
Guidance on characterization of excavated soil and other materials intended for re-use

*Lignes directrices sur la caractérisation de la terre excavée et d'autres
matériaux du sol destinés à la réutilisation*

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

ISO 15176:2019

<https://standards.itih.ai/catalog/standards/iso/22e42285-bafc-4ba0-a2d4-047f05a7aac1/iso-15176-2019>



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

ISO 15176:2019

<https://standards.iteh.ai/catalog/standards/iso/22e42285-bafc-4ba0-a2d4-047f05a7aac1/iso-15176-2019>



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 reference	2
3 Terms and definitions	2
3.1 Types of soil and other soil materials	2
3.2 Soil characteristics	4
3.3 Land and sites	5
3.4 Utilization, reclamation and treatment	5
3.5 Assessment	6
4 Characterization of soil materials and sites	7
4.1 General	7
4.2 Investigation strategies	9
4.3 Sampling strategies	10
4.3.1 General considerations	10
4.3.2 Sampling in situ soil materials	13
4.3.3 Sampling sediments	13
4.3.4 Sampling stockpiles of untreated or treated soil materials	14
4.3.5 Sampling materials arising from a process-based remediation method	14
4.3.6 Sampling manufactured soils	14
4.3.7 Sampling soil materials after placement at the target site	14
4.3.8 Sampling the water environment	14
4.4 Characterization of soil materials	14
4.4.1 General	14
4.4.2 Description of source and target sites	15
4.4.3 Chemical characterization including basic characteristics	17
4.4.4 Physical characteristics	22
4.4.5 Biological characteristics	22
5 Data quality, handling and evaluation	23
6 Using this document	24
Annex A (informative) Relevant parameters required for the chemical, physical and biological characterization of materials for re-use	25
Annex B (normative) Good practice in the re-use of soil materials	35
Annex C (informative) Guidance on determination of the scope of investigation needed before excavation of soil materials	39
Annex D (informative) Examples of classification and evaluation of soils and other soil materials	41
Annex E (informative) Examples of elements and compounds belonging to different contaminant groups	47
Bibliography	50

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 second edition cancels and replaces the first edition (ISO 15176:2002), which has been technically revised. The main changes compared to the previous edition are as follows:

- introduction of references to the ISO 18400 series of standards;
- updated references to international standards.

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

This document is one of a series providing guidance on the assessment of soils and soil materials in relation to certain functions and uses. It should be read in conjunction with other International Standards, some of which give more specific guidance in relation to some of the uses listed in the Scope or particular aspects of assessments. For example, ISO 15800¹⁾ gives guidance on assessments relating to human exposure to potentially harmful substances and ISO 15175 gives guidance on characterization of contaminated soil related to groundwater protection.

Soils are the dynamic product of chemical, physical and biological processes. They are the result of interactions between the inherent nature of the parent material, the prevailing environmental conditions and human activities. They are a valuable natural and finite resource which should be conserved wherever possible. When construction, mining or other activities require soils to be excavated and moved from their natural situation, they should as far as possible be re-used in a manner consistent with their natural properties and the intended use of the target location. Soils intended for re-use are usually required to have certain chemical, leaching, geotechnical, physical, biological and radiochemical attributes consistent with this future use. Particular attention should be paid in situations where there is reason to believe that the soil might be contaminated.

Soils that are to be excavated, stripped, or otherwise removed from their original location, should be investigated to determine how they can be re-used so as to minimize the quantities to be disposed of as waste and to determine environmental impacts that might arise during re-use. Treatment of soils and soil materials to remove or destroy contaminants or to reduce their availability to the environment can alter soil properties. These properties should therefore be determined before re-use. For manufactured soils, the characteristics of both the components and of the manufactured product might need to be determined.

The purpose of characterizing soil (or other media) as suggested in this document is usually to enable judgements to be made about its suitability for a defined use (e.g. arable farming, domestic gardens). These judgements can be made by reference to published international or national guidance that sets out physical, chemical or other generic criteria, or against criteria set on a site-specific basis. When substances are present that might be harmful to human health or the environment, the judgement can also be made on the basis of a site-specific qualitative, semi-quantitative or fully quantitative risk assessment. In many jurisdictions, formal guidance on such assessments has been published. In some cases this guidance fits within a legislative framework. Guidance has also been provided by professional organizations and some standardization bodies.

When deciding whether to re-use soil material, other possibly competing or overriding objectives such as protection of soil, nature, water and air; physical planning requirements and national legislative requirements should be considered.

Assessment of soil material for re-use could require the measurement of the chemical, physical, biological, geotechnical and radiochemical characteristics of soil material and of the source and target sites. The assessor should identify those parameters that are appropriate to the task in hand.

This document identifies the functions and properties of soil materials at the source (point of origin) and also the properties of the target (target) site which could be relevant to the potential uses listed in the Scope and indicates for which parameters or procedures there are International Standards available. Radiochemical and geotechnical aspects are not covered. For guidance on the geotechnical aspects of the use of soil materials as construction material, see also other relevant International Standards (e.g. those produced by ISO/TC 182, *Geotechnics in the field of civil engineering*) or national standards.

The way the soil is handled after excavation can affect soil properties. Some suggestions regarding good practice in soil handling and related practice and monitoring after placement are provided in [Annex B](#).

1) Under preparation. Stage at the time of publication: ISO/FDIS 15800.

Guidance on characterization of excavated soil and other materials intended for re-use

1 Scope

This document provides guidance on the range of tests that could be necessary to characterize soil and other soil materials intended to be re-used, with or without preliminary treatment (e.g. screening to remove over large material). It is intended to be of use in determining the suitability of soil materials for re-use (see 3.4.1), and the assessment of the environmental impacts that might arise from re-use. It takes into account the different requirements of topsoil, sub-soil and other soil materials such as sediments or treated soils. International Standard methods are listed that might be of use for characterization.

Soil materials include natural soils and other materials (e.g. fill, made ground) excavated, stripped, or otherwise removed from their original in-ground or above-ground location (e.g. stockpile), dredged materials, manufactured soils, and soil treated to remove or destroy contaminants. For manufactured soils, which are often made using excavated materials together with other materials such as “green waste”, the characteristics of the components and of the manufactured product might need to be determined.

NOTE The terms “excavated soil” and “excavated soil materials” are used for brevity throughout the document to embrace the range of materials covered.

An overriding principle governing the guidance provided in this document is that when there is to be no change in intended land use at the target site, imported soil materials cannot lead to a permanent reduction in performance of relevant soil functions.

The guidance provided is intended to cover a range of possible end uses, including:

- play areas for small children, including nursery schools, kindergartens, etc.;

- schools;

- gardens and other residential areas;

- allotments;

- horticulture;

- agriculture;

- forestry;

- recreational areas, e.g. parks, sport fields;

- restoration of damaged ecosystems;

- mining and industrial sites;

- construction sites;

- road and rail constructions.