

ICS 77.120.30

English Version

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

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

Kupfer und Kupferlegierungen - Bestimmung des  
Phosphorgehaltes - Spektrophotometrisches Verfahren

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## Foreword

This document (CEN/TS 15656:2009) 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 document:

— CEN/TS 15656, *Copper and copper alloys — Determination of phosphorus content — Spectrophotometric method.*

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## 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 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*

NOTE Informative references to documents used in the preparation of this Technical Specification, and cited at the appropriate places in the text, are listed in the Bibliography.

## 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 concentrations below 0,01 % mass fraction, extraction of phosphorus as phosphomolybdic acid and spectrophotometric determination as molybdenum blue; for concentrations 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**,  $\text{HNO}_3$  ( $\rho = 1,40$  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 40 % (volume fraction), ( $\rho = 1,13$  g/ml)

**4.4 Perchloric acid**,  $\text{HClO}_4$  ( $\rho = 1,67$  g/ml)

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

**4.6 Isobutanol**

**4.7 Sodium carbonate**,  $\text{Na}_2\text{CO}_3$

**4.8 Methanol**

**4.9 Methyl isobutyl ketone**