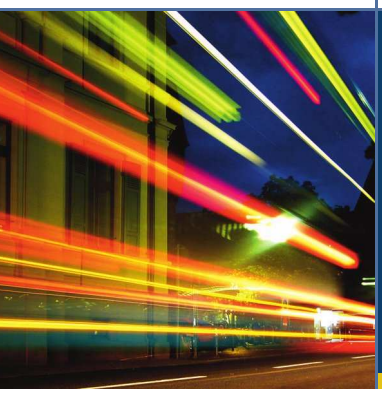
BS 3B 33:2009



BSI British Standards

AEROSPACE SERIES

Specification for copper-beryllium alloy wire (solution treated and precipitation treated)

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Amendments issued since publication

Date	Text affected

Contents

List of tables

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/-/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This British Standard supersedes BS 2B 33:2001, which is withdrawn.

Information about this document

This is a full revision of BS 2B 33 and introduces the following principal changes:

a) requirements are stated in tabular format in accordance with EN 4500-1;

b) references to springs have been deleted.

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-beryllium alloy supplied in the form of wire.

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 12166, *Copper and copper alloys – Wire for general purposes*

3 Technical requirements

3.1 Material to this standard shall conform to Table 1.

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

3.2 For the purposes of this standard, a batch shall be material of the same nominal cross-sectional dimensions, from the same cast, manufactured by the same route and heat treated together.

Table 1 **Technical requirements for Cu-Be alloy wire (solution treated and precipitation treated)**

1	**Material designation**			**BS B 33**						
2	**Chemical composition %**	Element		Be	Co + Ni	Co + Fe + Ni	Al	Si	Others	Cu
		Min.		1.80	0.20	—	—	—	—	Base
		Max.		2.00	—	0.6	0.20	0.20	0.50	
3	**Method of melting**			—						
4.1	**Form**			Wire						
4.2	**Method of production**			Drawn						
4.3	**Limit dimension(s)**		mm	D ⩽ 3						
5	**Technical specification**			Sections 1 and 7 of BS B 100						

6.1	**Delivery condition**			Solution treated
	Heat treatment			775 °C ⩽ θ ⩽ 835 °C / Quench [1)]
6.2	**Delivery condition code**			—
7	**Use condition**			Solution treated + precipitation treated
	Heat treatment			Delivery condition + 315 °C ⩽ θ ⩽ 335 °C / t = 3 h / AC
				Characteristics
8.1	**Test sample(s)**			See Section 7 of BS B 100
8.2	**Test piece(s)**			See Section 7 of BS B 100
8.3	**Heat treatment**			Use condition
9	**Dimensions concerned**		mm	D ⩽ 3
10	**Thickness of cladding on each face**		%	—
11	**Direction of test piece**			L
12	T	**Temperature**	°C	Ambient
13	T	**Proof stress**	$R_{p0.2}$ MPa	⩾ 890
14	T	**Strength**	R_m MPa	1 100 ⩽ R_m ⩽ 1 380 [2)]
15	T	**Elongation**	A %	—
16	T	**Reduction of area**	Z %	—
17	**Hardness**			—
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), 2)]

Table 1 **Technical requirements for Cu-Be alloy wire (solution treated and precipitation treated)** *(continued)*

43	**Wrapping test**	—	See Section 7 of BS B 100
		2	One sample per batch
		5	Delivery condition
		6	The test sample shall be closely wound to form a helix of five turns round a mandrel of diameter equal to that of the wire.
		7	No cracking
44	**External defects**	—	See Section 7 of BS B 100
95	**Marking**	—	See Section 7 of BS B 100
96	**Dimensional inspection**	—	BS EN 12166 class A
98	**Notes**	—	[1] Quenching shall be effected by forced air, sprayed water or immersion in oil or water. [2] The upper limit tensile strength does not apply to wire of D $\leqslant$ 0.5 mm.

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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