



SLOVENSKI STANDARD

SIST EN 2955:2002

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Aerospace series - Recycling of titanium and titanium alloy scrap

Aerospace series - Recycling of titanium and titanium alloy scrap

Luft- und Raumfahrt - Wiederaufbereitung von Schrott aus Titan und Titanlegierungen

Série aérospatiale - Recyclage des chutes de titane et d'alliages de titane

Ta slovenski standard je istoveten z: EN 2955:1993

[SIST EN 2955:2002](https://standards.iteh.ai/catalog/standards/sist/2e4629a0-1453-4fc6-9847-acf460ab2e2c/sist-en-2955-2002)

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English version

Aerospace series

Recycling of titanium and titanium alloy scrap

Série aérospatiale

Recyclage des chutes de titane et d'alliages de titane

Luft- und Raumfahrt

Wiederaufbereitung von Schrott aus Titan und Titanlegierungen

This European Standard was approved by CEN on 1993-07-26. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

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

This standard was submitted for Formal Vote, and the result was positive.

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 January 1994, and conflicting national standards shall be withdrawn at the latest by January 1994.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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1 Scope

This standard specifies the general requirements for recycling, by vacuum remelting, titanium and titanium alloy scrap used for the production of ingots.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited in the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2000 Aerospace series - Quality assurance - EN aerospace products - Approval of the quality system of manufacturers

3 Definitions

3.1 Scrap processor

The scrap processor classifies the scrap and guarantees conformity to the melter's requirements. Scrap processing may be carried out by an independent processor (scrap dealer), by the melter's processing department or by the purchaser's processing department.

3.2 Melter

A company which manufactures titanium or titanium alloy ingots.

3.3 Purchaser

Body which purchases the products from a manufacturer or a stockist in accordance with the requirements of the user.

NOTE : the purchaser may also be the user.

3.4 User

See EN 2000.

3.5 Melter's recovery department

The department responsible for recovering the scrap produced by the melter and preparing it for treatment by the scrap processor.

3.6 Purchaser's recovery department

The department responsible for recovering the scrap produced by the purchaser and preparing it for treatment by the scrap processor.

3.7 Scrap lot

Scrap from the same alloy and same classification prepared by the same processor in accordance with the same process schedule and processed at the same time.

3.8 Classification of scrap

The scrap categories and sub-categories are defined in the table 1.

3.9 Traceable scrap

Individual pieces of scrap, the history of which can be traced back to the original ingot.

3.10 Massive scrap

Scrap with an individual mass of $\geq 0,5$ kg.

3.11 Light scrap

Scrap with an individual mass of $< 0,5$ kg.

3.12 Non-contaminated scrap

Scrap which is free from contamination caused by :

- welding;
- brazing;
- electrolytic deposits;
- painting;
- coating;
- oxidation caused by heating;
- nitriding;
- etc.

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4 Recycling

For flow chart for scrap recycling see annex A.

4.1 General requirements

The scrap shall :

- come exclusively from aerospace quality products, but only if any defects which led to the rejection can be removed by remelting (e.g. without high density inclusions, HDI, carbides).
- be collected, segregated according to alloy type, classified in accordance with the table 1, put into boxes and marked with an identification number according to a laid-down procedure.

4.2 Approval

For each scrap category, the scrap processor shall demonstrate that his sorting process is capable of yielding a product that meets the requirements of this standard. In order to demonstrate this capability, a verification programme shall be established in conjunction with the melter and the purchaser.

After satisfactory results, the scrap processor shall be approved for processing of the scrap category concerned.

4.3 Procedure

Methods for inspection, cleaning, preparation, identification, maintenance of traceability and test frequency shall be laid down in a written procedure for each scrap category.

The melter and the purchaser shall have access to all documents and installations of the scrap processor in order to verify the application of the procedure. Any proposed change to this procedure shall be submitted for approval to the melter and, if appropriate, to the purchaser.

