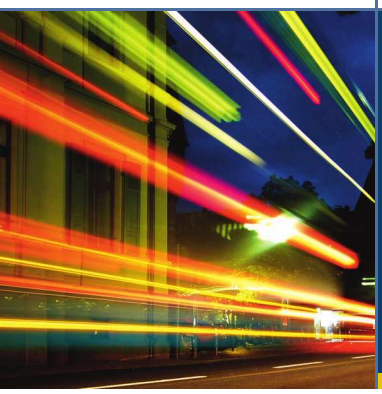
BS 3B 25:2009



BSI British Standards

AEROSPACE SERIES

Specification for copper-nickel-silicon alloy rods, bars, sections, forging stock and forgings (heat treated)

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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 6, 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/-/16, *Copper and miscellaneous 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This British Standard supersedes BS 2B 25:2001, which is withdrawn.

Information about this document

This is a full revision of BS 2B 25. The principal change from the previous edition is that requirements are stated in tabular format in accordance with EN 4500-1.

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

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements 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 copper-nickel-silicon alloy supplied in the following forms:

a) rods, bars and sections: heat treated, designation B 25A;

b) forging stock: as manufactured, designation B 25B;

c) forgings: heat treated, designation B 25C.

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 B 100, *Procedure for inspection, testing and acceptance of wrought copper alloys*

BS EN 12163, *Copper and copper alloys – Rod for general purposes*

BS EN 12165, *Copper and copper alloys – Wrought and unwrought forging stock*

3 Technical requirements

Material to this standard shall conform to Table 1 or Table 2.

NOTE The format and symbols used in Table 1 and Table 2 are derived from EN 4500-1.

Table 1 **Technical requirements for Cu-Ni-Si alloy rods, bars and sections (heat treated)**

1	**Material designation**			**BS B 25**					
2	**Chemical composition %**	Element		Ni	Si	Al	Fe	Total impurities	Cu
		Min.		2.0	0.4	—	—	—	Base
		Max.		3.5	0.8	0.02	0.10	0.30 [1)]	
3	**Method of melting**			—					
4.1	**Form**			Rods, bars and sections (B 25A)					
4.2	**Method of production**			Extruded and/or rolled, extruded and drawn, rolled and drawn or forged					
4.3	**Limit dimension(s)**		mm	—					
5	**Technical specification**			Sections 1 and 2 of BS B 100					
6.1	**Delivery condition**			Heat treated					
	Heat treatment			800 °C ⩽ θ ⩽ 900 °C / WQ or OQ + θ ⩾ 450 °C / t ⩾ 1 h / AC					
6.2	**Delivery condition code**			—					
7	**Use condition**			Delivery condition					
	Heat treatment			—					
				Characteristics					
8.1	**Test sample(s)**			See Section 2 of BS B 100					
8.2	**Test piece(s)**			See Section 2 of BS B 100					
8.3	**Heat treatment**			Use condition					
9	**Dimensions concerned**		mm	—					
10	**Thickness of cladding on each face**		%	—					
11	**Direction of test piece**			L					
12	T	**Temperature**	θ	°C	Ambient				
13	T	**Proof stress**	$R_{p0.2}$	MPa	⩾ 430				
14	T	**Strength**	R_m	MPa	⩾ 580				
15	T	**Elongation**	A	%	⩾ 12				
16	T	**Reduction of area**	Z	%	—				
17	**Hardness**			167 ⩽ HV ⩽ 218 or 159 ⩽ HBW ⩽ 207					
18	**Shear strength**		R_c	MPa	—				
19	**Bending**		κ	—	—				
20	**Impact strength**			—					
21	C	**Temperature**	θ	°C	—				
22	C	**Time**		h	—				
23	C	**Stress**	σ_a	MPa	—				
24	C	**Elongation**	a	%	—				
25	C	**Rupture stress**	σ_R	MPa	—				
26	C	**Elongation at rupture**	A	%	—				
27	**Notes** (see line 98)			[1)]					

Table 1 **Technical requirements for Cu-Ni-Si alloy rods, bars and sections (heat treated)** *(continued)*

44	**External defects**	—	See Section 2 of BS B 100
95	**Marking**	—	See Section 2 of BS B 100
96	**Dimensional inspection**	—	BS EN 12163 class B [2)]
97	**Designation**	—	B 25 A
98	**Notes**	—	[1)] Total impurities exclude Al and Fe. [2)] Dimensional tolerances for rods larger than the size ranges given in BS EN 12163 should be agreed between the supplier and the purchaser.

