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

**Part 1:
Batch test using a liquid to solid ratio
of 2 l/kg dry matter**

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

*Partie 1: Essai en bûchée avec un rapport liquide/solide de 2 l/kg de
matière sèche*





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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Principle	3
5 Reagents	3
6 Apparatus	4
7 Sample pretreatment	5
7.1 Preparation of laboratory sample and specification of particle size	5
7.2 Preparation of test sample	6
7.3 Determination of dry matter content and water content	6
7.4 Preparation of the test portion	7
8 Procedure	7
8.1 Temperature	7
8.2 Description of the procedure	7
8.2.1 Preparation of the eluent	7
8.2.2 Leaching step	7
8.2.3 Liquid/Solid separation step	8
8.3 Further preparation of the eluate for analysis	9
8.4 Blank test for the application of the leaching procedure	9
9 Calculation	10
10 Test report	10
11 Analytical determination	11
11.1 General	11
11.2 Blank test information	11
12 Performance characteristics	11
12.1 General	11
12.2 Validation results obtained for DIN 19529	11
12.2.1 General	11
12.2.2 Results for test material containing inorganic substances	12
12.2.3 Results for test materials containing organic substances	12
Annex A (informative) Information on the influence on the test results of the parameters that affect leaching	20
Annex B (informative) Example of a specific liquid-solid separation procedure for soil samples (applying only to the leaching of inorganic substances)	23
Annex C (informative) Calculation of centrifugation duration depending on centrifugation speed and rotor dimensions	25
Bibliography	27

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 7, *Impact assessment*.

This first edition of ISO 21268-1:2019 cancels and replaces the first edition (ISO/TS 21268-1:2007), which has been technically revised. The main changes compared to the previous edition are as follows:

- the maximum grain size has been changed to <2 mm as usual for soil;
- the demineralized water has been added as possible leachant;
- [7.1](#) and [7.2](#) have been renumbered and renamed to read [7.1](#) "Particle size" and [7.2](#) "Sample preparation";
- [12.1](#) "General" and [12.2](#) "Validation results obtained for DIN 19529" have been added;
- [A.3.6](#) "Special requirements for tests considering semi-volatile substances" has been added;
- a new informative [Annex C](#) "Calculation of centrifugation duration depending on centrifugation speed and rotor dimensions" has been added;
- references in [Clause 2](#) and the Bibliography have been updated.

A list of all parts in the ISO 21268 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In various countries, tests have been developed to characterize and assess the substances which can be released from materials. The release of soluble substances 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^[1].

Not all of the relevant aspects of leaching behaviour can be addressed in one standard (see description of influencing factors in [Annex A](#)).

Tests to characterize the behaviour of materials can generally be divided into three categories addressed in ISO 18772^[2] and EN 12920^[3]. The relationships between these tests are summarized below.

- a) “Basic characterization” tests are used to obtain information on the short- and long-term leaching behaviour and characteristic properties of materials. Liquid/solid ratios (L/S), 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 defined tests.
- b) “Compliance” tests are used to determine whether the material complies with a specific behaviour or with specific reference values. These 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): compliance tests.

This document was originally elaborated on the basis of EN 12457-1:2004^[4]. Especially, modifications considering requirements on subsequent ecotoxicological testing and analysis of organic substances have been included. Validation results have been adopted from DIN 19529^[5].

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

Part 1:

Batch test using a liquid to solid ratio of 2 l/kg dry matter

1 Scope

This document specifies a test providing information on leaching of soil and soil-like materials under the experimental conditions specified hereafter, and particularly at a liquid to solid ratio of 2 l/kg dry matter.

The document has been developed to measure the release of inorganic and organic substances from soil and soil-like material as well as to produce eluates for subsequent ecotoxicological testing. For ecotoxicological testing, see ISO 15799^[6] and ISO 17616^[7].

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

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

NOTE 3 Within the category of organic substances, a significant difference in behaviour exists between the more polar, relatively water-soluble compounds and apolar, hydrophobic organic substances (HOCs). In the latter case, mechanisms of release (e.g. particle-bound or dissolved organic carbon-bound) can be more crucial as well as sorption losses of soluble HOCs on different materials with which they come in contact (e.g. bottles, filters). The test and the results should be used for leaching of organic substances only with thorough consideration of the specific properties of the substances in question and the associated potential problems.

NOTE 4 For ecotoxicological testing, eluates representing the release of both inorganic and organic substances are needed. In this document, ecotoxicological testing is also meant to include genotoxicological testing.

This test method produces eluates, which can subsequently be characterized by physical, chemical and ecotoxicological methods in accordance with existing standard methods. The test is not suitable for substances that are volatile under ambient conditions.

This procedure is not applicable to materials with a dry-matter-content ratio lower than 33 %.

This test is mainly aimed at being used for routine and control purposes, and it cannot be used alone to describe all leaching properties of a soil. Additional leaching tests are needed for that extended goal. This document 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 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.

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