SLOVENSKI STANDARD
oSIST prEN ISO 11465:2024

01-oktober-2024

Blato, obdelani biološki odpadki, tla in odpadki - Določanje suhega ostanka ali vsebnosti vode in izračun suhe snovi na podlagi mase (ISO/DIS 11465:2024)

Sludge, treated biowaste, soil and waste - Determination of dry residue or water content and calculation of the dry matter fraction on a mass basis (ISO/DIS 11465:2024)

Schlamm, behandelter Bioabfall, Boden und Abfall - Bestimmung des Trockenrückstands oder des Wassergehalts und Berechnung des Trockenmassenanteils auf Grundlage der Masse (ISO/DIS 11465:2024)

Boues, biodéchets traités, sols et déchets - Détermination de la teneur en résidu sec ou en eau et calcul de la fraction massique de matière sèche (ISO/DIS 11465:2024)

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ICS:

13.080.20	Fizikalne lastnosti tal	Physical properties of soils

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2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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DRAFT International Standard

ISO/DIS 11465

Sludge, treated biowaste, soil and waste — Determination of dry residue or water content and calculation of the dry matter fraction on a mass basis

ICS: 13.080.20

ISO/TC **190**/SC **3**

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical and physical characterization*

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This second edition cancels and replaces the first edition (ISO 11465:1993 + Technical Correction:1994), which has been technically revised.

The main changes compared to the previous edition are as follows:

— content was merged with the content of EN 12880 where appropriate;

— content was merged with the content of EN 15934 where appropriate;

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— deletion of the informative Annex “Azeotropic distillation with toluene”;

— editorially revised.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

In case of analysis of solids and sludge water is usually not considered as part of the sample and results are generally related to dry matter, which can be calculated by determination of the dry residue (dry matter fraction). For this purpose, and for the determination of the water content, two methods are described in this document. The choice of the method depends on the type of sample and its content of volatile substances excluding water.

As a result of the validation study, the determination of water content by azeotropic distillation has been replaced by Karl-Fischer-titration. Nevertheless, the distillation may be useful in certain cases. This method is described in Annex B (informative).

This document 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 document is applicable and validated

Matrix		Materials used for validation
Sludge	(only method A)	Municipal sludge
Biowaste	(only method A)	Fresh compost
Soil	(only method A)	Sludge amended soil
Waste	(method A and B)	Contaminated soil, Dredged sludge, Nickel sludge, Filter cake, Distillation residue, Drilling emulsion

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WARNING — Persons using this document should be familiar with usual laboratory practice. This document 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 essential that tests conducted according to this document be carried out by suitably qualified staff.

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Sludge, treated biowaste, soil and waste — Determination of dry residue or water content and calculation of the dry matter fraction on a mass basis

1 Scope

This document specifies methods for the calculation of the dry matter fraction of sludge, sludge products, treated biowaste, soil and waste for which the results of performed analysis are to be calculated to the dry matter basis. Depending on the nature and origin of the sample, the calculation is based on a determination of the dry residue (Method A) or a determination of the water content (Method A & B). It applies to samples containing more than 1 % (mass fraction) of dry residue or more than 1 % (mass fraction) of water.

Method A applies to sludge, sludge products, treated biowaste, soil and solid waste. Method B applies to liquid waste and to samples which are suspected or known to contain volatiles except for water.

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.

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3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
dry residue
remaining mass fraction of a sample after a drying process at 105 °C under specified conditions

3.2
water content
mass fraction of water in a sample determined by the method after drying at 105 °C or by Karl-Fischer-titration under specified conditions

3.3
dry matter fraction
mass fraction of a sample minus its water content

4 Principle

4.1 General

Depending on the origin (sludge, biowaste, soil, waste) and the nature of the sample (liquid, solid or multiphase) either the water content or the dry residue is to be determined. The results from the determination of water content or dry residue are used to calculate the dry matter fraction. In case of

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multiphase (waste) samples these samples shall be homogenized. If homogenization is not possible, a phase separation according to e.g. EN 15002 can be applicable and the phases are analysed separately.

4.2 Principle of Method A — Drying at 105 °C (dry residue)

The sample is dried to a constant mass at 105 °C. This method applies to solid samples and samples which become solid during the drying process. The method generally applies to soil, sludge, sludge products and treated biowaste. Solid samples containing amounts of volatiles which are expected to affect the results shall be analysed by Method B.

4.3 Principle of Method B — Direct Karl Fischer titration (water content)

The method usually applies to liquid samples and homogenised multiphase samples. It can also be used for solid samples in case the “water content” is of interest and in case volatiles are expected to interfere with the determination according to Method A. The water content of a sample is determined by direct Karl-Fischer-titration and either volumetric or coulometric detection. Liquid samples are directly added to the cell, while solid samples are extracted by use of methanol.

5 Sample preparation

Pretreat the samples according to e.g. ISO 11464, EN 16179 or EN 15002 as appropriate, if not otherwise specified.

6 Method A — Drying at 105 °C

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6.1 General

When performing any kind of analysis on samples, the dry matter fraction shall be determined simultaneously on identical test portions, in order to base all other test results on the determined dry matter content of each individual sample.

6.2 Interferences

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The samples can change during storing and the drying process, e.g. by absorption of carbon dioxide in the case of alkaline samples, or of oxygen by reducing substances. Volatile compounds evaporating at 105 °C are measured as water using this procedure.

NOTE 1 For alkaline samples or samples susceptible to oxidation the drying can be carried out in a nitrogen atmosphere.

NOTE 2 In the case of sludges containing considerable amounts of water it is expedient to evaporate the greater part of the water carefully on a water bath in order to avoid loss of substances by splashing.

6.3 Hazards

Flammable or explosive gases may be released in the drying process.

Sludge samples are liable to ferment and usually contain harmful micro-organisms. Storage containers can burst and produce a hazardous spray and aerosol. If sludge samples are to be stored, store them between 0 and 4 °C. Cleanliness when working is essential. When handling sludge samples, it is necessary to take precautionary measures against the possible bursting of containers.

6.4 Apparatus

6.4.1 Drying system thermostatically controlled and capable of maintaining a temperature of (105 ± 5) °C; e.g. drying oven, infrared system, halogen lamp system.

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