

English Version

**Copper and copper alloys - Determination of phosphorus content
- Spectrophotometric method**

Cuivre et alliages de cuivre - Détermination du phosphore -
Méthode spectrophotométrique

Kupfer und Kupferlegierungen - Bestimmung des
Phosphorgehaltes - Spektrophotometrisches Verfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (CEN/TS 15656:2015) has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

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This document supersedes CEN/TS 15656:2009.

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 15656:2009, *Copper and copper alloys — Determination of phosphorus content — Spectrophotometric method.*

In comparison with CEN/TS 15656:2009 only editorial modifications have been made.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This Technical Specification specifies a molybdovanadate spectrophotometric method for the determination of phosphorus in copper and copper alloys in the form of castings or unwrought or wrought products.

The method is applicable to products having phosphorus mass fractions between 0,001 % and 0,5 %.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 nitric acid. Elimination of interfering elements by fuming with perchloric, hydrofluoric and hydrobromic acids. Decomposition of insoluble phosphates by fusion with sodium carbonate. For contents below 0,01 % mass fraction, extraction of phosphorus as phosphomolybdic acid and spectrophotometric determination as molybdenum blue; for contents between 0,005 % and 0,05 % mass fraction, extraction and spectrophotometric determination as phosphovanadomolybdic acid.

4 Reagents

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

4.1 Nitric acid, HNO_3 ($\rho = 1,40 \text{ g/ml}$)

4.2 Nitric acid solution, 1 + 1

Add 500 ml of nitric acid (4.1) to 500 ml of water.

4.3 Hydrofluoric acid, HF ($\rho = 1,13 \text{ g/ml}$)

4.4 Perchloric acid, HClO_4 ($\rho = 1,67 \text{ g/ml}$)

4.5 Hydrobromic acid, HBr ($\rho = 1,50 \text{ g/ml}$)

4.6 Isobutanol

4.7 Sodium carbonate, Na_2CO_3

4.8 Methanol

4.9 Methyl isobutyl ketone