BS EN 4800-004:2025

BSI Standards Publication

Aerospace series — Titanium and titanium alloys

Part 004: Wires — Technical specification

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National foreword

This British Standard is the UK implementation of EN 4800-004:2025. It supersedes BS EN 4800-004:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/61, Metallic materials for aerospace purposes.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Série aérospatiale - Titane et alliages de titane - Partie 004 : Fils Spécification technique

Luft- und Raumfahrt - Titan und Titanlegierungen - Teil 004: Drähte - Technische Lieferbedingungen

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European foreword

This document (EN 4800-004:2025) has been prepared by ASD-STAN.

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2025, and conflicting national standards shall be withdrawn at the latest by August 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 4800-004:2010.

The main changes with respect to the previous edition are as follows:

— EN 4800-004:2010-11:

- editorial improvements;
- update of Clause 2;
- update of the paragraph “Method of melting” in Table 1; and
- addition of a bibliography.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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Introduction

This document is part of the series of EN metallic material standards for aerospace applications. The general organization of this series is described in EN 4258.

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1 Scope

This document specifies the requirements for the ordering, manufacture, testing, inspection and delivery of titanium and titanium alloy wires. It is applicable when referred to and in conjunction with the European material standard unless otherwise specified on the drawing, order or inspection schedule.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 2002-001,[1] *Aerospace series — Metallic materials — Test methods — Part 001: Tensile testing at ambient temperature*

EN 2002-002, *Aerospace series — Metallic materials — Test methods — Part 002: Tensile testing at elevated temperature*

EN 2002-005, *Aerospace series — Test methods for metallic materials — Part 005: Uninterrupted creep and stress-rupture testing*

EN 2002-16, *Aerospace series — Metallic materials — Test methods — Part 16: Non-destructive testing — Penetrant testing*

EN 2003-009, *Aerospace series — Test methods — Titanium and titanium alloys — Part 009: Determination of surface contamination*

EN 2032-001, *Aerospace series — Metallic materials — Part 001: Conventional designation*

EN 2032-2, *Aerospace series — Metallic materials — Part 2: Coding of metallurgical condition in delivery condition*

EN 2078, *Aerospace series — Metallic materials — Manufacturing schedule, inspection schedule, inspection and test report — Definition, general principles, preparation and approval*

EN 2955, *Aerospace series — Recycling of titanium and titanium alloy scrap*

EN 3114-001, *Aerospace series — Test method — Microstructure of (α + β) titanium alloy wrought products — Part 001: General requirements*

EN 3114-002, *Aerospace series — Test method — Microstructure of (α + β) titanium alloy wrought products — Part 002: Microstructure of bars, sections, forging stock and forgings*

EN 3238, *Aerospace series — Metallic materials — Test method — Shear test for wires and rivets*

EN 3683, *Aerospace series — Test methods — Titanium alloy wrought products — Determination of primary α content — Point count method and line intercept method*

EN 3684, *Aerospace series — Test methods — Titanium alloy wrought products — Determination of β transus temperature — Metallographic method*

[1] Published as ASD-STAN prEN at the date of publication of this document, available at: https://www.asd-stan.org/.

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EN 3976, *Aerospace series — Titanium and titanium alloys — Test method — Chemical analysis for the determination of hydrogen content*

EN 4259, *Aerospace series — Metallic materials — Definition of general terms*

EN ISO 643, *Steels — Micrographic determination of the apparent grain size* (ISO 643)

ISO 7800, *Metallic materials — Wire — Simple torsion test*

ISO 7801, *Metallic materials — Wire — Reverse bend test*

ISO 7802, *Metallic materials — Wire — Wrapping test*

ISO 9649, *Metallic materials — Wire — Reverse torsion test*

TR 2410,[2] *Aerospace series — Metallic materials — Relationship between dimensional standards and material standards*

AMS 2750,[3] *Pyrometry*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 4259 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Wording of order

The order shall clearly indicate:

a) quantities to be supplied;

b) dates of delivery;

c) material standard number;

d) delivery condition and metallurgical code of products;

e) dimensions and tolerances or reference to an appropriate dimensional standard;

f) product designation, when required;

g) forwarding address;

h) nature and type of packing, if required;

i) definition and frequency of any special tests and their retest procedures, if required.

[2] Published as ASD-STAN TR, available at: https://www.asd-stan.org/.
[3] Published by Society of Automotive Engineers (SAE), available at: https://www.sae.org/.

