SLOVENSKI STANDARD
SIST EN 15216:2022

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Nadomešča:
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Matriksi z vidika okolja - Določevanje celotnih trdnih raztopljenih snovi (TDS) v vodi in izlužkih

Environmental matrices - Determination of total dissolved solids (TDS) in water and eluates

Umweltrelevante Matrizes - Bestimmung des Gesamtgehaltes an gelösten Feststoffen (TDS) in Wasser und Eluaten

Matrices environnementales - Détermination de la concentration en matières solides dissoutes totales (TDS) de l'eau et des éluats

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13.030.20	Tekoči odpadki. Blato	Liquid wastes. Sludge

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EUROPEAN STANDARD

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English Version

Environmental solid matrices - Determination of total dissolved solids (TDS) in water and eluates

Matrices environnementales solides - Détermination de la concentration en matières solides dissoutes totales (TDS) de l'eau et des éluats

Umweltrelevante Matrizes - Bestimmung des Gesamtgehaltes an gelösten Feststoffen (TDS) in Wasser und Eluaten

This European Standard was approved by CEN on 11 July 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 15216:2021) has been prepared by Technical Committee CEN/TC 444 “Environmental characterization of solid matrices”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

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 supersedes EN 15216:2007.

In comparison with EN 15216:2007, the following changes have been made:

— Textual changes to clarify the procedure after a third weighing and in case of observed inhomogeneity.

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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Introduction

Total dissolved solids are a common sum parameter that is in use in water analysis and in analysis of eluates.

1 Scope

This document specifies a method for the determination of total dissolved solids (TDS) in water and eluates (see Annex A), provided they are not volatile under the conditions specified or that they do not release water molecules from hydration. It applies to water and eluates containing more than 100 mg/l of total dissolved solids. Samples with lower amounts of dissolved solids can be analysed by repetition of the drying step.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

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

3.1
total dissolved solids
TDS
ρ_{TDS}

mass of dissolved constituents per unit volume of water remaining after a specified filtering and drying process

Note 1 to entry: TDS is expressed in milligrams per litre.

4 Principle

The test sample is filtered and then dried in a dish to a constant mass in an oven at (105 ± 5) °C.

5 Sample storage and preparation

It is recommended to carry out the test immediately, but not later than one week after sampling of the water sample or preparation of the eluate.

During storage, the laboratory sample may be subject to changes which are liable to influence the analysis result. If storage is necessary, samples shall be kept at 2 °C to 8 °C.

6 Equipment

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

6.2 Desiccator with an active drying agent such as silica gel.

6.3 Analytical balance with an accuracy of 1 mg or better.

6.4 Membrane filter (porosity of 0,45 µm).

6.5 Filtration apparatus.

6.6 Evaporation dish or crucible. Temperature tolerant laboratory vessel withstanding 105 °C. Suitable materials are glass, ceramic, porcelain, aluminium and other materials inert to the test portion.

7 Procedure

Filter the test sample through the membrane filter as specified in 6.4 unless it has been membrane filtered before (e.g. eluates prepared according to the EN 12457 series).

Dry the dish, for example in the oven, at (105 ± 5) °C and weigh to the nearest 1 mg (to obtain m_a) after cooling to ambient temperature.

Homogenize and transfer an aliquot (V_{FB}), if necessary in stages, into the dish to ensure that not less than 20 mg and not more than 1 000 mg of dry mass, m_D, remains after evaporation to dryness.

Evaporate the sample to dryness by a drying system according to 6.1 and weigh to the nearest 1 mg (to obtain m_b) after cooling to ambient temperature in the desiccator.

The mass of the dry matter, m_D, shall be considered constant if, after drying for a further half-hour period, the mass obtained does not differ by more than 0,5 % of the previous value or 2 mg whichever is the greater. Otherwise, drying shall be repeated until constant mass has been reached.

If a constant value is not obtained even after drying for a third time, use the value determined last and add a note in the test report.

When inhomogeneity or unexpected behaviour of the sample is observed, it is recommended that the analysis is carried out in duplicate.

8 Calculation of results

Calculate the total dissolved solids from Formula (1):

$$\rho_{TDS} = \frac{m_D}{V_{FB}} \quad (1)$$

with

$$m_D = m_b - m_a$$

where

ρ_{TDS} is the concentration of total dissolved solids, in mg/l;

m_D is the mass of the dry matter, in mg;

m_a is the mass of the empty dish, in mg;

m_b is the mass of the dish containing the dry matter, in mg;

V_{FB} is the volume of the filtered test sample taken, in l.

Values shall be rounded to 3 significant figures.

9 Test report

The test report shall contain at least the following details:

a) reference to this document;

b) all data which are necessary to identify the sample;

c) calculated concentration of total dissolved solids;

d) details of all procedural steps which deviate from this standard together with all circumstances that may have influenced the results;

e) type of drying procedure, in case a drying oven is not used.

Annex A
(informative)

Performance characteristics

The method performance characteristics given in Table A.1 have been established in a European intercomparison study on two surface water samples, two waste water samples and two eluates, carried out in 2006.

Table A.1 — Performance characteristics for the determination of total dissolved solids in water and eluates

Material	*p*	*N*	O %	Mean mg/l	S_r %	S_R %
Surface water A	17	34	0	478	2,15	4,49
Surface water B	17	34	0	3 810	0,39	2,53
Waste water A	17	34	0	27 300	1,34	4,33
Waste water B	17	34	0	4 840	1,28	5,55
Eluate A	17	34	0	4 090	1,74	6,27
Eluate B	17	34	0	3 440	0,71	3,16

p is number of participating laboratories

N is the number of outlier-free individual analytical results

O is the percentage of outliers

S_r is the estimate of the relative repeatability standard deviation

S_R is the estimate of the relative reproducibility standard deviation