SLOVENSKI STANDARD
oSIST prEN 16192:2018

01-marec-2018

Odpadki - Analiza izlužkov

Waste - Analysis of eluates

Abfälle - Analyse von Eluaten

Déchets - Analyse des éluats

Ta slovenski standard je istoveten z: **prEN 16192**

ICS:

13.030.20 Tekoči odpadki. Blato Liquid wastes. Sludge

oSIST prEN 16192:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 16192

March 2018

ICS 13.030.99

Will supersede EN 16192:2011

English Version

Waste - Analysis of eluates

Déchets - Analyse des éluats

Abfälle - Analyse von Eluaten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 444.

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

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Ref. No. prEN 16192:2018 E

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European foreword

This document (prEN 16192:2018) has been prepared by Technical Committee CEN/TC 444 “Test methods for environmental characterization of solid matrices”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 16192:2011.

The changes between this European Standard and the previous edition involve an update of the relevant EN and ISO standards or a removal if withdrawn, and an addition of new relevant standards.

Introduction

This European standard is intended to be used for the characterization of waste as defined in the Council Directive 75/442/EEC on waste, as amended by Council Directive 91/156/EEC of 18th March 1991, and national regulations, whose final destination for disposal is landfill. In the Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC, the test methods are described for determining the acceptability of waste at landfills. In section 3 of the Annex of this Decision the European standards EN 12506 and EN 13370 are included which are replaced by this European Standard.

This European Standard deals with the determination of chemical constituents, electrical conductivity, pH and total dissolved solids (TDS) in eluates which have been obtained by leaching of waste samples for example using EN 12457, parts 1 to 4: “Characterization of waste - Leaching - Compliance test for leaching of granular waste materials and sludges". In principle, it may be used for the analysis of every kind of eluate as long as the performance characteristics of the applied analytical method fulfill the specific requirements.

1 Scope

This European Standard specifies methods for the determination of the parameters pH, ammonium, AOX, As, Ba, Cd, Cl^-, easily liberatable CN^-, Co, Cr, Cr(VI), Cu, DOC/TOC, electrical conductivity, F^-, Hg, Mo, Ni, NO_2^-, Pb, phenol index, total S, Sb, Se, SO_4^{2-}, TDS, V and Zn in aqueous eluates for the characterization of waste.

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.

EN ISO 5667-3, *Water quality - Sampling - Part 3: Preservation and handling of water samples (ISO 5667-3)*

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:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
eluate
solution obtained by a leaching test

3.2
laboratory sample
sample or subsample(s) sent to or received by the laboratory

3.3
leachant
aqueous solution used in a leaching test

3.4
leaching test
laboratory test for the determination of the release of matter from a waste into water or an aqueous solution

3.5
sample
portion of material selected from a larger quantity of material

3.6
test portion; analytical portion
quantity of material of proper size for measurement of the concentration or other properties of interest, removed from the test sample

Note 1 to entry: The test portion can be taken from the laboratory sample directly if no preparation of sample is required (e.g. with liquids), but usually it is taken from the prepared test sample.

Note 2 to entry: A unit or increment of proper homogeneity, size and fineness, needing no further preparation, can be a test portion.

3.7
test sample;analytical sample
sample, prepared from the laboratory sample, from which test portions are removed for testing or analysis

4 Sample pretreatment

The eluate shall be analysed for the total content of its constituents. If precipitation occurs between the preparation of the eluate and the analysis it is necessary to ensure by appropriate methods (e.g. redissolution, separate analysis of solution and precipitate) that the total content of the parameters of interest is determined. If the eluate results from a procedure including 0,45 µm membrane filtration analytical results refer to the content dissolved by the leaching process.

Eluates are susceptible to be changed to different extents as a result of physical, chemical or biological reactions which may take place between the time of leaching and the analysis. pH shall be determined immediately after preparation of the eluates and prior to sample pretreatment.

It is therefore essential to take the necessary precautions to minimize these reactions and in the case of many parameters to analyse the eluate sample with a minimum of delay. The maximum delay is given in EN ISO 5667-3 or in the respective analytical standards.

Precautions should be taken before and during transport as well as during the time in which the samples are preserved in the laboratory before being analysed, to avoid alteration of the test portion.

Split the eluate in an adequate number of test portions for different chemical analyses and preserve them according to the requirements in the analytical standards or EN ISO 5667-3.

One specific test portion may be an untreated aliquot of the laboratory sample for the analysis of chromates such as chloride, fluoride, sulfate, nitrite and chromium(VI) as well as for the determination of electrical conductivity.

