SLOVENSKI STANDARD
oSIST prEN ISO 12782-4:2011

01-april-2011

[Not translated]

Soil quality - Parameters for geochemical modelling of leaching and specification of constituents in soils and materials - Part 4: Extraction of humic substances from solid samples (ISO/DIS 12782-4:2010)

Bodenbeschaffenheit - Parameter zur geochemischen Modellierung der Elution und Speziation von Bestandteilen in Böden und Materialien - Teil 4: Extraktion von Humusstoffen aus Feststoffproben (ISO/DIS 12782-4:2010)

Qualité du sol - Paramètres pour la modélisation géochimique du lessivage et spécifications des constituants des sols et des matériaux - Partie 4: Extraction des substances humiques des échantillons de sol (ISO/DIS 12782-4:2010)

Ta slovenski standard je istoveten z: **prEN ISO 12782-4**

ICS:

13.080.10	Kemijske značilnosti tal	Chemical characteristics of soils

oSIST prEN ISO 12782-4:2011 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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DRAFT
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ICS 13.080.05

English Version

Soil quality - Parameters for geochemical modelling of leaching and specification of constituents in soils and materials - Part 4: Extraction of humic substances from solid samples (ISO/DIS 12782-4:2010)

Qualité du sol - Paramètres pour la modélisation géochimique du lessivage et spécifications des constituants des sols et des matériaux - Partie 4: Extraction des substances humiques des échantillons de sol (ISO/DIS 12782-4:2010)

Bodenbeschaffenheit - Parameter zur geochemischen Modellierung der Elution und Speziation von Bestandteilen in Böden und Materialien - Teil 4: Extraktion von Humusstoffen aus Feststoffproben (ISO/DIS 12782-4:2010)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 345.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN ISO 12782-4:2010) has been prepared by Technical Committee ISO/TC 190 "Soil quality" in collaboration with Technical Committee CEN/TC 345 “Characterization of soils” the secretariat of which is held by NEN.

This document is currently submitted to the parallel Enquiry.

Endorsement notice

The text of ISO/DIS 12782-4:2010 has been approved by CEN as a prEN ISO 12782-4:2010 without any modification.

DRAFT INTERNATIONAL STANDARD ISO/DIS 12782-4

ISO/TC **190**/SC **7** Secretariat: **DIN**

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Soil quality — Parameters for geochemical modelling of leaching and specification of constituents in soils and materials —

Part 4: Extraction of humic substances from solid samples

Qualité du sol — Paramètres pour la modélisation géochimique du lessivage et spécifications des constituants des sols et des matériaux —

Partie 4: Extraction des substances humiques des échantillons de sol

ICS 13.080.05

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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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.

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.

ISO 12782-4 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 7, *Soil and site assessment*.

ISO 12782 consists of the following parts, under the general title *Soil quality — Parameters for geochemical modelling of the leaching and speciation of constituents in soils and materials*:

— *Part 1: Extraction of iron(hydr)oxides with ascorbic acid*

— *Part 2: Extraction of iron(hydr)oxides with dithionite*

— *Part 3: Extraction of aluminium(hydr)oxides with ammonium oxalate - oxalic acid*

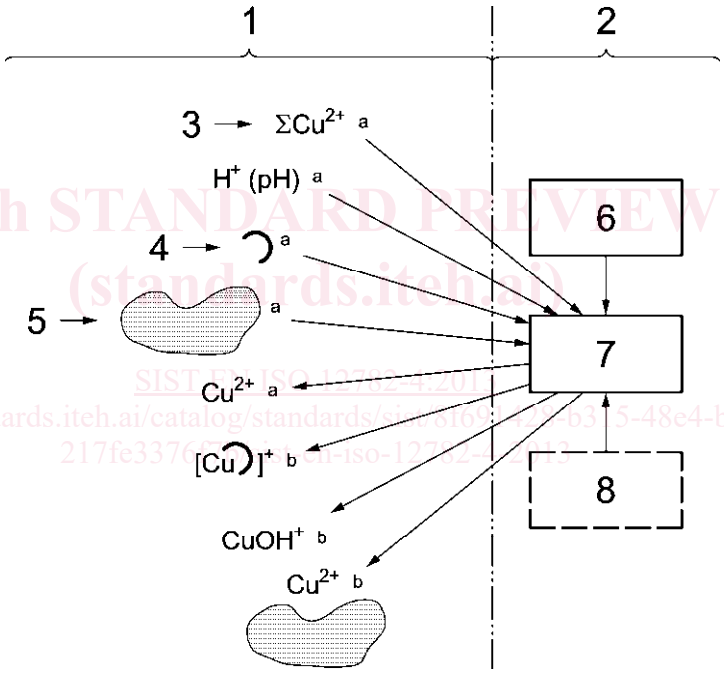
— *Part 4: Extraction of humic substances from solid samples*

