



# SLOVENSKI STANDARD

## SIST EN 2954-001:2010

01-maj-2010

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**Aeronavtika - Makrostruktura gnetenih izdelkov iz titana in titanovih zlitin - 001.**  
**del: Splošne zahteve**

Aerospace series - Macrostructure of titanium and titanium alloy wrought products - Part 001: General requirements

Luft- und Raumfahrt - Makrostruktur von geschmiedeten Erzeugnissen aus Titan und Titanlegierungen - Teil 001: Allgemeine Anforderungen

Série aérospatiale - Macrostructure de produits corroyés en titane et en alliages de titane - Partie 001: Exigences générales

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**Ta slovenski standard je istoveten z: EN 2954-001:2010**

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**ICS:**

49.025.30 Titan Titanium

**SIST EN 2954-001:2010 en**

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EUROPEAN STANDARD

**EN 2954-001**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2010

ICS 49.025.30

English Version

**Aerospace series - Macrostructure of titanium and titanium alloy  
wrought products - Part 001: General requirements**

Série aérospatiale - Macrostructure de produits corroyés en  
titane et en alliages de titane - Partie 001 : Exigences  
générales

Luft- und Raumfahrt - Makrostruktur von geschmiedeten  
Erzeugnissen aus Titan und Titanlegierungen - Teil 001:  
Allgemeine Anforderungen

This European Standard was approved by CEN on 6 February 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document (EN 2954-001:2010) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

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

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 2954-001:2010 (E)****1 Scope**

This standard specifies the conditions for the macrographic examination of titanium and titanium alloy bar, section, forging stock and forgings. Specific macrostructures are defined in EN 2954-002.

This standard shall be applied in conjunction with EN material standards and technical specifications, which define the acceptance criteria unless otherwise specified on the order.

**2 Normative references**

Not applicable.

**3 Sampling**

Sampling and its frequency is defined in the relevant material standard, technical specification or order. Samples shall be at least 10 mm thick. Unless otherwise agreed, samples from bar, section and forging stock must be cut in the transverse direction. For forgings, the sampling location is specified in the inspection schedule.

Samples shall preferably be taken by sawing. Cold-work hardened zones shall be avoided or removed. If the sample material is taken by abrasive cut-off or flame cutting, the resulting heat affected zone shall be removed completely in the course of sample preparation.

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**4 Preparation of samples for examination <sup>1)</sup>**  
(standards.iteh.ai)**4.1 Surface preparation**

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The sample surface to be examined shall be prepared by turning, planing, milling, grinding and/or polishing to ensure that the macrostructure is clearly detectable after etching. A surface finish of  $R_a \leq 2 \mu\text{m}$  is recommended.

**4.2 Etchants**

Unless otherwise agreed between purchaser and manufacturer, the following etchant solution shall be used:

- Nitric acid + hydrofluoric acid ( $\text{HNO}_3 + \text{HF}$ ) + water;
- 40 Vol. % nitric acid (65 %,  $d = 1,365$ );
- + 8 Vol. % hydrofluoric acid (40 %,  $d = 1,13$ );
- + water.

All equipment coming into contact with the etchant shall be made from acid resistant materials such as PVC. Baths shall be covered when not in use. They shall only be used for macro-etching and their composition shall be checked periodically. It is recommended that all operations are carried out under fume extraction.

**4.3 Macro-etching**

Macro-etching shall be carried out as follows:

- a) the sample shall be carefully cleaned of adhering dirt, then degreased and rinsed in running water;

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1) Relevant official safety regulations shall be taken into account.

- b) the sample shall be etched in the etchant solution at temperature ambient until the macrostructure has been clearly developed;
- c) subsequently the sample shall be rinsed in running water and if required in a non-aqueous solvent such as ethanol, followed by drying in air.

If a tarnish film appears, it may be removed by the use of the following solution:

- 2 Vol. % nitric acid (HNO<sub>3</sub>) (65 %, d = 1,365);
- 1 Vol. % hydrofluoric acid (HF) (40 %, d = 1,13);
- 50 Vol. % hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) (30 %);
- 47 Vol. % water.

## 5 Examination

The visual examination shall be carried out in daylight or in artificial light of sufficient intensity (typically > 2 000 lux). Normally examination shall be without magnification.

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## Bibliography

- [1] EN 2954-002, *Aerospace series — Macrostructure of titanium and titanium alloy wrought products — Part 002: Macrostructure of bar, section, forging stock and forgings*

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