys — Wrought products — Technical specification — Part 2: Bar and section*. [1)]

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

1	Material designation		Steel FE-PM3901 (X15CrNi17-3)							
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Ni	Fe
		min.	0,12	–	–	–	–	15,0	2,00	Base
		max.	0,20	1,00	1,00	0,030	0,025	17,0	3,00	
3	Method of melting		Air melted							
4.1	Form		Bar for machining							
4.2	Method of production		–							
4.3	Limit dimension(s)	mm	$D_e \leq 200$							
5	Technical specification		EN 4700-2							

6.1	Delivery condition	Softened	Hardened and tempered
	Heat treatment	–	950 °C ≤ θ ≤ 1 040 °C / OQ [a] + 635 °C ≤ θ ≤ 685 °C / AC or faster + 585 °C ≤ θ ≤ 615 °C / AC or faster
6.2	Delivery condition code	A	U
7	Use condition	Hardened and tempered	Delivery condition
	Heat treatment	Delivery condition + 950 °C ≤ θ ≤ 1 040 °C / OQ [a] + 635 °C ≤ θ ≤ 685 °C / AC or faster + 585 °C ≤ θ ≤ 615 °C / AC or faster	–

Characteristics

8.1	Test sample(s)				See EN 4700-2.	
8.2	Test piece(s)				See EN 4700-2.	
8.3	Heat treatment				Softened	Use condition
9	Dimensions concerned			mm	a or $D \leq 200$	$D_e \leq 200$
10	Thickness of cladding on each face			%	–	–
11	Direction of test piece				–	L
12	T	Temperature	θ	°C	–	Ambient
13		Proof stress	$R_{p0,2}$	MPa	–	≥ 700
14		Strength	R_m	MPa	–	900 ≤ R_m ≤ 1 100
15		Elongation	A	%	–	≥ 12
16		Reduction of area	Z	%	–	–
17	Hardness				HB ≤ 293	262 ≤ HB ≤ 331
18	Shear strength		R_c	MPa	–	–
19	Bending		k	–	–	–
20	Impact strength				–	KV ≥ 20 J; Notch direction T
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)				a	

30	Microstructure	–	See EN 4700-2.
		1	See EN 4436.
		7	The δ-ferrite shall not exceed 5 %
44	External defects	–	See EN 4700-2.
50	Cleanliness/inclusion content (micro-cleanness)	–	See EN 4700-2.
		7	Category 2
51	Macrostructure	–	See EN 4700-2.
61	Internal defects	–	See EN 4700-2.
		1	EN 4050-1
		6	a or $D \leq 100$ mm may be tested on the product or at an earlier stage of manufacturing
		7	Class 2
95	Marking inspection	–	See EN 4700-2.
96	Dimensional inspection	–	See EN 4700-2.
98	Notes	–	[a] For $D_e \leq 30$ mm may be AC.
99	Typical use	–	–

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

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL