

English Version

Organic and organo-mineral fertilizers - Determination of  
the content of specific elements by ICP-AES after  
extraction by water

Engrais organiques et organo-minéraux -  
Détermination de la teneur en éléments spécifiques par  
ICP-AES après extraction à l'eau

Organische und organisch-mineralische Düngemittel -  
Bestimmung des Gehalts spezifischer Elemente mittels  
ICP-AES nach Extraktion mit Wasser

This Technical Specification (CEN/TS) was approved by CEN on 13 March 2022 for provisional application.

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## European foreword

This document (CEN/TS 17774:2022) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN

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## **Introduction**

This document is part of a modular approach and concerns the analytical measurement step. “Modular” means that a test standard concerns a specific step in assessing a property and not the whole chain of measurements. Inductively coupled plasma atomic emission spectrometry (ICP-AES) is nowadays widely used and a well-established method in many laboratories.

## 1 Scope

This document specifies a method for the determination of boron (B), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo) and zinc (Zn) in organic fertilizers and organo-mineral fertilizers extracts using inductively coupled plasma-atomic emission spectrometry (ICP-AES).

NOTE Alternatively, inductively coupled plasma mass spectrometry (ICP-MS) can be used for the measurement if the user proves that the method gives the same results.

This method is applicable to water extracts prepared according to CEN/TS 17766. The method can be used for the determination of other elements, provided the user has verified the applicability.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

CEN/TS 17766, *Organic and organo-mineral fertilizers — Extraction by water for subsequent determination of elements*

EN 12944-1, *Fertilizers and liming materials — Vocabulary — Part 1: General terms*

EN 12944-2, *Fertilizers and liming materials — Vocabulary — Part 2: Terms relating to fertilizers*

EN ISO 3696:1995, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1 and EN 12944-2 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

## 4 Principle

The method is based on the ICP-AES measurement of the concentration of boron (B), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo) and zinc (Zn) in fertilizer extracts prepared according to CEN/TS 17766. The elements are determined after appropriate dilution of the extract. The solution is dispersed by a nebulizer of the ICP-AES instrument and the resulting aerosol is transported into the plasma. Element specific emission spectra are produced by a radio-frequency inductively coupled argon plasma where atoms or ions are excited at high temperature. The emission spectra are dispersed by a spectrometer, and the intensities of the emission lines are monitored by photosensitive devices. Multi-element determinations using sequential or simultaneous optical systems and axial or radial viewing of the plasma may be used.

The method may be used for the determination of other elements, provided the user has verified the applicability.