For trace metal analysis test portions usually need to be acidified to pH ≤ 2.

For safety reasons it is recommended to acidify the test portion under a hood as volatile toxic substances can be generated.

NOTE In cases where high contents of soluble solids are leached, acidification of the eluates can lead to precipitation of salts. This can be avoided by dilution prior to acidification.

5 Blank determination

The blank contribution of the applied analytical procedures shall be determined as described in the analytical standards and considered in the calculation of the results when appropriate.

6 Interference

A large number of compounds can interfere with the determination of the parameters concerned. These potential interferences are listed in the individual standards in question.

Several types of interference effects can contribute to inaccuracies in the determination of the various parameters, especially at low concentrations. These potential interference effects are listed in the individual standards and shall be considered separately for each analytical technique.

Chemical interferences are characterized by molecular compound formation, ionization effects, solute vaporization, precipitation and effects of decomposition of organic matter. Addition of buffer and/or preservation methods may reduce these effects.

Physical interferences can be caused by changes of viscosity and surface tension. They can cause significant inaccuracies especially in eluate samples containing high concentrations of acids and/or dissolved components. The colour or turbidity of eluates can cause interference in spectrophotometric determination.

7 Selection of the suitable test method

Select the appropriate standardized test method listed in Table 1 according to the type of waste eluate, the concentration range of the parameter of interest and the expected interferences.

For analytical quality control purposes ISO/TS 13530 and EN ISO/IEC 17025 should be considered.

It is pointed out that the standardized test methods listed in Table 1 have primarily been developed for the analysis of water samples. Most of them were validated in an interlaboratory trial for a limited number of waste eluate matrices (see Annex A). Their suitability for other waste eluates shall be checked in the laboratory performing the analysis. Additional validation data obtained in the evaluation of the analytical performance of laboratories are given in Annex B.

Those standards cited in Table 1 that have not been validated in the CEN/TC 292 interlaboratory trial in 1999 - 2001 (Annex A), including revised or newly developed standards since this trial, have the matrix waste water and/or leachates included in their scope, and they proved to be applicable for the analysis of eluates in routine analyses.

If the methods referred to in Table 1 are found to be inappropriate by reason of, for example, detection limits, repeatability or interferences, other methods validated for water analysis can be used. Their suitability for waste eluates shall be checked in the laboratory performing the analysis. The reason for the deviation shall be stated in the test report.

Table 1 — Parameters and test methods

Parameter	Test method
pH	EN ISO 10523:2012
Ammonium	EN ISO 11732:2005 EN ISO 14911:1999 ISO 7150-1:1984 ISO 15923-1:2013
AOX	EN ISO 9562:2004
As	EN ISO 11885:2009 EN ISO 11969:1996 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016 ISO 17378-1:2014 ISO 17378-2:2014
Ba	EN ISO 11885:2009 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Cd	ISO 8288:1986 EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016

Parameter	Test method
Cl^-	ISO 9297:1989 EN ISO 10304-1:2009 EN ISO 15682:2001
CN^- easily liberatable	EN ISO 14403-1:2012[a] EN ISO 14403-2:2012[a] ISO 6703-2:1984
Co	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Cr	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Cr(VI)	ISO 11083:1994 EN ISO 10304-3:1997 EN ISO 23913:2009
Cu	ISO 8288:1986 EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
DOC/TOC	EN 1484:1997
Electrical conductivity	EN 27888:1993
F^-	EN ISO 10304-1:2009[b] ISO 10359-1:1992
Hg	EN ISO 12846:2012 EN ISO 17852:2008
Mo	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Ni	ISO 8288:1986 EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
NO_2^-	EN 26777:1993 EN ISO 10304-1:2009

Parameter	Test method
	EN ISO 13395:1996 ISO 15923-1:2013
Pb	ISO 8288:1986 EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Phenol index	EN ISO 14402:1999[c] ISO 6439:1990
Total S	EN ISO 11885:2009
Sb	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016 ISO 17378-1:2014 ISO 17378-2:2014
Se	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016 ISO/TS 17379-1:2013 ISO/TS 17379-2:2013
SO_4^{2-}	EN ISO 10304-1:2009 ISO 15923-1:2013 ISO 22743:2006
TDS	EN 15216:2007
V	EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016
Zn	ISO 8288:1986 EN ISO 11885:2009 EN ISO 15586:2003 EN ISO 17294-1:2006 EN ISO 17294-2:2016

[a] free cyanide is equivalent to easily liberatable cyanide for eluates with low organic content after distillation.

[b] for eluates with low organic content.

[c] after distillation.