

ICS 13.030.10

English version

Characterization of waste - Leaching behaviour tests - Up-flow percolation test (under specified conditions)

Caractérisation des déchets - Essais de comportement à la lixiviation - Essai de percolation à écoulement ascendant (dans des conditions spécifiées)

Charakterisierung von Abfällen - Auslaugungsverhalten - Perkulationsprüfung im Aufwärtsstrom (unter festgelegten Bedingungen)

This Technical Specification (CEN/TS) was approved by CEN on 24 March 2004 for provisional application.

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Foreword

This document (CEN/TS 14405:2004) has been prepared by Technical Committee CEN/TC 292 "Characterisation of waste", the secretariat of which is held by NEN.

This Technical Specification has been developed primarily to support the requirements for leaching behaviour testing within EU and EFTA countries.

This Technical Specification was elaborated on the basis of:
NEN 7343:1995
NT ENVIR 002:1995

This Technical Specification specifies an up-flow percolation test to determine the leaching behaviour of granular waste materials under standardized percolation conditions. Another Technical Specification will be produced to specify a percolation test for simulating conditions of specific scenarios.

For a more complete characterization of the leaching behaviour of waste under specified conditions the application of other test methods is required (see ENV 12920). For informative references see the Bibliography.

The annexes A, B and C are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom

Introduction

In various European countries tests have been developed to characterize and assess the constituents that can be released from waste materials. The release of soluble constituents upon contact with water is regarded as a main mechanism of release, which results in a potential risk to the environment during the re-use or disposal of waste materials. These tests are intended to identify the leaching properties of waste materials. The complexity of the leaching process makes simplifications necessary. Not all of the relevant aspects of leaching behaviour can be addressed in one standard.

Tests to characterize the behaviour of waste materials can be divided into three categories. The relationships between these tests are summarized below:

“Basic characterization” tests are used to obtain information on the short and long term leaching behaviour and characteristic properties of waste materials. Liquid/solid (L/S) ratios, leachant composition, factors controlling leachability such as pH, redox potential, complexing capacity, ageing of waste and physical parameters are addressed in these tests.

“Compliance” tests are used to determine whether the waste complies with a specific behaviour or with specific reference values. The tests focus on key variables and leaching behaviour previously identified by basic characterization tests.

“On-site verification” tests are used as a rapid check to confirm that the waste is the same as which has been subjected to the compliance test(s). On-site verification tests are not necessarily leaching tests.

The test procedure described in this method belongs to category (1): basic characterization tests.

1 Scope

This Technical Specification is applicable to determine the leaching behaviour of inorganic constituents from granular waste (without or with size reduction (see 6.2)). The waste body is subjected to percolation with water as a function of liquid to solid ratio under specified percolation conditions. The waste is leached under hydraulically dynamic conditions. The method is a once-through column leaching test and the test results establish the distinction between different release patterns, for instance wash-out and release under the influence of interaction with the matrix, when approaching local equilibrium between waste and leachant.

NOTE 1 The mentioned specified percolation conditions are arbitrary and are not simulating a specific scenario.

NOTE 2 Waste materials that show a saturated hydraulic conductivity between 10^{-7} m/s and 10^{-8} m/s can be subjected to this test, but it can be difficult to maintain the imposed flow rate. If a waste shows a saturated hydraulic conductivity below 10^{-8} m/s, the test should not be carried out. (See C.5 for a definition of ‘hydraulic conductivity’.)

NOTE 3 This procedure is generally not applicable to biologically degrading materials and materials reacting with the leachant, leading, for example, to excessive gas emission or excessive heat release.

NOTE 4 This procedure is applicable to materials showing solidification in the column, if the final hydraulic conductivity is within the specified range (see NOTE 1).

2 Normative references

This Technical Specification incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Technical Specification only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12506, *Characterization of waste – Analysis of eluates – Determination of pH, As, Ba, Cd, Cl, Co, Cr, Cr^{VI}, Cu, Mo, Ni, NO₂⁻, Pb, total S, SO₄²⁻, V and Zn.*

EN 13370, *Characterization of waste – Analysis of eluates – Determination of Ammonium, AOX, conductivity, Hg, phenol index, TOC, easily liberatable CN, F.*

prEN 14346:2002, *Characterization of waste – Calculation of dry matter by determination of dry residue or water content.*

prEN 14899, *Characterisation of Waste - Sampling of waste materials: Framework for the preparation and application of a Sampling.*

EN ISO 5667-3, *Water quality – Sampling – Part 3: Guidance on the preservation and handling of samples (ISO 5667-3:2003).*

3 Terms and definitions

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

3.1

dry residue w_{dr}

remaining mass fraction in percent of a sample after a drying process at 105 °C

[prEN 14346:2002]

3.2

eluate

solution obtained by a laboratory leaching test

3.3

equilibrium condition

condition achieved when the pH deviation during a checking period is below a specified value (see 7.4)

3.4

granular waste

solid waste that is neither monolithic, liquid, gas nor sludge

3.5

laboratory sample

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

[IUPAC, 1997]

3.6

leachant

liquid that is brought into contact with the test portion in the leaching procedure

3.7

liquid to solid-ratio

L/S

ratio between the amount of liquid (L) and of solid (S) in the test

NOTE L/S is expressed in l/kg dry matter.

3.8

sample

quantity that is representative of a certain larger quantity