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National Standards
Authority of Ireland
Glasnevin, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
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COPPER AND COPPER ALLOYS - DETERMINATION OF TIN CONTENT - PART 4: MEDIUM TIN CONTENT - FLAME ATOMIC ABSORPTION SPECTROMETRY METHOD (FAAS)

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English Version

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

Cuivre et alliages de cuivre - Dosage de l'etain - Partie 4 : Etain 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)

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (CEN/TS 15022-4:2006) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, the secretariat of which is held by DIN.

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

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

This is one of four parts of the standard/technical specification 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*

prEN 15022-2, *Copper and copper alloys — Determination of tin content — Part 2: Spectrometric method*

EN 15022-3, *Copper and copper alloys — Determination of tin content — Part 3: Low tin content — Flame atomic absorption spectrometry method (FAAS)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, 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.

1 Scope

This Technical Specification 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 %.

2 Normative references

The following referenced documents are indispensable for the application of this European Technical Specification. 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 discharge lamp.

4 Reagents and materials

4.1 General

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.2 Hydrochloric acid, HCl (ρ = 1,19 g/ml)

4.3 Hydrochloric acid solution, 7 + 3

Dilute 700 ml of hydrochloric acid (4.2) in 300 ml of water.

4.4 Hydrogen peroxide, H_2O_2 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 calibration solution.

4.5 Tin stock solution, 1 g/l Sn

Weigh (1 ± 0,001) g of tin (Sn ≥ 99 %) and transfer it into a 250 ml beaker. Dissolve it in 100 ml hydrochloric acid (4.2) and several drops of hydrogen peroxide (4.4) 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 well.

1 ml of this solution contains 1 mg of Sn.