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

ISO 21268-3:2019

<https://standards.iteh.ai/catalog/standards/iso/d865d514-893c-4e12-bf60-810279f978d4/iso-21268-3-2019>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 21268-3:2019

<https://standards.iteh.ai/catalog/standards/iso/d865d514-893c-4e12-bf60-810279f978d4/iso-21268-3-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Principle	3
5 Reagents and materials	4
6 Apparatus	4
7 Sample pre-treatment	6
7.1 Preparation of laboratory sample and specification of particle size	6
7.2 Preparation of the test sample	7
7.3 Test portion	7
7.4 Determination of dry matter content	7
8 Procedure	8
8.1 Temperature	8
8.2 Preparation of the eluent	8
8.3 Preparation of the column	8
8.4 Packing of the column	8
8.5 Start of the test	9
8.6 Sample Collection and Liquid/Solid separation step	10
8.7 Collection of additional eluate fractions	11
8.8 Further preparation of the eluates for analysis	12
8.9 Blank test	12
9 Calculation	12
10 Test report	13
11 Analytical determination	13
11.1 General	13
11.2 Blank test information	13
12 Performance characteristics	14
12.1 General	14
12.2 Validation trials performed in Japan	15
12.2.1 Round robin tests performed in accordance with ISO/TS 21268-3:2007	15
12.2.2 Robustness testing and validation results considering equilibration period and flow rate	15
12.3 Validation results obtained in Germany (DIN 19528[5])	16
12.3.1 General	16
12.3.2 Results for validation trial 1	17
12.3.3 Results for validation trial 2	20
Annex A (informative) Suggestions for packing the column, water saturation and establishment of equilibrium conditions	25
Annex B (informative) Justification of the choices made in developing the test procedure	27
Annex C (informative) Calculation of centrifugation duration depending on centrifugation speed and rotor dimensions	31
Annex D (informative) Additional information on robustness testing and validation results based on waste materials	33
Bibliography	34

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 21268-3:2019 cancels and replaces (ISO/TS 21268-3:2007), 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;
- demineralized water has been added as possible leachant;
- the column diameter has been changed from "5 cm or 10 cm" to "5 cm to 10 cm";
- flow rate of 30 cm/d has been added as option based on robustness testing;
- [7.1](#) and [7.2](#) has been exchanged to read [7.1](#) "Particle size" and [7.2](#) "Sample preparation";
- [11.1](#) "General", [11.2](#) "Validation trials performed in Japan" and [12.3](#) "Validation results obtained in Germany (DIN 19528)" have been added;
- [B.2](#) "Particle size distribution" has been deleted;
- a new informative [Annex C](#) "Calculation of centrifugation duration depending on centrifugation speed and rotor dimensions" has been added;
- references in [Clause 2](#) and Bibliography has 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 characterise 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 (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 a): basic characterization tests.

This document was originally elaborated on the basis of CEN/TS 14405:2004^[4]. Especially, modifications considering requirements on subsequent ecotoxicological testing and analysis of organic substances have been included. Validation results have been adopted from DIN 19528^[5] and from Japanese validation studies^[15,16].

<https://standards.iteh.ai/catalog/standards/iso/d865d514-893c-4e12-bf60-810279f978d4/iso-21268-3-2019>

