

BS 2HR 203:2009



# BSI British Standards

## AEROSPACE SERIES

### **Specification for nickel- chromium-titanium heat-resisting alloy plate, sheet and strip (Nickel base, Cr 19.5, Ti 0.4)**

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 4, an inside back cover and a back cover.

## Foreword

### Publishing information

This British Standard is published by BSI and came into effect on 30 November 2009. It was prepared by Panel ACE/61/-/48, *Heat resisting alloys*, under the authority of Technical Committee ACE/61, *Metallic materials for aerospace purposes*. A list of organizations represented on this committee can be obtained on request to its secretary.

### Supersession

This standard supersedes BS HR 203:1972, which is withdrawn.

### Information about this document

This is a full revision of BS HR 203. The principal change from the previous edition is that the requirements are stated in tabular format in accordance with EN 4500-1 and EN 4500-3.

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### Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

### Contractual and legal considerations

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.**

## 1 Scope

This British Standard specifies requirements for nickel-chromium-titanium heat-resisting alloy plate, sheet and strip.

## 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.

BS HR 100, *Procedure for inspection and testing of wrought heat-resisting alloys*

## 3 Technical requirements

Material to this standard shall conform to Table 1.

*NOTE* The format and symbols used in Table 1 are derived from EN 4500-1 and EN 4500-3.

Table 1 Technical requirements for nickel-chromium-titanium heat-resisting alloy plate, sheet and strip

1	Material designation			BS HR 203										
2	Chemical composition %	Element		C	Si	Mn	S	Co	Cr	Cu	Fe	Pb	Ti	Ni
		Min.		0.08	—	—	—	—	18.0	—	—	—	0.20	Base
		Max.		0.15	1.0	1.0	0.020	5.0	21.0	0.5	5.0	0.005 0	0.60	
3	Method of melting			Induction melted and cast in air; induction melted, vacuum refined and cast in air; consumable electrode remelted										
4.1	Form			Plate, sheet and strip										
4.2	Method of production			Rolled										
4.3	Limit dimension(s)	mm		—										
5	Technical specification			Sections 1 and 5 of BS HR 100										
6.1	Delivery condition			a ≤ 3: Cold rolled + annealed + descaled <sup>1)</sup>					a > 3: Hot rolled + annealed + descaled <sup>1)</sup>					
	Heat treatment			1 000 °C ≤ θ ≤ 1 100 °C / AC or cool in controlled atmosphere										
6.2	Delivery condition code			U										
7	Use condition			Delivery condition										
	Heat treatment			—										
<b>Characteristics</b>														
8.1	Test sample(s)			See Section 5 of BS HR 100										
8.2	Test piece(s)			See Section 5 of BS HR 100										
8.3	Heat treatment			Delivery condition										
9	Dimensions concerned	mm		0.25 ≤ a < 0.5			0.5 ≤ a ≤ 3.0			a > 3.0				
10	Thickness of cladding on each face	%		—										
11	Direction of test piece			L and LT										
12	Temperature	θ	°C	Ambient										
13	Proof stress	R <sub>p0.2</sub>	MPa	≥ 260			≥ 310			≥ 230				
14	T	Strength	R <sub>m</sub>	≥ 650			≥ 760			≥ 620				
15		Elongation	A	≥ 25			≥ 30			≥ 30				
16	Reduction of area	Z	%	—										
17	Hardness			HV ≤ 230										
18	Shear strength	R <sub>c</sub>	MPa	—										
19	Bending	κ	—	a ≤ 2.0: 0.5 ; α = 180°					a > 2.0: 1.0 ; α = 180°					
20	Impact strength			—										
21	Temperature	θ	°C	—										
22	Time			h										
23	Stress	σ <sub>a</sub>	MPa	—										
24	C	Elongation	a	%										
25		Rupture stress	σ <sub>R</sub>	MPa										
26		Elongation at rupture	A	%										
27	Notes (see line 98)			1)										

Table 1 Technical requirements for nickel-chromium-titanium heat-resisting alloy plate, sheet and strip  
(continued)

<b>44</b>	<b>External defects</b>		See Section 5 of BS HR 100
<b>95</b>	<b>Marking</b>	—	See Section 5 of BS HR 100
<b>96</b>	<b>Dimensional inspection</b>	—	See Section 5 of BS HR 100
<b>98</b>	<b>Notes</b>	—	<sup>1)</sup> As an alternative to annealing + descaling, material shall be bright annealed.

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## Bibliography

### Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 4500-1, *Metallic materials – Rules for the drafting and presentation of material standards – Part 1: General rules*<sup>1)</sup>

EN 4500-3, *Metallic materials – Rules for the drafting and presentation of material standards – Part 3: Specific rules for heat resisting alloys*<sup>1)</sup>

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<sup>1)</sup> Published as ASD-STAN Prestandard at the date of publication of this standard.





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