



SLOVENSKI STANDARD
SIST-TS CEN/TS 17753:2023

01-februar-2023

Anorganska gnojila - Določevanje specifičnih onesnaževal

Inorganic fertilizers - Determination of specific contaminants

Anorganische Düngemittel - Bestimmung spezifischer Kontaminanten

Engrais inorganiques - Détermination des contaminants spécifiques

Ta slovenski standard je istoveten z: CEN/TS 17753:2022

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ICS:

65.080 Gnojila Fertilizers

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**Inorganic fertilizers - Determination of specific
contaminants**

Engrais inorganiques - Détermination des
contaminants spécifiques

Anorganische Düngemittel - Bestimmung spezifischer
Kontaminanten

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

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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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 17753:2022) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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CEN/TS 17753:2022 (E)

Introduction

Regulation (EU) 2019/1009 [3] 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 specific contaminants (i.e. the mercury, cadmium, nickel, copper, zinc, arsenic, lead, chromium VI, biuret, perchlorate and total chromium content) 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 [3].

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1 Scope

This document specifies references to methods for the determination of the following contaminants: mercury, cadmium, nickel, copper, zinc, arsenic, lead, chromium(VI), biuret, perchlorate and total chromium content in inorganic 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 [3].

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

NOTE 1 The determination of copper and zinc in inorganic fertilizers as micronutrients is covered by CEN/TS 17754:2022.

NOTE 2 The determination of copper in ammonium nitrate fertilizers of high nitrogen content is covered by CEN/TS 17751:2022.

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 15479:2009, *Fertilizers — Spectrophotometric determination of biuret in urea*

EN 16317:2013+A1:2017, *Fertilizers and liming materials — Determination of arsenic by inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution*

EN 16318:2013+A1:2016, *Fertilizers and liming materials — Determination of chromium(VI) by photometry (method A) and by ion chromatography with spectrophotometric detection (method B)*

EN 16319:2013+A1:2015, *Fertilizers and liming materials — Determination of cadmium, chromium, lead and nickel by inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution*

EN 16320:2013+A1:2017, *Fertilizers and liming materials — Determination of mercury by vapour generation (VG) after aqua regia dissolution*

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

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

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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 17246:2019, *Fertilizers — Determination of perchlorate in mineral fertilizers by ion chromatography and conductivity detection (IC-CD)*

ISO 18643:2016, *Fertilizers and soil conditioners — Determination of biuret content of urea-based fertilizers — HPLC method*

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.

5 Determination of specific contaminants**5.1 Mercury (Hg)**

For the determination of the content of mercury in inorganic fertilizers the method as described in EN 16320:2013+A1:2017 shall be used. EN 16320:2013+A1:2017 specifies a method for the determination of the content of mercury after extraction with aqua regia and the detection of mercury by vapour generation (VG) coupled to an atomic absorption spectrometer or an inductively coupled plasma-atomic emission spectrometer.

5.2 Cadmium (Cd), nickel (Ni), arsenic (As) and lead (Pb)

For the determination of the content of cadmium, nickel and lead in inorganic fertilizers the method as described in EN 16319:2013+A1:2015 shall be used. EN 16319:2013+A1:2015 specifies a method for the determination of the content of cadmium, nickel and lead using inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution.

For the determination of the content of arsenic in inorganic fertilizers EN 16317:2013+A1:2017 shall be used. EN 16317:2013+A1:2017 specifies a method for the determination of the content of arsenic using inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution.

5.3 Copper (Cu) and zinc (Zn)

For the extraction of the total copper and zinc content, EN 16964:2018 shall be used.

For the extraction of the water-soluble copper and zinc content, EN 16962:2018 shall be used.

For the determination of the total and the water-soluble copper and zinc content EN 16963:2018 or EN 16965:2018 shall be used.

EN 16963:2018 specifies a method for the determination of total and water extractable 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 extractable copper and zinc in fertilizer extracts using flame atomic absorption spectrometry (FAAS).

NOTE 1 The determination of copper and zinc in inorganic fertilizers as micronutrients is covered by CEN/TS 17754:2022.

NOTE 2 The determination of copper in ammonium nitrate fertilizers of high nitrogen content is covered by CEN/TS 17751:2022.

5.4 Chromium(VI) (Cr(VI))

For the determination of the content of hexavalent chromium (Cr(VI)) in inorganic fertilizers EN 16318:2013+A1:2016 shall be used. EN 16318:2013+A1:2016 specifies two methods for the determination of the content of soluble chromate.

Method A specifies the determination of chromate after extraction with water by photometry. This method shall be used to determine Cr(VI)-mass fractions higher than 1 mg/kg.

Method B specifies the determination of chromate by alkaline digestion and ion chromatography with spectrophotometric detection. This method shall be used to determine Cr(VI)-mass fractions higher than 0,1 mg/kg.

5.5 Biuret (C₂H₅N₃O₂)

For the determination of the biuret content in liquid and solid urea-based fertilizers ISO 18643:2016 shall be used. ISO 18643:2016 specifies the test procedure for the determination of the biuret content in liquid and solid urea-based fertilizers based on the HPLC method.

NOTE ISO 18643:2016 expresses the result as a mass fraction of biuret in % whereas Regulation (EU) 2019/1009 [3] expects g/kg. Conversion to be made: Mass fraction in % equals 10 g/kg.

For the determination of biuret in urea also EN 15479:2009 may be used.

5.6 Perchlorate (ClO₄-)

For the determination of the content of perchlorate in inorganic fertilizers EN 17246:2019 shall be used. EN 17246:2019 specifies a method for the determination of traces of perchlorate by ion chromatography and conductivity detection (IC-CD).

5.7 Total chromium (Cr(total))

For the determination of the content of total chromium in inorganic fertilizers EN 16319:2013+A1:2015 shall be used. EN 16319:2013+A1:2015 specifies a method for the determination of chromium using inductively coupled plasma-atomic emission spectrometry (ICP-AES) after aqua regia dissolution.

Table 1 — References to methods for the determination of specific contaminants

Contaminant	Mass fraction mg/kg	Determination
Mercury		EN 16320:2013+A1:2017
Cadmium		EN 16319:2013+A1:2015
Nickel		EN 16319:2013+A1:2015
Copper		EN 16963:2018 EN 16965:2018
Zinc		EN 16963:2018 EN 16965:2018
Arsenic		EN 16317:2013+A1:2017
Lead		EN 16319:2013+A1:2015
Chromium(VI)	> 1 > 0,1 and ≤ 1	EN 16318:2013+A1:2016, method A EN 16318:2013+A1:2016, method B
Biuret		EN 15479:2009 (urea and urea-based fertilizers) ISO 18643:2016 (liquid and solid urea-based fertilizers)
Perchlorate		EN 17246:2019
Total chromium		EN 16319:2013+A1:2015