— *Part 5: Extraction of humic substances from aqueous samples*

Introduction

In addition to leaching procedures for subsequent chemical and ecotoxicological testing of soil and materials, predictive models are becoming indispensable tools in the environmental risk assessment of these materials. Models are particularly required when the results of laboratory leaching tests are to be translated to specific scenarios in the field, with regard to assessing risks of both contaminant migration and bioavailability.

In the past few years, geochemical models have been shown to be valuable tools to be combined with the data obtained from characterisation leaching standards such as the pH-dependence and percolation tests. These models have the advantage of being based on fundamental thermodynamical parameters that have a general validity. In order to enable extrapolation of laboratory leaching data to the mobility and/or bioavailability of a constituent in a specific field scenario, these models require additional input parameters for specific soil properties (Figure 1).



Key

1 experiment

2 geochemical speciation modelling

3 available metal concentration

4 dissolved humic substances

5 reactive (solid) surfaces

6 database with stability constants

7 computer program

8 assumptions

Figure 1 — elationships between experimental data, as obtained from laboratory leaching/extraction tests, and geochemical modelling of the speciation of a heavy metal in the environment (modified after M. Gfeller & R. Schulin, ETH, Zürich

The characterisation leaching standards provide information on the concentrations of the contaminant of interest as a function of, in particular, pH and liquid/solid (L/S) ratio. In addition, a more complete analysis of the leachates does also provide information on the major ion composition and dissolved organic carbon (DOC), parameters that are particularly important for the chemical speciation of constituents through processes such as precipitation, complexation and competition for adsorption on reactive mineral and organic surfaces in the soil. As Figure 1 shows, for the example of copper, geochemical modelling allows calculation of the distribution of the metal among these different chemical species in the system of interest, which is necessary information for risk assessment purposes as these different chemical forms play distinct roles in the mobility and bioavailability of the metal in the soil. In addition to information obtained from the leaching standards (in their current state of development/definition), two additional types of information are required:

1) the “available” (sometimes also referred to as “active” or “exchangeable”) concentration of the constituent in the solid phase, as opposed to the total concentration determined by acid destruction of the soil matrix. This “available” concentration can be obtained by leaching at low pH, a condition that can be obtained by extending the pH range in the pH-dependence leaching test (ISO/TS 21268-4) down to pH of approximately 0,4.

2) the concentration of reactive organic and mineral surfaces in the soil, which constitute the major binding (adsorption) sites for most constituents in the soil matrix.

The major reactive surfaces that control the binding of constituents by sorption processes to the soil matrix are particulate organic matter and iron- and aluminium(hydr)oxides. It is generally accepted that the reactivity of these mineral and organic surfaces can strongly vary as a function of their specific surface area/crystallinity (iron- and aluminium(hydr)oxides) and composition (organic matter). When intending to use the results for the above described purposes of geochemical modelling in conjunction with leaching tests, it is important that the methods are selective for reactive surfaces for which also generic thermodynamical adsorption parameters are available for the most important major and trace elements.

These reactive surfaces have been identified in soils as well as in a variety of other materials for which the leaching of constituents is of relevance. It has been shown that the binding properties of these surfaces play a generic role in the speciation and leaching of constituents among these different materials. As an example, a similar geochemical modelling approach, using model input from the partial or complete ISO 12782 series, has been successfully applied to different soils [1], amended soils [2,3], municipal incinerator bottom ash [4], steel slag [5, 6], bauxite residues [7], and recycled concrete aggregate [8]. Hence, the scope of the ISO 12782 series extends from soils to materials including soil amendments and waste materials.

This part of ISO 12782 aims to determine important reactive organic surfaces in soil and materials, for which generic thermodynamic adsorption parameters exist, i.e., humic and fulvic acids. The procedure is based on [9], while generic thermodynamic adsorption parameters for humic and fulvic acids are available in [10, 11].

Thermodynamic parameters for other adsorption models than used in [10, 11] are also available in the literature and may also be used to model the binding of constituents to humic and fulvic acids.

The method [12] is based on a conventional isolation and purification method [9] that is also used by the International Humic Substances Society (IHSS).

