BS 2HR 240:2011

BSI Standards Publication

AEROSPACE SERIES

Specification for cobalt-chromium-tungsten-nickel-manganese heat-resisting alloy plate, sheet and strip (Cobalt base, Cr 20, W 15, Ni 10, Mn 1.5)

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Contents

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 31 January 2011. It was prepared by Panel ACE/61/-/48, *Heat resisting alloys for aerospace purposes*, 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This standard supersedes BS HR 240:1972, which is withdrawn.

Information about this document

This is a full revision of BS HR 240. The principal change from the previous edition is that requirements are stated in tabular format in accordance with EN 4500-1 and EN 4500-3.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Use of this document

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Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its methods are expressed either as a set of instructions or 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 cobalt-chromium-tungsten-nickel-manganese 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, testing and acceptance 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 cobalt-chromium-tungsten-nickel-manganese heat-resisting alloy plate, sheet and strip**

1	**Material designation**			**BS HR 240**									
2	**Chemical composition %**	Element		C	Si	Mn	P	S	Cr	Fe	Ni	W	Co
		Min.		0.05	—	1.0	—	—	19.0	—	9.0	14.0	Base
		Max.		0.15	0.4	2.0	0.040	0.030	21.0	3.0	11.0	16.0	
3	**Method of melting**			Air melted; vacuum melted; air melted and vacuum refined; 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**		Annealed and descaled or annealed in a protective atmosphere
	Heat treatment		1 175 °C ≤ θ ≤ 1 205 °C / rapid cool
6.2	**Delivery condition code**		U
7	**Use condition**		Delivery condition
	Heat treatment		—

Characteristics

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**			Use condition		
9	**Dimensions concerned**		mm	—		
10	**Thickness of cladding on each face**		%	—		
11	**Direction of test piece**			L or LT		
12	**T**	**Temperature**	θ °C	Ambient		
13		**Proof stress**	$R_{p0.2}$ MPa	$370 \leq R_{p0.2} \leq 550$		
14		**Strength**	R_m MPa	≥ 890		
15		**Elongation**	A %	≥ 35		
16		**Reduction of area**	Z %	—		
17	**Hardness**			HV ≤ 290		
18	**Shear strength**		R_c MPa	—		
19	**Bending**		κ —	a ≤ 1.3 mm: 0.75; α = 180°	1.3 < a ≤ 3.0 : 1.0 ; α = 120°	
20	**Impact strength**			—		
21	**C**	**Temperature**	θ °C	815		
22		**Time**	h	$t_R \geq 23$		
23		**Stress**	σ_a MPa	—		
24		**Elongation**	a %	—		
25		**Rupture stress**	σ_R MPa	165		
26		**Elongation at rupture**	A %	≥ 10		
27	**Notes** (see line 98)			—		

Table 1 **Technical requirements for cobalt-chromium-tungsten-nickel-manganese heat-resisting alloy plate, sheet and strip** *(continued)*

33	**Grain size**	—	See Section 1 of BS HR 100
		3	Transverse sample
		5	Use condition
		7	Maximum average transverse grain size diameter ≤ 0.130 mm. Occasional grains of up to 0.250 mm are permitted.
44	**External defects**	—	See Section 5 of BS HR 100
95	**Marking**	—	See Section 5 of BS HR 100
96	**Dimensional inspection**	—	See Section 5 of BS HR 100
98	**Notes**	—	—

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* [1)]

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

[1)] Published as ASD-STAN Prestandard at the date of publication of this standard.

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BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001
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