Table 2 **Technical requirements for Cu-Ni-Si alloy forging stock and forgings (heat treated)**

1	**Material designation**			**BS B 25**					
2	**Chemical composition %**	Element		Ni	Si	Al	Fe	Total impurities	Cu
		Min.		2.0	0.4	—	—	—	Base
		Max.		3.5	0.8	0.02	0.10	0.30 [1)]	
3	**Method of melting**			—					
4.1	**Form**			Forging stock (B 25C)			Forging (B 25C)		
4.2	**Method of production**			Extruded and/or rolled, extruded and drawn, forged or cast			Forged from B 25B stock		
4.3	**Limit dimension(s)**		mm	—			—		
5	**Technical specification**			Sections 1 and 3 of BS B 100			Sections 1 and 4 of BS B 100		

6.1	**Delivery condition**			As manufactured	Heat treated
	Heat treatment			—	800 °C $\leqslant \theta \leqslant$ 900 °C / WQ or OQ + $\theta \geqslant$ 450 °C / t $\geqslant$ 1 h / AC
6.2	**Delivery condition code**			—	—
7	**Use condition**			Delivery condition	Heat treated
	Heat treatment			—	Delivery condition

Characteristics

8.1	**Test sample(s)**				See Section 3 of BS B 100	See Section 4 of BS B 100
8.2	**Test piece(s)**				See Section 3 of BS B 100	See Section 4 of BS B 100
8.3	**Heat treatment**				Reference (see line 29)	Use condition
9	**Dimensions concerned**			mm	—	—
10	**Thickness of cladding on each face**			%	—	—
11	**Direction of test piece**				L	L
12	T	**Temperature**	θ	°C	Ambient	Ambient
13	T	**Proof stress**	$R_{p0.2}$	MPa	$\geqslant$ 430	$\geqslant$ 430
14	T	**Strength**	R_m	MPa	$\geqslant$ 580	$\geqslant$ 580
15	T	**Elongation**	A	%	$\geqslant$ 12	$\geqslant$ 12
16	T	**Reduction of area**	Z	%	—	
17	**Hardness**				167 $\leqslant$ HV $\leqslant$ 218 or 159 $\leqslant$ HBW $\leqslant$ 207	
18	**Shear strength**		R_c	MPa	—	
19	**Bending**		κ	—	—	
20	**Impact strength**				—	
21	C	**Temperature**	θ	°C	—	
22	C	**Time**		h	—	
23	C	**Stress**	σ_a	MPa	—	
24	C	**Elongation**	a	%	—	
25	C	**Rupture stress**	σ_R	MPa	—	
26	C	**Elongation at rupture**	A	%	—	
27	**Notes** (see line 98)				[1)]	

Table 2 **Technical requirements for Cu-Al-Ni-Fe alloy forging stock and forgings (heat treated)** *(continued)*

29	**Reference heat treatment**	—	800 °C $\leqslant \theta \leqslant$ 900 °C / WQ or OQ + $\theta \geqslant$ 450 °C / t $\geqslant$ 1 h / AC	
44	**External defects**	—	Forging stock: See Section 3 of BS B 100	Forgings: See Section 4 of BS B 100
58	**Forgeability**	—	Section 3 of BS B 100	
		6	Compression at 900 °C $\leqslant \theta \leqslant$ 950 °C to 20% of original length	
95	**Marking**	—	Forging stock: See Section 3 of BS B 100	Forgings: See Section 4 of BS B 100
96	**Dimensional inspection**	—	Forging stock: BS EN 12165 class A [2)]	Forgings: See Section 4 of BS B 100
98	**Notes**	—	[1)] Total impurities exclude Al and Fe. [2)] Applicable to round forging stock. Dimensional tolerances to be applied to round forging stock outside the range given in BS EN 12165 and to forging stock of other shapes should be agreed between the supplier and the purchaser.	

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)]

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

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