

---

---

## Soil quality — Guidance on long and short term storage of soil samples

*Qualité du sol — Lignes directrices relatives au stockage  
des échantillons de sol à long et à court termes*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

This document is a preview generated by EVS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2007

All rights reserved. Unless otherwise specified, no Part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword.....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions.....	3
4 General comments on soil storage.....	3
5 Change in soil properties during storage .....	4
6 Storage conditions.....	4
6.1 General.....	4
6.2 Light .....	4
6.3 Temperature .....	4
6.4 Humidity.....	4
6.5 Accessibility, security, documentation and quality control.....	5
6.6 Duration of storage.....	5
6.7 Containers and quantity of sample stored.....	5
6.8 Preparing the samples after storage.....	5
7 Stepwise scheme .....	6
8 Step A: Consideration of need for further analysis and duration of storage.....	6
9 Step B: Consideration of parameters currently relevant to the study .....	6
10 Step C: Consideration of parameters which may be of interest in the future.....	6
11 Step D: Consideration of how each of these parameters may be affected by storage conditions.....	7
11.1 General.....	7
11.2 Soil characteristics .....	7
11.3 Chemical parameters.....	7
11.4 Biological tests .....	10
12 Step E: Design of storage conditions required to avoid change in sample properties .....	11
13 Step F: Design of documentation and labelling scheme including sample management.....	11
14 Step G: Estimation of costs for storage and documentation and comparison of these costs with available or expected funding.....	11
15 Test report .....	12
Annex A (normative) Storage for soil samples .....	13
Bibliography .....	16

## 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 18512 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 2, *Sampling*.

## Introduction

Many soil investigation programmes require that soil samples be stored for future use. The choice of storage conditions may determine whether or not the samples will be suitable for the intended future use. This International Standard gives guidance on choosing conditions for storage of soil samples.

This document is a preview generated by EVS

This document is a preview generated by EVS

# Soil quality — Guidance on long and short term storage of soil samples

## 1 Scope

This International Standard gives guidance on how to store and preserve soil samples for laboratory determinations and how to prepare them for analysis after storage. Special emphasis is given to maximum storage times as a function of different storage conditions.

## 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.

EN 15192:2006, *Characterisation of waste and soil — Determination of Chromium(VI) in solid material by alkaline digestion and ion chromatography with spectrophotometric detection*

ISO 10301, *Water quality — Determination of highly volatile halogenated hydrocarbons — Gas-chromatographic methods*

ISO 10381-6, *Soil quality — Sampling — Part 6: Guidance on the collection, handling and storage of soil under aerobic conditions for the assessment of microbiological processes, biomass and diversity in the laboratory*

ISO 10382, *Soil quality — Determination of organochlorine pesticides and polychlorinated biphenyls — Gas-chromatographic method with electron capture detection*

ISO 10390, *Soil quality — Determination of pH*

ISO 10694, *Soil quality — Determination of organic and total carbon after dry combustion (elementary analysis)*

ISO 11048, *Soil quality — Determination of water-soluble and acid-soluble sulfate*

ISO 11074, *Soil quality — Vocabulary*

ISO 11259, *Soil quality — Simplified soil description*

ISO 11261, *Soil quality — Determination of total nitrogen — Modified Kjeldahl method*

ISO 11263, *Soil quality — Determination of phosphorus — Spectrometric determination of phosphorus soluble in sodium hydrogen carbonate solution*

ISO 11265, *Soil quality — Determination of the specific electrical conductivity*

ISO 11266, *Soil quality — Guidance on laboratory testing for biodegradation of organic chemicals in soil under aerobic conditions*

ISO 11267, *Soil quality — Inhibition of reproduction of Collembola (Folsomia candida) by soil pollutants*

ISO 11268-1, *Soil quality — Effects of pollutants on earthworms (Eisenia fetida) — Part 1: Determination of acute toxicity using artificial soil substrate*

ISO 11268-2, *Soil quality — Effects of pollutants on earthworms (Eisenia fetida) — Part 2: Determination of effects on reproduction*

ISO 11466, *Soil quality — Extraction of trace elements soluble in aqua regia*

ISO 13877, *Soil quality — Determination of polynuclear aromatic hydrocarbons — Method using high-performance liquid chromatography*

ISO 13878, *Soil quality — Determination of total nitrogen content by dry combustion ("elemental analysis")*

ISO 14154, *Soil quality — Determination of some selected chlorophenols — Gas-chromatographic method with electron-capture detection*

ISO 14238, *Soil quality — Biological methods — Determination of nitrogen mineralization and nitrification in soils and the influence of chemicals on these processes*

