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## Soil quality — Guidance on the selection and application of screening methods

*Qualité du sol — Lignes directrices pour la sélection et l'application des  
méthodes de diagnostic rapide*



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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 12404 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

## Introduction

Screening methods, which can be chemical, physical or biochemical in nature, can often be applied in a quick and simple manner. Performance of quick and simple tests can be used in the field (i.e. on-site) and, in some cases, are also applicable for laboratory use. They can indicate the presence or absence of an analyte, or provide a qualitative estimate of a concentration or value, or generate a quantitative result. They can also be used to produce a spatial distribution of concentrations or values within a site, which can be supported by subsequent reference (laboratory-base) analysis. When used in this way, the purpose is generally to obtain information on target parameters or groups of parameters and the location of unusual concentrations, possibly prior to undertaking a more detailed study or investigation. For these purposes, the bias and precision of these methods need not be to the same level as conventional laboratory reference methods, for example as demonstrated by International Standards, as the initial objective of their use is to obtain as much information as possible in a relatively short period of time on the presence or absence, or range of concentrations likely to be determined for a particular site. It may be more important to obtain a result quickly or with an improved spatial resolution as an indication of the magnitude and likely concentration, rather than precise and unbiased values.

Typically, for measurement techniques, a result may be obtained in one of three ways. Firstly, as a qualitative presence or absence result. Secondly, as a semi-quantitative result expressed within a relatively wide range of values, and thirdly, as a result with an accompanying uncertainty of measurement with a significantly smaller range of values that might be expected. (The third option is usually a result generated using a laboratory reference method, with the uncertainty of measurement of laboratory reference methods generally being smaller than that of screening methods.) Whichever result is generated depends on the nature and type of the screening method used, as well as the technology on which the screening method is based.

The use of screening methods usually increases the efficiency of a site investigation, while providing as much information as that obtained in situations where only laboratory reference methods are used. Whilst the use of these rapid measurement techniques at a particular site should not replace conventional analysis, their use greatly facilitates the investigation in a complementary role. Generally, many more samples can be analysed and results generated faster than determined by more conventional testing of laboratory reference methods. This enables areas, for example, those with very high levels of concentrations, or where very low concentrations exist, to be identified much more quickly and efficiently. If too few samples are taken and analysed by more costly laboratory reference methods, there is a risk that these areas might not be identified and could easily be missed. This process then allows more effort to be directed on those areas where high or unusual levels are likely to be present, for example, by employing conventional laboratory reference method analysis. This can save time, money and resources, especially when cost-effective screening methods are applied to a large number of samples and supportive conventional reference method analysis is also undertaken, where relevant.

The use of screening methods, particularly if carried out on-site, can offer an immediate decision-making opportunity which enables staff to direct their efforts more effectively to those areas where a more thorough investigation might need to be undertaken. The guidance in this International Standard describes the application of screening methods, and how they might be used for assessing soil quality. Notwithstanding some of the issues raised, screening methods can generate robust and reliable results which can be used with confidence.

**NOTE** Although soil screening methods are most commonly used to determine contaminants (pollutants) in soils, for example in site investigations, they can also be used to determine parameters in uncontaminated soils (e.g. agricultural soils.) The use of the word “contaminant” in this International Standard can equally apply to any relevant soil parameter.



# Soil quality — Guidance on the selection and application of screening methods

## 1 Scope

This International Standard provides guidance on the selection and application of screening methods for assessing soil quality. Guidance is given to choose an appropriate screening method for a specific parameter and defines the conditions under which they can be used.

This International Standard does not recommend any particular screening method, but confirms the principles of their selection and application.

## 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 11074, *Soil quality — Vocabulary*

## 3 Terms and definitions

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

### 3.1

#### **screening method**

method which is used (often on-site) to quickly explore a given area or test a set of samples and obtain data on soil quality

### 3.2

#### **laboratory reference method**

laboratory-based method which is performed in accordance with National or International Standards and is not necessarily comparable with screening methods

**NOTE** A laboratory reference method may be recognized nationally or internationally and is performed within a qualified laboratory. Its results are not necessarily comparable with those of screening methods.

## 4 General

### 4.1 Introduction

This International Standard describes a framework for selection and application of screening methods.

It defines the whole process, from the selection of the screening method, the applicability and fit-for-purpose testing, the fulfilling of the acceptance criteria, the quality control of the applied method, to the documentation of measurement results.

The suitability of any particular screening method depends on the parameter or group of parameters requiring determination and on the technical nature of the method.

Screening methods can be classified in various categories as outlined below.