

**Aerospace series —
Steel FE-CM3801
(GX5CrNiCuNb16-4) —
Homogenized, solution
treated and
precipitation hardened,
investment casting
De ≤ 50 mm,
Rm ≥ 900 MPa**

ICS 49.025.10

National foreword

This British Standard is the UK implementation of EN 4216:2007.

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 this committee can be obtained on request to its secretary.

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English Version

**Aerospace series - Steel FE-CM3801 (GX5CrNiCuNb16-4) -
Homogenized, solution treated and precipitation hardened,
investment casting $De \leq 50$ mm, $Rm \geq 900$ MPa**

Série aéronautique - Acier FE-CM3801 (GX5CrNiCuNb16-4)
- Homogénéisé, mis en solution et durci par précipitation -
Pièces moulées à la cire perdue $De \leq 50$ mm, $Rm \geq 900$
MPa

Luft- und Raumfahrt - Stahl FE-CM3801 (GX5CrNiCuNb16-4)
- Diffusionsgeglüht, lösungsgeglüht und ausgelagert,
Gußstücke Wachsausschmelzung $De \leq 50$ mm, $Rm \geq 900$
MPa

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Contents

Page

Foreword.....3

Introduction4

1 **Scope**4

2 **Normative references**4

Foreword

This document (EN 4216:2007) 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.

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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-CM3801 (GX5CrNiCuNb16-4) — Homogenized, solution treated and precipitation hardened, investment casting $D_e \leq 50$ mm, $R_m \geq 900$ 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 2103-3, *Aerospace series — Steel, nickel base and cobalt base alloy remelting stock and castings — Technical specifications — Part 3: Pre-production and production castings*

EN 3484, *Aerospace series — Steel FE-CM61 — As cast — Reference heat treatment: homogenised, solution treated, precipitation hardened and sub zero — Remelting stock¹⁾*

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 content¹⁾*

EN 4500-5, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 5: Specific rules for steels¹⁾*

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

1	Material designation		Steel FE-CM3801 (GX5CrNiCuNb16-4)										
2	Chemical composition %	Element	C	Si	Mn	P	S	Cr	Ni	Cu	N ₂	Nb+Ta	Fe
		min.	–	0,50	–	–	–	15,5	3,60	2,80	–	0,15	Base
		max.	0,06	1,00	0,70	0,04	0,03	16,7	4,60	3,50	0,05	0,40	
3	Method of melting		Air melted										
4.1	Form		Investment casting										
4.2	Method of production		Cast from remelting stock EN 3484										
4.3	Limit dimension(s)	mm	$D_e \leq 50$										
5	Technical specification		EN 2103-3										

6.1	Delivery condition		Homogenized, solution treated and precipitation treated										
	Heat treatment		1 150 °C / t = 1 h 30 min / AC or OQ + 1 040 °C / t ≥ 30 min / AC or OQ / cool to $\theta \leq 20$ °C + 590 °C / t = 1 h 30 min / AC										
6.2	Delivery condition code		U										
7	Use condition		Delivery condition										
	Heat treatment		–										

Characteristics

8.1	Test sample(s)		Cut from the casting					Separately cast						
8.2	Test piece(s)		See EN 2103-3					See EN 2103-3						
8.3	Heat treatment		Delivery condition					Delivery condition						
9	Dimensions concerned	mm	Wall thickness $\leq 25^a$					Wall thickness $\leq 25^a$						
10	Thickness of cladding on each face	%	–					–						
11	Direction of test piece		–					–						
12	Temperature	θ	°C	Ambient					Ambient					
13	Proof stress	$R_{p0,2}$	MPa	≥ 830					≥ 830					
14	T Strength	R_m	MPa	≥ 900					≥ 900					
15	Elongation	A	%	≥ 6					≥ 8					
16	Reduction of area	Z	%	≥ 15					≥ 15					
17	Hardness		≥ 30 HRC											
18	Shear strength	R_c	MPa	–										
19	Bending	k	–	–										
20	Impact strength		–											
21	Temperature	θ	°C	–										
22	Time		h	–										
23	Stress	σ_a	MPa	–										
24	C Elongation	a	%	–										
25	Rupture stress	σ_R	MPa	–										
26	Elongation at rupture	A	%	–										
27	Notes (see line 98)		a											

30	Microstructure	1	See EN 4436
		2	One per batch
		3	Test piece appended to casting
		7	Delta ferrite content $\leq 15\%$
35	Repair by welding	–	See EN 2103-3
44	External defects	–	See EN 2103-3
61	Internal defects	–	See EN 2103-3
95	Marking inspection	–	See EN 2103-3
96	Dimensional inspection	–	See EN 2103-3
98	Notes	–	^a For wall thickness > 25 mm, properties to be agreed between manufacturer and purchaser.
99	Typical use	–	–

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