



BSI Standards Publication

## AEROSPACE SERIES

**Specification for nickel-chromium-cobalt-titanium-aluminium heat-resisting alloy wire for thread inserts  
(Nickel base, Cr 19.5, Co 18.0, Ti 2.5, Al 1.5) (0.45 mm to 2 mm diameter)**

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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 31 January 2011. 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This standard supersedes BS 2HR 503:1973, which is withdrawn.

### Information about this document

This is a full revision of BS HR 503. 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

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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 nickel-chromium-cobalt-titanium-aluminium heat-resisting alloy wire for thread inserts.

## 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 nickel-chromium-cobalt-titanium-aluminium heat-resisting alloy wire for thread inserts

1	Material designation		BS HR 503							
2	Chemical composition %	Element	C	Si	Mn	S	Ag	Al	B	Bi
		Min.	—	—	—	—	—	1.0	—	—
		Max.	0.13	1.0	1.0	0.015	5 ppm	2.0	0.020	1 ppm
		Element	Co	Cr	Cu	Fe	Pb	Ti	Zr	Ni
		Min.	15.0	18.0	—	—	—	2.0	—	Base
Max.	21.0	21.0	0.2	1.5	20 ppm	3.0	0.15			
3	Method of melting		Induction melted, vacuum refined and cast in air or consumable electrode remelted.							
4.1	Form		Wire							
4.2	Method of production		Cold drawn							
4.3	Limit dimension(s)	mm	0.44 < D ≤ 2.0							
5	Technical specification		Sections 1 and 7 of BS HR 100							
6.1	Delivery condition		Cold drawn							
	Heat treatment		—							
6.2	Delivery condition code		F							
7	Use condition		Delivery condition							
	Heat treatment		—							
<b>Characteristics</b>										
8.1	Test sample(s)		See Section 7 of BS HR 100							
8.2	Test piece(s)		See Section 7 of BS HR 100							
8.3	Heat treatment		Delivery condition				Reference (see line 29)			
9	Dimensions concerned	mm	0.44 < D ≤ 2.0			0.44 < D ≤ 1.0		1.0 < D ≤ 2.0		
10	Thickness of cladding on each face	%	—							
11	Direction of test piece		L				L			
12	Temperature	θ	°C	Ambient			Ambient			
13	Proof stress	R <sub>p0.2</sub>	MPa	—			≥ 1 160			
14	Strength	R <sub>m</sub>	MPa	≤ 1 390			≥ 1 390		≥ 1 390	
15	Elongation	A	%	—			—			
16	Reduction of area	Z	%	—						
17	Hardness		—							
18	Shear strength	R <sub>c</sub>	MPa	—						
19	Bending	κ	—	—						
20	Impact strength		—							
21	Temperature	θ	°C	—						
22	Time		h	—						
23	Stress	σ <sub>a</sub>	MPa	—						
24	Elongation	a	%	—						
25	Rupture stress	σ <sub>R</sub>	MPa	—						
26	Elongation at rupture	A	%	—						
27	Notes (see line 98)		—							



## 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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