ISO 14240-1, *Soil quality — Determination of soil microbial biomass — Part 1: Substrate-induced respiration method*

ISO 14240-2, *Soil quality — Determination of soil microbial biomass — Part 2: Fumigation-extraction method*

ISO 14255, *Soil quality — Determination of nitrate nitrogen, ammonium nitrogen and total soluble nitrogen in air-dry soils using calcium chloride solution as extractant*

ISO/TS 14256-1, *Soil quality — Determination of nitrate, nitrite and ammonium in field-moist soils by extraction with potassium chloride solution — Part 1: Manual method*

ISO 14507, *Soil quality — Pretreatment of samples for determination of organic contaminants*

ISO 15009, *Soil quality — Gas chromatographic determination of the content of volatile aromatic hydrocarbons, naphthalene and volatile halogenated hydrocarbons — Purge-and-trap method with thermal desorption*

ISO 15473, *Soil quality — Guidance on laboratory testing for biodegradation of organic chemicals in soil under anaerobic conditions*

ISO 15685, *Soil quality — Determination of potential nitrification and inhibition of nitrification — Rapid test by ammonium oxidation*

ISO 15799, *Soil quality — Guidance on the ecotoxicological characterization of soils and soil materials*

ISO 15903, *Soil quality — Format for recording soil and site information*

ISO 15952, *Soil quality — Effects of pollutants on juvenile land snails (Helicidae) — Determination of the effects on growth by soil contamination*

ISO 16072, *Soil quality — Laboratory methods for determination of microbial soil respiration*

ISO 16387, *Soil quality — Effects of pollutants on Enchytraeidae (Enchytraeus sp.) — Determination of effects on reproduction and survival*

ISO 16703, *Soil quality — Determination of content of hydrocarbon in the range C10 to C40 by gas chromatography*

ISO 17155, *Soil quality — Determination of abundance and activity of soil microflora using respiration curves*

ISO 20963, *Soil quality — Effects of pollutants on insect larvae (Oxythyrea funesta) — Determination of acute toxicity*

ISO 22030, *Soil quality — Biological methods — Chronic toxicity in higher plants*

ISO 22155, *Soil quality — Gas chromatographic quantitative determination of volatile aromatic and halogenated hydrocarbons and selected ethers — Static headspace method*

ISO 23753-1, *Soil quality — Determination of dehydrogenase activity in soils — Part 1: Method using triphenyltetrazolium chloride (TTC)*

ISO 23753-2, *Soil quality — Determination of dehydrogenase activity in soils — Part 2: Method using iodotetrazolium chloride (INT)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11074 and ISO 11259 apply.

In this International Standard, the term “refrigeration” refers to a temperature of  $4\text{ °C} \pm 2\text{ °C}$ . The term “freezing” refers to a temperature lower than  $-18\text{ °C}$ .

### 4 General comments on soil storage

Many studies involve the collection of soil samples in the field, followed by laboratory determination of various properties of the collected samples. In general, the samples are taken at the site being investigated, mixed or otherwise treated at the site, packed in containers and then transported to the laboratory. Upon arrival at the laboratory, the samples may again be treated before being sent for analysis. Some samples may be stored directly for later analysis. After analysis, the remaining part of the samples may be discarded or stored. The samples are stored when there is a need for further analysis, either because there is a need for checking parameters already determined or there is a need for making additional determinations in the future.

In practice, there are two main situations in which sample storage is relevant.

- Routine testing of soil samples, e.g. by environmental laboratories, where soil samples typically are stored for a few weeks after sampling in order to carry out some additional tests, or in order to confirm results found earlier.
- Situations in which samples have to be stored for a long period, sometimes over decades, e.g. monitoring programs, reference materials, or research programs in which degradability is tested.

Both these situations fall within the scope of this International Standard.

The conditions for storage should be selected carefully at all stages, from the point of taking the sample onwards. As an unexpected delay in transport may occur, this guidance should be applied even if the planned transportation time is short. Examples of storage conditions to be considered are light, temperature, humidity, accessibility, duration of storage, type of container and amount of sample to be stored. Documentation of the samples and the storage conditions is also important. Risk and security problems should be considered. Well-designed storage conditions are particularly important in large-scale studies, such as monitoring, where the number of samples may become quite large over the years. Incorrectly chosen storage conditions may lead to high costs and may render the samples unfit for future use.

The effect of storage on biodiversity has been considered only with respect to microbiological diversity.

Radioactive change caused by loss or gain of radioactive matter should be considered in connection with the respective compounds. Radioactive decay is generally not affected by storage and is not treated in this International Standard.