SLOVENSKI STANDARD
SIST-TS CEN/TS 17754:2023

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Anorganska gnojila - Določevanje specifičnih mikrohranil

Inorganic fertilizers - Determination of specific micronutrients

Anorganische Düngemittel - Bestimmung spezifischer Spurennährstoffe

Engrais inorganiques - Détermination des oligo-éléments spécifiques

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ICS:

65.080	Gnojila	Fertilizers

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TECHNICAL SPECIFICATION

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CEN/TS 17754

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Inorganic fertilizers - Determination of specific micronutrients

Engrais inorganiques - Détermination des oligo-éléments spécifiques

Anorganische Düngemittel - Bestimmung spezifischer Spurennährstoffe

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

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European foreword

This document (CEN/TS 17754:2022) 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

Regulation (EU) 2019/1009 [2] lays down the rules on the making available on the market of EU fertilizing products and the specific safety and quality requirements for the defined product function categories (PFCs). Inorganic fertilizers have been classified into PFC 1(C).

The specific safety and quality requirements in relation to the following specific micronutrients are defined in this document as well as normative references of the test methods to be used in order to measure the compliance with the related requirement in the Regulation (EU) 2019/1009 [2].

1 Scope

This document specifies references to methods for the determination of the content of the following specific micronutrients in inorganic fertilizers:

— the total boron content;

— the total cobalt content;

— the total copper and zinc content;

— the total iron content;

— the total manganese content;

— total molybdenum content;

— the water-soluble boron content;

— the water-soluble cobalt content;

— the water-soluble copper content;

— the water-soluble iron content;

— the water-soluble manganese content;

— the water-soluble molybdenum content;

— the water-soluble zinc content;

— the sum of declared micronutrients in compound micronutrient fertilizers.

This document is applicable to EU fertilizing products classified as PFC 1(C) and PFC 7 as long as the blend only consists of EU fertilizing products classified as PFC 1(C), PFC 2 and PFC 5 as specified in the Regulation (EU) 2019/1009 [2].

An overview of the references to methods for the determination of the specific micronutrients is given in Table 1.

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.

EN 1482-1:2007, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*

EN 1482-2:2007, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

EN 1482-3:2016, *Fertilizers and liming materials — Sampling and sample preparation — Part 3: Sampling of static heaps*

EN 12944-1:1999,[1] *Fertilizers and liming materials — Vocabulary — Part 1: General terms*

EN 12944-2:1999,[2] *Fertilizers and liming materials — Vocabulary — Part 2: Terms relating to fertilizers*

EN 16962:2018, *Fertilizers — Extraction of water soluble micro-nutrients in fertilizers and removal of organic compounds from fertilizer extracts*

EN 16963:2018, *Fertilizers — Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES*

EN 16964:2018, *Fertilizers — Extraction of total micro-nutrients in fertilizers using aqua regia*

EN 16965:2018, *Fertilizers — Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)*

EN 17041:2018, *Fertilizers — Determination of boron in concentrations ≤ 10 % using spectrometry with azomethine-H*

EN 17042:2018, *Fertilizers — Determination of boron in concentrations > 10 % using acidimetric titration*

EN 17043:2018, *Fertilizers — Determination of molybdenum in concentrations ≤ 10 % using spectrometry of a complex with ammonium thiocyanate*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1:1999 and EN 12944-2:1999 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 Sampling and sample preparation

4.1 Sampling

Samples taken for quality control purposes shall be representative, as described in EN 1482-1:2007. Sampling of static heaps shall be performed according to EN 1482-3:2016.

4.2 Sample preparation

The sample preparation for quality control purposes shall be performed according to EN 1482-2:2007.

[1] As impacted by EN 12944-1:1999/AC:2000.
[2] As impacted by EN 12944-2:1999/AC:2000.

