

**Copper and copper alloys - Determination of tin content
- Part 4: Medium tin content - Flame atomic absorption
spectrometric method (FAAS)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

**Copper and copper alloys - Determination of tin content - Part 4:
Medium tin content - Flame atomic absorption spectrometric
method (FAAS)**

Cuivre et alliages de cuivre - Détermination de la teneur en
étain - Partie 4: Étain en moyenne teneur - Méthode par
spectrométrie d'absorption atomique dans la flamme
(SAAF)

Kupfer und Kupferlegierungen - Bestimmung des
Zinngehaltes - Teil 4: Mittlerer Zinngehalt -
Flammenatomabsorptionsspektrometrisches Verfahren
(FAAS)

This European Standard was approved by CEN on 24 September 2011.

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Foreword

This document (EN 15022-4:2011) has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

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.

This document supersedes CEN/TS 15022-4:2006.

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 10 "Methods of analysis" to prepare the revision of the following document:

CEN/TS 15022-4:2006, *Copper and copper alloys — Determination of tin content — Part 4: Medium tin content — Flame atomic absorption spectrometry method (FAAS)*.

In comparison with the first edition of CEN/TS 15022-4:2006, the following significant technical changes were made:

- a) conversion into a European Standard;
- b) Clause 9 completely revised and the results of the precision test included.

This is one of four parts of the standard for the determination of tin content in copper and copper alloys. The other parts are:

- prEN 15022-1, *Copper and copper alloys — Determination of tin content — Part 1: Titrimetric method* (Part 1 will be the subject of a future work);
- CEN/TS 15022-2, *Copper and copper alloys — Determination of tin content — Part 2: Spectrophotometric method*;
- EN 15022-3, *Copper and copper alloys — Determination of tin content — Part 3: Low tin content — Flame atomic absorption spectrometry method (FAAS)*.

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1 Scope

This European Standard specifies a flame atomic absorption spectrometric method (FAAS) for the determination of the tin content of copper and copper alloys in the form of unwrought, wrought and cast products.

The method is applicable to products having medium tin mass fractions between 0,2 % and 3,0 %.

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.

ISO 1811-1, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 1: Sampling of cast unwrought products*

ISO 1811-2, *Copper and copper alloys — Selection and preparation of samples for chemical analysis — Part 2: Sampling of wrought products and castings*

3 Principle

Dissolution of a test portion in hydrochloric acid and hydrogen peroxide followed, after suitable dilution, by aspiration into a nitrous oxide/acetylene flame of an atomic absorption spectrometer. Measurement of the absorption of the 286,3 nm line emitted by a tin hollow-cathode lamp.

4 Reagents

Use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.1 Hydrochloric acid, HCl ($\rho = 1,19$ g/ml).

4.2 Hydrochloric acid solution, 7 + 3.

Add 700 ml of hydrochloric acid (4.1) to 300 ml of water.

4.3 Hydrogen peroxide, H₂O₂ 30 % (mass fraction) solution, free from tin base stabilizers.

Hydrogen peroxide may be stabilized by products containing some tin. It is therefore necessary to use exactly the same volume of hydrogen peroxide for the dissolution of the test sample as for the preparation of the corresponding blank test.

4.4 Tin stock solution, 1 g/l Sn.

Weigh ($1 \pm 0,001$) g of tin ($\text{Sn} \geq 99$ %) and transfer it into a 250 ml beaker. Dissolve it in 100 ml hydrochloric acid (4.1) and several drops of hydrogen peroxide (4.3) and cover with a watch glass. Heat gently until the metal is dissolved. Cool to room temperature and transfer the solution quantitatively into a 1 000 ml one-mark volumetric flask. Dilute to the mark with water and mix.

1 ml of this solution contains 1 mg of Sn.