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5 Health and safety

a) The products in the delivery condition shall fulfil the current health and safety laws of the area of the country when and where it is to be delivered.

b) A product safety data sheet shall be available.

6 Technical requirements

6.1 General

a) The product shall be manufactured in accordance with the requirements of the relevant material standard and the applicable requirements of this document.

b) A manufacturing schedule shall be established and applied in accordance with EN 2078.

c) The product shall satisfy the requirements of the material standard and/or order and shall be free from irregularities prejudicial to the subsequent manufacture or use of this product.

d) Notwithstanding previous acceptance complying with this material standard, any product that is found, at a later stage, to contain such defects shall be rejected.

e) Unless otherwise specified, the requirements in Table 1 and Table 2 shall apply in conjunction with those of the relevant material standard. Table 1 relates to lines 1 to 29 (inclusive) of the material standard and Table 2 relates to lines 30 onwards in which the sub-line format is also used. Lines 2 to 98 may also be opened in line 100 if the material standard details specific qualification requirements.

f) If a specific line number is not shown in Table 1 and Table 2, the requirement is stated in the material standard and/or order.

g) The requirements of the order and/or material standard shall override the requirements of the technical specification.

6.2 Qualification requirements

Qualification requirements, when invoked by the material standard and/or order, are detailed in Table 1 and Table 2.

Unless otherwise agreed between the manufacturer and customer, the qualification phase shall be run on the first three batches, coming from three different ingots.

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6.3 Release requirements

6.3.1 Release tests

a) Release testing shall be the responsibility of the manufacturer.

b) The customer reserves the right to perform any of the inspections and/or tests required by the material standard and/or order.

c) The test samples shall be representative of the product.

d) When required, the manufacturer shall inform the customer of the planned dates for extraction of samples and release testing in order that these operations may be witnessed.

e) Table 1 and Table 2 detail the requirements for each line of the material standard.

f) Unless otherwise specifically requested by the customer, a particular inspection and/or test for release shall be carried out if corresponding acceptance criteria and/or values are stated in the applicable material standard, but see also in 6.3.5.

6.3.2 Retests

a) If the test procedure or test piece preparation is faulty, testing shall be re-applied at the original frequency after rectification of the original cause of failure.

b) When failure cannot be attributed to faulty testing, or test piece preparation, further test samples shall be selected at twice the original frequency from the product, one of which shall be that on which the original results were obtained unless already withdrawn by the manufacturer after suitable identification of the cause of failure.

c) If all retest results are satisfactory, the batch shall be accepted.

d) If one or more tests are unsatisfactory, the batch shall be:

   1) rejected; or

   2) 100 % retested and the conforming products accepted; or

   3) partially or fully re-heat treated if heat treatment can rectify the cause of the failure and tested as a completely new batch except for chemical composition, for which redetermination of hydrogen content is required.

e) No product or test sample shall be re-heat treated more than twice.

6.3.3 Rejection

Any failure to meet the requirements of the material standard shall be cause for rejection.

6.3.4 Special tests

Special tests may be required by the customer. In such cases, the nature of the test, method, frequency and technical requirements shall be specified on the order or inspection schedule and shall be mutually agreed by the manufacturer and customer.

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6.3.5 Capability clause

a) Where capability clause is invoked and where sufficient statistical evidence exists, the test shall not be carried out (unless specifically requested by the customer).

b) However, this in no way reduces the obligations of the manufacturer to fulfil the requirements.

c) If subsequent testing indicates that the product does not comply with the requirements, the batch shall be rejected.

d) If sufficient statistical evidence does not exist, the test shall be carried out at a frequency agreed between the manufacturer and the customer.

6.3.6 Statistical process control

Reduction in the extent of release testing, other than that specified in 6.3.5 above, may be negotiated with the customer on the basis of appropriate statistical process control and/or statistical data.

6.3.7 Inspection and test report

The manufacturer shall furnish, with each delivery, a report conforming to the requirements of EN 2078 stating the following:

a) manufacturer's name and address and, if appropriate, identification of the plant;

b) order number;

c) material standard number;

d) delivery condition and metallurgical code of the product;

e) quantity and dimensions;

f) manufacturing and inspection schedule reference;

g) cast and batch number;

h) batch and/or test samples heat treatment condition;

i) results of the tests and retests if any.

6.4 Traceability

Each product shall be traceable to the cast, production batch and/or heat treatment batch at all stages of manufacture, testing and delivery.

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