
Blato, obdelani biološki odpadki in tla - Določevanje elementov po razklopu z zlatotopko in dušikovo kislino - Metoda plamenske atomske absorpcijske spektrometrije (FAAS)

Sludge, treated biowaste and soil - Determination of elements in aqua regia and nitric acid digests - Flame atomic absorption spectrometry method (FAAS)

Schlamm, behandelter Bioabfall und Boden - Bestimmung von Elementen in Königswasser- und Salpetersäure-Auflösungslösungen - Flammen-Atomabsorptionsspektrometrie (FAAS)

Boue, biodéchet traité et sol - Détermination des éléments solubles dans l'eau régale et l'acide nitrique - Spectrométrie d'absorption atomique dans la flamme (SAA)

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ICS

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**Sludge, treated biowaste and soil - Determination of elements in
aqua regia and nitric acid digests - Flame atomic absorption
spectrometry method (FAAS)**

Boue, biodéchet traité et sol - Détermination des éléments
solubles dans l'eau régale et l'acide nitrique - Spectrométrie
d'absorption atomique dans la flamme (SAA)

Schlamm, behandelter Bioabfall und Boden - Bestimmung
von Elementen in Königswasser- und Salpetersäure-
Aufschlusslösungen - Flammen-
Atomabsorptionsspektrometrie (FAAS)

This draft Technical Specification is submitted to CEN members for Technical Committee Approval. It has been drawn up by the Technical Committee CEN/TC 400.

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Foreword

This document (FprCEN/TS 16188:2010) has been prepared by Technical Committee CEN/TC 400 "Project Committee - Horizontal standards in the fields of sludge, biowaste and soil", the secretariat of which is held by DIN.

This document is currently submitted to the Formal Vote.

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

This document is part of a modular horizontal approach in which this document belongs to the analytical step.

The preparation of this document by CEN is based on a mandate by the European Commission (Mandate M/330), which assigned the development of standards on sampling and analytical methods for hygienic and biological parameters as well as inorganic and organic determinants, aiming to make these standards applicable to sludge, treated biowaste and soil as far as this is technically feasible.

Until now, test methods determining properties of materials within the environmental area were prepared in Technical Committees (TCs) working on specific products/matrices (e.g. soil, waste, sludge). However, it is understood that many steps within individual test procedures may also be used for the analysis of various other materials. By careful determination of these steps and selection of specific questions within these steps, elements of the test procedure can be described in a way that can be used for a variety of matrices and materials with certain specifications. This optimization is in line with the development among end-users of standards. A majority of routine environmental analyses are carried out by institutions and laboratories working under a scope that is not limited to one single environmental matrix but covers a wide variety of matrices. Availability of standards covering more matrices contributes to the optimization of laboratory procedures and standard maintenance costs, e.g. costs related to accreditation and recognition.

A horizontal modular approach was developed in the project "Horizontal". "Modular" means that a test standard developed in this approach concerns a specific step in assessing a property and not the whole "chain of measurement" (from sampling to analyses). A beneficial feature of this approach is that individual "modules" can be replaced by improved ones without jeopardizing the standard "chain".

The results of the desk study as well as the evaluation and validation studies have been subject to discussions with all parties concerned in the CEN structure during the development by project "Horizontal". The results of these consultations with interested parties in the CEN structure have been presented to and discussed in CEN/TC 400.

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

IMPORTANT — It is absolutely essential that tests conducted according to this Technical Specification be carried out by suitably trained staff.

FprCEN/TS 16188:2010 (E)

1 Scope

This Technical Specification specifies the determination of metals in *aqua regia* and nitric acid digests of sludge, treated biowaste and soil samples, using flame atomic absorption spectrometry. The method is applicable for the determination of the following elements:

Chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), Nickel (Ni), zinc (Zn).

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.

prEN 16173, *Sludge, treated biowaste and soil — Digestion of nitric acid soluble fractions of elements*

prEN 16174, *Sludge, treated biowaste and Soil — Digestion of aqua regia soluble fractions of elements*

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

3 Principle

The method is based on the atomic absorption spectrometric measurement of the concentration of the elements in an *aqua regia* or nitric acid extract of the sample, prepared in accordance with prEN 16173 or prEN 16174, using the instrumental conditions given in Table 1.

Table 1 — General conditions for flame atomic absorption spectrometry

Element	Wavelength nm	Flame type	Lanthanum chloride	Main interference	Background correction
Chromium	357,9	Oxidizing air/acetylene or acetylene/N ₂ O	Yes No	Fe, Si	Deuterium
Cobalt	240,7	Oxidizing air/acetylene	No		Deuterium
Copper	324,8	Oxidizing air/acetylene	No		Deuterium
Iron	248,3	Oxidizing air/acetylene	No	Co, Ni, Si	Deuterium
Manganese	279,5	Oxidizing air/acetylene or acetylene/N ₂ O	Yes No	Fe, Si	Deuterium
Nickel	232,0	Oxidizing air/acetylene	No	Fe	Deuterium
Zinc	213,9	Oxidizing air/acetylene	No		Deuterium

NOTE The wavelengths given are the most sensitive. Interferences are generally lower if the nitrous oxide (N₂O) flame is used for the determination of chromium and manganese. Users should be aware that small changes in gas volume ratios can have significant effects on the intensity of the analytical signal, and can also change the linearity of the instrument response. Also difference in acid strength, which will vary slightly from digest to digest, can have a measurable