

**Characterization of waste - Analysis of eluates**

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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English Version

## Characterization of waste - Analysis of eluates

Caractérisation des déchets - Analyse des éluats

Charakterisierung von Abfällen - Analyse von Eluaten

This European Standard was approved by CEN on 15 October 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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## Foreword

This document (EN 16192:2011) has been prepared by Technical Committee CEN/TC 292 "Characterization of waste", 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of an identical text or by endorsement, at the latest by May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

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 supersedes EN 12506:2003 and EN 13370:2003.

Details of significant technical changes between this European Standard and the previous edition are:

- This European Standard, EN 16192, is now a single document (instead of two) for the analysis of eluates specifying methods for the determination of the parameters pH, ammonium, AOX, As, Ba, Cd, Cl<sup>-</sup>, easily liberatable CN<sup>-</sup>, Co, Cr, Cr(VI), Cu, DOC/TOC, electrical conductivity, F<sup>-</sup>, Hg, Mo, Ni, NO<sub>2</sub><sup>-</sup>, Pb, phenol index, total S, Sb, Se, SO<sub>4</sub><sup>2-</sup>, TDS, V and Zn in aqueous eluates for the characterization of waste.
- In Clause 7 the parameters, previously described in two documents, are now all integrated in Table 1.
- In Table 1 for all parameters EN and ISO standards are updated, removed if withdrawn and new relevant standards are added, i.e.:
  - addition of the parameters Sb and Se together with the related analytical methods;
  - revision of the standards EN ISO 11885 (ICP-OES) and EN ISO 10304-1 (IC);
  - addition of the ICP-MS method (EN ISO 17294-1:2006 and EN ISO 17294-2:2004);
  - addition of the AAS with graphite furnace technique (EN ISO 15586:2003);
  - addition of the flow analysis techniques for Cl<sup>-</sup> (EN ISO 15682:2001), Cr(VI) (EN ISO 23913:2009) and SO<sub>4</sub><sup>2-</sup> (ISO 22743:2006);
  - addition of the parameter TDS (total dissolved solids) together with the related analytical method;
  - addition of the parameter DOC (dissolved organic carbon) to the parameter TOC (total organic carbon);
  - revision of the standards EN ISO 11732 (ammonium by flow analyser);
  - replacement of EN 1485 (AOX) by EN ISO 9562:2004;
  - revision and addition of new standards for Hg determination – EN 1483 and EN ISO 17852.
- In Annex B (informative) additional validation data are added obtained from a round robin test for the determination of Ba, Cd, Cr, Mo, Sb and Se in eluates and from round robin tests in the framework of acceptability of waste at landfills, both organized in Belgium.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 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 "Characterization of waste - Leaching - Compliance test for leaching of granular waste materials and sludges" (Part 1 to Part 4). 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<sup>-</sup>, easily liberatable CN<sup>-</sup>, Co, Cr, Cr(VI), Cu, DOC/TOC, electrical conductivity, F<sup>-</sup>, Hg, Mo, Ni, NO<sub>2</sub><sup>-</sup>, Pb, phenol index, total S, Sb, Se, SO<sub>4</sub><sup>2-</sup>, TDS, V and Zn in aqueous eluates for the characterization of waste.

## 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.

EN 1483:2007, *Water quality — Determination of mercury — Method using atomic absorption spectrometry*

EN 1484:1997, *Water analysis — Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)*

EN 15216:2007, *Characterization of waste — Determination of total dissolved solids (TDS) in water and eluates*

EN 26777:1993, *Water quality — Determination of nitrite — Molecular absorption spectrometric method (ISO 6777:1984)*

EN 27888:1993, *Water quality — Determination of electrical conductivity (ISO 7888:1985)*

prEN ISO 5667-3, *Water quality — Sampling — Part 3: Preservation and handling of water samples (ISO/DIS 5667-3:2010)*

EN ISO 9562:2004, *Water quality — Determination of adsorbable organically bound halogens (AOX) (ISO 9562:2004)*

EN ISO 10304-1:2009, *Water quality — Determination of dissolved anions by liquid chromatography of ions — Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007)*

EN ISO 10304-3:1997, *Water quality — Determination of dissolved anions by liquid chromatography of ions — Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate (ISO 10304-3:1997)*

EN ISO 11732:2005, *Water quality — Determination of ammonium nitrogen — Method by flow analysis (CFA and FIA) and spectrometric detection (ISO 11732:2005)*

EN ISO 11885:2009, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (ISO 11885:2007)*

EN ISO 11969:1996, *Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique) (ISO 11969:1996)*

EN ISO 13395:1996, *Water quality — Determination of nitrite nitrogen and nitrate nitrogen and the sum of both by flow analysis (CFA and FIA) and spectrometric detection (ISO 13395:1996)*

EN ISO 14402:1999, *Water quality — Determination of the phenol index by flow analysis (FIA and CFA) (ISO 14402:1999)*

EN ISO 14403:2002, *Water quality — Determination of total cyanide and free cyanide by continuous flow analysis (ISO 14403:2002)*

EN ISO 14911:1999, *Water quality — Determination of dissolved Li<sup>+</sup>, Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, K<sup>+</sup>, Mn<sup>2+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, Sr<sup>2+</sup> and Ba<sup>2+</sup> using ion chromatography — Method for water and waste water (ISO 14911:1998)*

EN ISO 15586:2003, *Water quality — Determination of trace elements using atomic absorption spectrometry with graphite furnace (ISO 15586:2003)*

EN ISO 15682:2001, *Water quality — Determination of chloride by flow analysis (CFA and FIA) and photometric and potentiometric detection (ISO 15682:2000)*

EN ISO 17294-1:2006, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 1: General guidelines (ISO 17294-1:2004)*

EN ISO 17294-2:2004, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 2: Determination of 62 elements (ISO 17294-2:2003)*

EN ISO 17852:2008, *Water quality — Determination of mercury — Method using atomic fluorescence spectrometry (ISO 17852:2006)*

EN ISO 23913:2009, *Water quality — Determination of chromium(VI) — Method using flow analysis (FIA and CFA) and spectrometric detection (ISO 23913:2006)*

ISO 6439:1990, *Water quality — Determination of phenol index — 4-Aminoantipyrine spectrometric methods after distillation*

ISO 6703-2:1984, *Water quality — Determination of cyanide — Part 2: Determination of easily liberatable cyanide*

ISO 7150-1:1984, *Water quality — Determination of ammonium — Part 1: Manual spectrometric method*

ISO 8288:1986, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame atomic absorption spectrometric methods*

ISO 9297:1989, *Water quality — Determination of chloride — Silver nitrate titration with chromate indicator (Mohr's method)*

ISO 9965:1993, *Water quality — Determination of selenium — Atomic absorption spectrometric method (hydride technique)*

ISO 10359-1:1992, *Water quality — Determination of fluoride — Part 1: Electrochemical probe method for potable and lightly polluted water*

ISO 10523:2008, *Water quality — Determination of pH*

ISO 11083:1994, *Water quality — Determination of chromium (VI) — Spectrometric method using 1,5-diphenylcarbazide*

ISO 22743:2006, *Water quality — Determination of sulfates — Method by continuous flow analysis (CFA)*

### **3 Terms and definitions**

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

#### **3.1**

##### **sample**

portion of material selected from a larger quantity of material

#### **3.2**

##### **eluate**

solution obtained by a leaching test

#### **3.3**

##### **laboratory sample**

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

#### **3.4**

##### **test sample; analytical sample**

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