The scrap processor shall furnish a certificate of conformity to the requirements of the order for each lot which shall include the following information :

- scrap lot number,
- alloy type,
- scrap category or sub-category,
- chemical composition,
- mass of scrap lot.

4.4 Technical requirements

4.4.1 General

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The scrap shall be cleaned and segregated into uniform lots corresponding to one of the categories or sub-categories in the table 1.

Contaminated zones shall be removed.

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Massive scrap shall be individually inspected to verify the alloy.

With the exception of oxygen, carbon and hydrogen in the case of turnings, the chemical composition of the scrap shall conform to the requirements of the relevant standard.

4.4.2 Turnings

In addition to the information given in the table 1, sorting of turnings shall include :

- a screening to eliminate particles ≥ 1 mm,
- a test equipment (X-ray or equivalent technique) to guarantee the elimination of particles from the tungsten carbide tools with a diameter of :
 - $\geq 0,4$ mm for turnings sub-categories 4.2.1 and 4.3.1,
 - $\geq 1,0$ mm for turnings sub-categories 4.2.2 and 4.3.2 (see table 1).

The efficiency of this test equipment shall be assessed periodically by introducing and detecting tungsten carbide balls with a diameter of 0,4 mm (sub-categories 4.2.1 and 4.3.1) or 1,0 mm (sub-categories 4.2.2 and 4.3.2) in accordance with the specification of the melter.

Table 1 - Classification of titanium and titanium alloy scrap

1 Definitions of categories	2 Definitions of sub-categories	3 Requirement	4 Inspection method	5 Test frequency
1 Traceable massive or light scrap, individually inspected	1.1 Clean and non-contaminated scrap or scrap from which contaminated zones have been removed by mechanical cutting 1) 1.2 Scrap in which contaminated zones have been removed by a method other than mechanical cutting (e.g. : vapour blasting, etching)	Material identification	As defined by the scrap processor	100 %
2 Non-traceable massive or light scrap, individually inspected	2.1 Clean and non contaminated zones scrap and scrap which contaminated zones have been removed by mechanical cutting 1) 2.2 Scrap in which contaminated zones have been removed by a method other than mechanical cutting (e.g. : vapour blasting, etching)	Non-contamination and cleanliness	Visual	100 %
3 Non-traceable light scrap inspected by sampling	3.1 Clean and non-contaminated scrap or scrap from which contaminated zones have been removed by mechanical cutting 1) 3.2 Scrap in which contaminated zone have been removed by a method other than mechanical cutting (e.g. : vapour blasting, etching)	Material identification	As defined by the scrap processor	By representative sampling in accordance with the specification of the melter 100 % evaluation

1) Scrap machined with other than high speed steel tools shall be the next sub-category.

Table 1 (continued)

1 Definitions of categories	2 Definitions of sub-categories	3 Requirement	4 Inspection method	5 Test frequency
4	4.1 From machining with high speed steel tools, - of the same alloy, - clean	Magnetic sorting 1) Chemical composition Cleanness	As defined by the scrap processor Visual	100 % By representative sampling 100 % evaluation
Turnings	4.2 4.2.1 From machining with tungsten carbide tools containing more than 5,5 % cobalt and having verified ferromagnetism - of the same alloy - clean - with no tungsten carbide particles $\geq 0,4$ mm diameter	Magnetic sorting Chemical composition Cleanness	As defined by the scrap processor Visual	100 % By representative sampling 100 % evaluation
	4.2.2 From machining with tungsten carbide tools containing more than 5,5 % cobalt and having verified ferromagnetism - of the same alloy - clean - with no tungsten carbide particles $\geq 1,0$ mm diameter	No tungsten carbide tools particles $\geq 0,4$ mm for 4.2.1 and $\geq 1,0$ mm for 4.2.2	X - ray or equivalent	100 %

1) The efficiency of magnetic sorting shall be assessed periodically in accordance with the specification of the melter.