



NSAI
Standards

Standard Recommendation
S.R. CEN ISO/TS 21268-3:2009

Soil quality - Leaching procedures for subsequent chemical and ecotoxicological testing of soil and soil materials - Part 3: Upflow percolation test (ISO/TS 21268-3:2007)

S.R. CEN ISO/TS 21268-3:2009

Incorporating amendments/corrigenda issued since publication:

<i>This document replaces:</i>	<i>This document is based on:</i> CEN ISO/TS 21268-3:2009	<i>Published:</i> 4 November, 2009
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This document was published under the authority of the NSAI and comes into effect on: 27 November, 2009

ICS number:
13.080.05

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ICS 13.080.05

English Version

Soil quality - Leaching procedures for subsequent chemical and ecotoxicological testing of soil and soil materials - Part 3: Up-flow percolation test (ISO/TS 21268-3:2007)

Qualité du sol - Modes opératoires de lixiviation en vue d'essais chimiques et écotoxicologiques ultérieurs des sols et matériaux du sol - Partie 3: Essai de percolation à écoulement ascendant (ISO/TS 21268-3:2007)

Bodenbeschaffenheit - Eluierungsverfahren für die anschließende chemische und ökotoxikologische Untersuchung von Boden und von Bodenmaterialien - Teil 3: Perkolationstest im Aufwärtsstrom (ISO/TS 21268-3:2007)

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Foreword

The text of ISO/TS 21268-3:2007 has been prepared by Technical Committee ISO/TC 190 “Soil quality” of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TS 21268-3:2009 by Technical Committee CEN/TC 345 “Characterization of soils” the secretariat of which is held by NEN.

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The text of ISO/TS 21268-3:2007 has been approved by CEN as a CEN ISO/TS 21268-3:2009 without any modification.

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**Soil quality — Leaching procedures for
subsequent chemical and
ecotoxicological testing of soil and soil
materials**

Part 3:
Up-flow percolation test

*Qualité du sol — Modes opératoires de lixiviation en vue d'essais
chimiques et écotoxicologiques ultérieurs des sols et matériaux du sol*

Partie 3: Essai de percolation à écoulement ascendant



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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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ISO/TS 21268-3 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 7, *Soil and site assessment*.

ISO/TS 21268 consists of the following parts, under the general title *Soil quality — Leaching procedures for subsequent chemical and ecotoxicological testing of soil and soil materials*:

- *Part 1: Batch test using a liquid to solid ratio of 2 l/kg dry matter*
- *Part 2: Batch test using a liquid to solid ratio of 10 l/kg dry matter*
- *Part 3: Up-flow percolation test*
- *Part 4: Influence of pH on leaching with initial acid/base addition*

Introduction

In various countries, tests have been developed to characterise and assess the constituents which can be released from 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 use or disposal of materials. The intent of these tests is to identify the leaching properties of 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 characterise the behaviour of materials can generally be divided into three categories (EN 12920; EN/TS 14405) and are addressed in ISO 18772^[13]. The relationships between these tests are summarised below:

- a) “Basic characterisation” tests are used to obtain information on the short- and long-term leaching behaviour and characteristic properties of materials. Liquid/solid (L/S) ratios, leachant composition, factors controlling leachability, such as pH, redox potential, complexing capacity, role of dissolved organic carbon (DOC), ageing of material and physical parameters, are addressed in these tests.
- b) “Compliance” tests are used to determine whether the material complies with a specific behaviour or with specific reference values. The tests focus on key variables and leaching behaviour previously identified by basic characterisation tests.
- c) “On-site verification” tests are used as a rapid check to confirm that the material is the same as that 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 b): basic characterisation tests.

NOTE Up to now, the test procedure described in this part of ISO/TS 21268 has not been validated internationally.

This Technical Specification was elaborated on the basis of CEN/TS 14405.

Soil quality — Leaching procedures for subsequent chemical and ecotoxicological testing of soil and soil materials

Part 3: Up-flow percolation test

1 Scope

This part of ISO/TS 21268 specifies a test, which is aimed at determining the leaching behaviour of inorganic and organic constituents from a soil and soil material. The method is a once-through percolation test with water (0,001 mol/l CaCl_2) under standardized conditions of flow rate. The material is leached under dynamic hydraulic conditions. The eluates obtained can be used to determine the ecological properties of the soil with respect to micro-organisms, flora and fauna. The test results enable 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 material and leachant.

This test method produces eluates, which can subsequently be characterised by physical, chemical and ecotoxicological methods in accordance with existing standard methods. The results of eluate analysis are presented as a function of the liquid/solid ratio. The test is not suitable for species that are volatile under ambient conditions.

NOTE 1 Volatile organic constituents include the low-molecular-weight components in mixtures such as mineral oil.

NOTE 2 It is not always possible to optimise test conditions simultaneously for inorganic and organic constituents and optimum test conditions may also vary between different groups of organic constituents. Test requirements for organic constituents are generally more stringent than those for inorganic constituents. The test conditions suitable for measuring the release of organic constituents will generally also be applicable to inorganic constituents.

NOTE 3 For ecotoxicological testing, eluates representing the release of both inorganic and organic contaminants are needed. In this document, ecotoxicological testing is also meant to include genotoxicological testing.

The application of this test method alone is not sufficient for the determination of the leaching behaviour of a material under specified conditions different to those from the test procedure, since this generally requires the application of several test methods, behavioural modelling and model validation. This part of ISO/TS 21268 does not address issues related to health and safety. It only determines the leaching properties as outlined in Clause 4.

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.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-3, *Water Quality — Sampling — Part 3: Guidance on the preservation and handling of water samples*

ISO 7027:1999, *Water quality — Determination of turbidity*

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