

Sludge, treated biowaste and soil - Determination of total nitrogen using dry combustion method

EESTI STANDARDI EESSÕNA

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EUROPEAN STANDARD

EN 16168

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 13.030.01; 13.080.10

English Version

**Sludge, treated biowaste and soil - Determination of total
nitrogen using dry combustion method**

Boues, biodéchets traités et sols - Détermination de la
teneur totale en azote par combustion sèche

Schlamm, behandelter Bioabfall und Boden - Bestimmung
des Gesamt-Stickstoffgehalts mittels trockener
Verbrennung

This European Standard was approved by CEN on 24 May 2012.

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Foreword

This document (EN 16168:2012) 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 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of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] 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.

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.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is applicable and validated for several types of matrices as indicated in Table 1 (see also Annex A for the results of the validation).

Table 1 — Matrices for which this European Standard is applicable and validated

Matrix	Materials used for validation
Sludge	Municipal sludge
Biowaste	Fresh compost Compost
Soil	Sludge amended soil Agricultural soil

WARNING — Persons using this European Standard should be familiar with usual laboratory practice. This European Standard 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 European Standard be carried out by suitably trained staff.

1 Scope

This European Standard specifies the determination of total nitrogen (organic and inorganic) according to the procedure of Dumas in sludge, treated biowaste and soil. A typical limit of detection is 0,02 % nitrogen, and a typical limit of quantification is 0,08 % nitrogen.

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 15934, *Sludge, treated biowaste, soil and waste — Calculation of dry matter fraction after determination of dry residue or water content*

EN 16179, *Sludge, treated biowaste and soil — Guidance for sample pretreatment*

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

EN ISO 5667-15, *Water quality — Sampling — Part 15: Guidance on the preservation and handling of sludge and sediment samples (ISO 5667-15)*

ISO 18512, *Soil quality — Guidance on long and short term storage of soil samples*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

total nitrogen

amount of nitrogen that is released after Dumas combustion of the sample

4 Principle

The total nitrogen content of the material is determined by heating it to a temperature of at least 850 °C in the presence of oxygen. Mineral (inorganic) and organic nitrogen compounds are oxidized and/or volatilized. The combustion products are oxides of nitrogen (NO_x) and molecular nitrogen (N_2). After transforming all nitrogen into molecular nitrogen, the content of the nitrogen gas is measured using thermal conductometry or other device specific detectors.

5 Interferences and sources of errors

Pores in the material to be analysed are filled with air and therefore with nitrogen. Nitrogen also enters the combustion cell when it is opened to exchange the sample. Purging of the cell and the material to be analysed by inert gas is sufficient in leaving no nitrogen gas behind. Moist samples shall be used only in special cases and handled with care, as they can leach out of sample vials during the process or contaminate the device by spattering.

Fluctuations of total nitrogen may be caused by differences in nitrogen content of carrier gases used. Therefore a blank determination shall be performed after changing gas bottles and each day before starting the analytical series.