5 Extraction of specific micronutrients

5.1 Total boron, cobalt, copper, iron, manganese, molybdenum and zinc

For the extraction of total boron, cobalt, copper, iron, manganese, molybdenum and zinc EN 16964:2018 shall be used. EN 16964:2018 specifies a method for the extraction of total boron, cobalt, copper, iron, manganese, molybdenum and zinc with aqua regia from inorganic fertilizers containing one or more micronutrients.

5.2 Water-soluble forms of boron, cobalt, copper, iron, manganese, molybdenum and zinc

For the extraction of water soluble forms of boron, cobalt, copper, iron, manganese, molybdenum and zinc EN 16962:2018 shall be used. EN 16962:2018 specifies a method for the extraction of water soluble forms of boron, cobalt, copper, iron, manganese, molybdenum and zinc from inorganic fertilizers containing one or more micronutrients and the procedure for removal of organic compounds from the water extracts.

6 Determination of specific micronutrients

6.1 Boron

For the determination of the total and the water-soluble boron content in inorganic fertilizers containing more than 10 % boron EN 17042:2018 shall be used.

For the determination of the total and the water-soluble boron content in inorganic fertilizers containing less than or equal to 10 % boron EN 17041:2018 shall be used. The method is not suitable for fertilizers with Fe concentrations more than twenty times higher than the concentration of boron.

Depending on availability of the technique, EN 16963:2018 may also be used. EN 16963:2018 specifies a method for the determination of total and water-soluble boron in fertilizer extracts using inductively coupled plasma-atomic emission spectrometry (ICP-AES).

6.2 Cobalt, iron, manganese, copper and zinc

For the determination of the total and the water-soluble cobalt, iron, manganese, copper and zinc content in fertilizer extracts EN 16963:2018 or EN 16965:2018 shall be used, depending on availability of the technique.

EN 16963:2018 specifies a method for the determination of total and water-soluble cobalt, iron, manganese, copper and zinc in fertilizer extracts using inductively coupled plasma-atomic emission spectrometry (ICP-AES).

EN 16965:2018 specifies a method for the determination of total and water-soluble cobalt, iron, manganese, copper and zinc in fertilizer extracts using flame atomic absorption spectrometry (FAAS).

6.3 Molybdenum

For the determination of the total and the water-soluble molybdenum content in fertilizer extracts less than or equal to 10 % molybdenum EN 17043:2018 shall be used. EN 17043:2018 specifies a method for determination of total and water-soluble molybdenum in inorganic fertilizers containing less than or equal to 10 % molybdenum.

Depending on availability of the technique, EN 16963:2018 may also be used. EN 16963:2018 specifies a method for the determination of total and water soluble molybdenum in fertilizer extracts using inductively coupled plasma-atomic emission spectrometry (ICP-AES).

Table 1 — References to methods for the extraction and determination of specific micronutrients

Micronutrient	Percentage %	Extraction	Determination
total boron		EN 16964:2018	EN 16963:2018
	> 10 %	EN 16964:2018	EN 17042:2018
	≤ 10 %	EN 16964:2018	EN 17041:2018 [a]
total cobalt, iron, manganese, copper and zinc		EN 16964:2018	EN 16963:2018
		EN 16964:2018	EN 16965:2018
total molybdenum		EN 16964:2018	EN 16963:2018
	≤ 10 %	EN 16964:2018	EN 17043:2018
water-soluble boron		EN 16962:2018	EN 16963:2018
	> 10 %	EN 16962:2018	EN 17042:2018
	≤ 10 %	EN 16962:2018	EN 17041:2018 [a]
water-soluble cobalt, iron, manganese, copper and zinc		EN 16962:2018	EN 16963:2018
		EN 16962:2018	EN 16965:2018
water-soluble molybdenum		EN 16962:2018	EN 16963:2018
	≤ 10 %	EN 16962:2018	EN 17043:2018

[a] The method is not suitable for fertilizers with Fe concentrations more than twenty times higher than the concentration of boron.

7 Sum of declared micronutrients

The sum of declared micronutrients shall be calculated from the various, individually determined total amounts of micronutrients, including the suspended, complexed or chelated micronutrients, and the micronutrients in solution, if applicable.