



BSI Standards Publication

Copper and copper alloys — Determination of nickel content

Part 3: Flame atomic absorption
spectrometric method (FAAS)

National foreword

This British Standard is the UK implementation of EN 15023-3:2010. It supersedes DD CEN/TS 15023-3:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee NFE/34, Copper and copper alloys.

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

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English Version

**Copper and copper alloys - Determination of nickel content -
Part 3: Flame atomic absorption spectrometric method (FAAS)**

Cuivre et alliages de cuivre - Détermination du nickel -
Partie 3: Méthode par spectrométrie d'absorption atomique
dans la flamme (SAAF)

Kupfer und Kupferlegierungen - Bestimmung des
Nickelgehaltes - Teil 3:
Flammenatomabsorptionsspektrometrisches Verfahren
(FAAS)

This European Standard was approved by CEN on 19 June 2010.

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Foreword

This document (EN 15023-3:2010) 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of an identical text or by endorsement, at the latest by January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

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 15023-3:2006.

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 15023-3:2006, *Copper and copper alloys — Determination of nickel content — Part 3: Flame atomic absorption spectrometry method (FAAS)*.

In comparison with the first edition of CEN/TS 15023-3:2006, the following significant technical changes were made:

- Transformation into a European Standard;
- In 7.4.1.1, text added;
- Clause 9, Precision - completely revised.

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

- prEN 15023-1, *Copper and copper alloys — Determination of nickel content — Part 1: Spectrophotometric method*;
- prEN 15023-2, *Copper and copper alloys — Determination of nickel content — Part 2: Titrimetric method*.

Part 1 and Part 2 will be the subjects of future work.

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.

1 Scope

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

The method is applicable to products having a nickel mass fractions between 0,001 % and 6,0 %.

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 and nitric acid solution followed, after suitable dilution and the addition of lanthanum chloride to mask the effect of interfering ions, by aspiration into an air/acetylene flame of an atomic absorption spectrometer. Measurement of the absorption of the 232,0 nm or the 352,4 nm line emitted by a nickel hollow-cathode lamp.

4 Reagents

During the analysis, 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 Nitric acid, HNO₃ ($\rho = 1,40$ g/ml).

4.3 Nitric acid solution, 1 + 1.

Add 500 ml of nitric acid (4.2) to 500 ml of water.

4.4 Lanthanum (III) chloride solution, 100 g/l.

Dissolve 50 g of lanthanum (III) chloride heptahydrate (LaCl₃ · 7H₂O) in a 400 ml beaker with water and transfer the solution into a 500 ml one-mark volumetric flask. Dilute to the mark with water and mix.

4.5 Nickel stock solution, 1,0 g/l Ni.

Weigh ($1 \pm 0,001$) g of nickel (Ni $\geq 99,8$ %) and transfer it into a 250 ml beaker. Add 10 ml of hydrochloric acid (4.1) and 10 ml of the nitric acid solution (4.3). Cover with a watch glass and, if necessary, heat gently to assist dissolution. When dissolution is complete, 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 1,0 mg of Ni.

4.6 Nickel standard solution, 0,1 g/l Ni.