

Specification for

**Low carbon,  
precipitation  
hardening nickel-  
chromium-aluminium-  
molybdenum-niobium  
alloy castings —**

**(Nickel base Cr 11.5, Al 6.0, Mo 4.0,  
Nb 2.0)**

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# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Aerospace Standards Policy Committee (ACE/-) to Technical Committee ACE/48, upon which the following bodies were represented:

British Industrial Fasteners Federation  
British Steel Industry  
Ministry of Defence  
Seamless Steel Tube Association  
Society of British Aerospace Companies Limited

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## Foreword

This revision supersedes BS HC 209:1979, which is withdrawn, and includes trace elements in the chemical composition and is presented in a tabular format. The basic specification for the material remains unchanged.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This British Standard specifies the chemical composition, mechanical properties and inspection and test requirements for a heat resisting nickel alloy (Nickel base, Cr 11.5, Al 6.0, Mo 4.0, Nb 2.0) in the form of castings and remelting stock.

## 2 References

This standard makes reference to the following British Standards:

BS HC 100, *Inspection and testing procedure for iron, nickel, copper, cobalt and refractory metal base alloy castings*.

BS EN 2500, *Aerospace series — Guidelines for the preparation and use of standards for metallic materials*<sup>1)</sup>.

## 3 Material requirements

The requirements for the material in the delivery and use of conditions are given in Table 1, the format and nomenclature of which complies with the requirements defined in BS EN 2500.

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<sup>1)</sup> In preparation.

Table 1 — Material requirements

1	Chemical composition % or (parts per million)	Element	C	Si	Mn	S	Ag	Al	As	B	Bi	Cd	Co	Cr	Cu	Fe	Ga	In	
		Min.	0.03					5.5		0.005					11.0				
		Max.	0.07	0.50	0.25	0.015	(5)	6.2	(30)	0.015	(0.5)	(0.2)	1.0	12.0	0.50	0.50	(30)	(0.2)	
		Element	Mg	Mo	Nb <sup>+</sup> Ta	Pb	Sb	Se	Sn	Te	Ti	Tl	V	W	Zn	Zr	Ni		
		Min.		3.8	1.5						0.4					0.05	Base		
		Max.	(50)	4.5	2.2	(5)	(3)	(5)	(30)	(2)	1.0	(0.2)	0.1	0.2	(10)	0.15			
2	1			2							3								
3	Method of melting			Vacuum melted and cast															
4	Form			Remelt stock							Castings								
5	Acceptance standard			BS HC 100, sections 1 and 2							BS HC 100, sections 1 and 3								
6	Delivery condition and heat treatment			As cast, see note 1.															
7	Use condition and heat treatment			As cast, see note 1.															
8	Test piece heat treatment sampling			Cast None BS HC 100, sections 1 and 2							Separate or integral None. See note 1 See note 2								
12	Tensile	Temperature	$\theta$	°C								Ambient							
13		Proof stress	$R_p$ 0.2	MPa								$\geq 685$							
14		Strength	$R_m$	MPa								$\geq 755$							
15		Elongation	$A$	%								$\geq 6$							
21	Stress rupture	Temperature	$\theta$	°C	980														
22		Time	$t$	h	$\geq 45$														
25		Rupture stress	$\sigma_R$	MPa	150														
27	NOTES			<p>1. If required by the order, castings shall be treated under vacuum or protective atmosphere for 2 hours at <math>1\ 170 \pm 10</math> °C, and cooled to room temperature followed by precipitation treatment at <math>870 \pm 10</math> °C for 2 hours.</p> <p>2. If required, the properties to be obtained on test pieces machined from designated areas of castings shall be agreed between the manufacturer and the purchaser.</p>															



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