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Irish Standard
I.S. EN 16963:2018

Fertilizers - Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

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National Foreword

I.S. EN 16963:2018 is the adopted Irish version of the European Document EN 16963:2018, Fertilizers - Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16963

January 2018

ICS 65.080

English Version

Fertilizers - Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES

Engrais - Dosage du bore, du cobalt, du cuivre, du fer, du manganèse, du molybdène et du zinc par ICP-AES

Düngemittel - Bestimmung von Bor, Cobalt, Kupfer, Eisen, Mangan, Molybdän und Zink mit ICP-AES

This European Standard was approved by CEN on 15 October 2017.

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European foreword

This document (EN 16963:2018) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2018, and conflicting national standards shall be withdrawn at the latest by July 2018.

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 mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

The preparation of this document is based on a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/335) concerning the modernization of methods of analysis of fertilizers in the framework of Regulation (EC) No 2003/2003 [1].

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 well established in many laboratories. The European Standard can be used for determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc in all extracts prepared according to EN 16962 and EN 16964. The method can be applied to mineral fertilizers with micro-nutrient contents of ≤ 10 % as well as contents of > 10 %.

The inter-laboratory study reflects the final properties of the method for determination of individual micro-nutrients in water and aqua regia extracts including extraction steps.

WARNING — Persons using this European Standard should be familiar with normal laboratory practice. This European Standard does not purport to address all of the safety issues, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this European Standard are carried out by suitably trained staff.

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1 Scope

This European Standard specifies a method for the determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc in fertilizer extracts using inductively coupled plasma-atomic emission spectrometry (ICP-AES).

This method is applicable to water and aqua regia fertilizer extracts prepared according to EN 16962 and/or EN 16964.

NOTE In most cases, the presence of small quantities of organic matter will not affect determinations by ICP-AES and it is not necessary to apply organic matter removal.

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.

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

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

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

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

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

3 Terms and definitions

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

4 Principle

The method is based on the ICP-AES measurement of the concentration of boron, cobalt, copper, iron, manganese, molybdenum and zinc in fertilizer extracts prepared according to EN 16962 or EN 16964. 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.

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