BS 2TA 59:2009

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Specification for sheet of titanium-aluminium-vanadium alloy (Tensile strength 920–1 180 MPa)

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Amendments issued since publication

Date	Text affected

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 30 November 2009. It was prepared by Panel ACE/61/-/49, *Titanium and its 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This British Standard supersedes BS TA 59:1980, which is withdrawn.

Information about this document

This is a full revision of BS TA 59, and introduces the following principal changes:

a) requirements stated in tabular format in accordance with EN 4500-1 and EN 4500-4;

a) chemical composition amended to add requirements for "other" elements;

a) melting method details deleted and replaced by reference to Section 1 of BS TA 100.

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 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 standard specifies requirements for titanium-aluminium-vanadium alloy sheet with a tensile strength of 920 to 1 180 MPa.

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 TA 100, *Procedure for inspection, testing and acceptance of wrought titanium and titanium 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 4500-4.

Table 1 **Technical requirements for titanium-aluminium-vanadium alloy sheet**

1	**Material designation**			**BS TA 59**											
2	**Chemical composition** %	Element		Al	V	Fe	C	O_2	N_2	H_2	Y	Others		Ti	
												Each	Total		
		Min.		5.50	3.50	—	—	—	—	—	—	—	—	Base	
		Max.		6.75	4.50	0.30	0.08	0.20	0.050	0.015	0.005	0.10	0.40		
3	**Method of melting**			See Section 1 of BS TA 100											
4.1	**Form**			Sheet [1)]											
4.2	**Method of production**			Rolling											
4.3	**Limit dimension(s)**		mm	—											
5	**Technical specification**			Sections 1 and 5 of BS TA 100											

6.1	**Delivery condition**	Annealed + descaled
	Heat treatment	700 °C $\leqslant \theta \leqslant$ 900 °C / AC or FC [2)]
6.2	**Delivery condition code**	U
7	**Use condition**	Delivery condition
	Heat treatment	—

					Characteristics	
8.1	**Test sample(s)**				See Section 5 of BS TA 100	
8.2	**Test piece(s)**				See Section 5 of BS TA 100	
8.3	**Heat treatment**				Use condition	
9	**Dimensions concerned**			mm	b $\leqslant$ 200	b > 200
10	**Thickness of cladding on each face**			%	—	—
11	**Direction of test piece**				L	L and LT
12	T	**Temperature**	θ	°C	Ambient	Ambient
13		**Proof stress**	$R_{p0.2}$	MPa	$\geqslant$ 870	$\geqslant$ 870
14		**Strength**	R_m	MPa	920 $\leqslant R_m \leqslant$ 1 180	920 $\leqslant R_m \leqslant$ 1 180
15		**Elongation**	A	%	$\geqslant$ 8	$\geqslant$ 8
16		**Reduction of area**	Z	%	—	
17	**Hardness**				—	
18	**Shear strength**		R_c	MPa	—	
19	**Bending**		κ	—	5.0; α =180° (sample taken in transverse direction)	
20	**Impact strength**				—	
21	C	**Temperature**	θ	°C	—	
22		**Time**		h	—	
23		**Stress**	σ_a	MPa	—	
24		**Elongation**	a	%	—	
25		**Rupture stress**	σ_R	MPa	—	
26		**Elongation at rupture**	A	%	—	
27	**Notes** (see line 98)				[1), 2)]	

Table 1 **Technical requirements for titanium-aluminium-vanadium alloy sheet** *(continued)*

44	**External defects**	—	See Section 5 of BS TA 100
74	**Surface contamination**	—	See Section 5 of BS TA 100
95	**Marking**	—	See Section 5 of BS TA 100
96	**Dimensional inspection**	—	See Section 5 of BS TA 100
		7	The tolerances applicable to material finished by hot rolling shall apply
98	**Notes**	—	[1] British Standards covering other forms of material of similar composition are:

R_m (MPa)	min.	895	900	960	1 100
	max.	1 150	1 160	1 270	1 300
Limiting ruling section (lrs) (mm)		—	150	—	20
Maximum thickness (mm)		100	—	—	—
Form		British Standard			
Sheet and strip		—	—	BS TA 10	—
Bar and section for machining		—	BS TA 11	—	—
Forging stock		—	BS TA 12	—	—
Forging stock and wire		—	—	—	BS TA 28 [a]
Forgings		—	BS TA 13	—	—
Plate		BS TA 56	—	—	—

[a] Primarily intended for the manufacture of fasteners conforming to the requirements of the "A" series of British Standards.

[2] Selected temperature shall be held at ±15 °C

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.

BS TA 10, *Specification for sheet of titanium-aluminium-vanadium alloy (Tensile strength 960–1 270 MPa)*

BS TA 11, *Specification for bar and section for machining of titanium-aluminium-vanadium alloy (Tensile strength 900–1 160 MPa – Limiting ruling section 150 mm)*

BS TA 12, *Specification for forging stock of titanium-aluminium-vanadium alloy (Tensile strength 900–1 160 MPa) (Limiting ruling section 150 mm)*

BS TA 13, *Specification for forgings of titanium-aluminium-vanadium alloy (Tensile strength 900–1 160 MPa) (Limiting ruling section 150 mm)*

BS TA 28, *Specification for forging stock and wire of titanium-aluminium-vanadium alloy (Tensile strength 1 100–1 300 MPa) (Limiting ruling section 20 mm)*

BS TA 56, *Specification for plate of titanium-aluminium-vanadium alloy (Tensile strength 895–1 150 MPa) (Maximum thickness 100 mm)*

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

EN 4500-4, *Metallic materials – Rules for the drafting and presentation of material standards – Part 4: Specific rules for titanium and titanium alloys* [1)]

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

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