INTERNATIONAL STANDARD

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First edition
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Soil quality — Sampling —

Part 204: Guidance on sampling of soil gas

Qualité du sol — Échantillonnage —

Partie 204: Lignes directrices pour l'échantillonnage des gaz de sol

Reference number
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Contents

Page

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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

This first edition of ISO 18400-204 cancels and replaces ISO 10381-7:2005, which has been technically and structurally revised. The ISO 18400 series is based on a modular structure and cannot be compared to ISO 10381-7 clause by clause.

A list of all parts in the ISO 18400 series can be found on the ISO website.

Introduction

This document is one of a group of International Standards to be used in conjunction with each other where necessary. The ISO 18400 series deals with sampling procedures for the various purposes of soil investigation. The roles/positions of the individual standards within the total investigation programme are shown in Figure 1. The stated soil gas and landfill-gas measurements do not give any quantitative statement of the total quantity of material detected in soil gas or soil. The measurement results can be influenced by, e.g. temperature, humidity, air pressure, minimum extraction depth, etc.

The general terminology used is in accordance with that established in ISO/TC 190 and, more particularly, with the vocabulary given in ISO 11074.

Toxic, asphyxiating and explosive soil gases can enter buildings and other built development on and below ground and variously pose potential risks to occupants and users and to the structures themselves.

Such gases might be present in the ground naturally, or be present as a result of contamination of the ground, or arise from buried wastes. In addition to the main components found in air (nitrogen and oxygen), soil gas can contain volatile organic compounds (VOCs), inorganic vapours (e.g. mercury) and a wide range of other gases (e.g. methane, carbon dioxide, carbon monoxide, hydrogen sulfide, ammonia, helium, neon, argon, xenon, radon, etc.).

These gases can have several origins such as: landfilled wastes; contaminated soils on a brownfield site; plume of contaminated groundwater; spill or leakage of chemicals products, leaks of mains gas (natural gas); sewer gas, etc.

In order to complete an assessment of the risks posed by the presence of permanent and other soil gases like VOCs, it is necessary to understand and characterize the potential sources of gas in and around a site.

Guidance on installations for soil gas sampling (equipment and instruments, methods of sampling, requirements of controls, etc.) and other relevant information (e.g. on environmental conditions) are provided in this document.

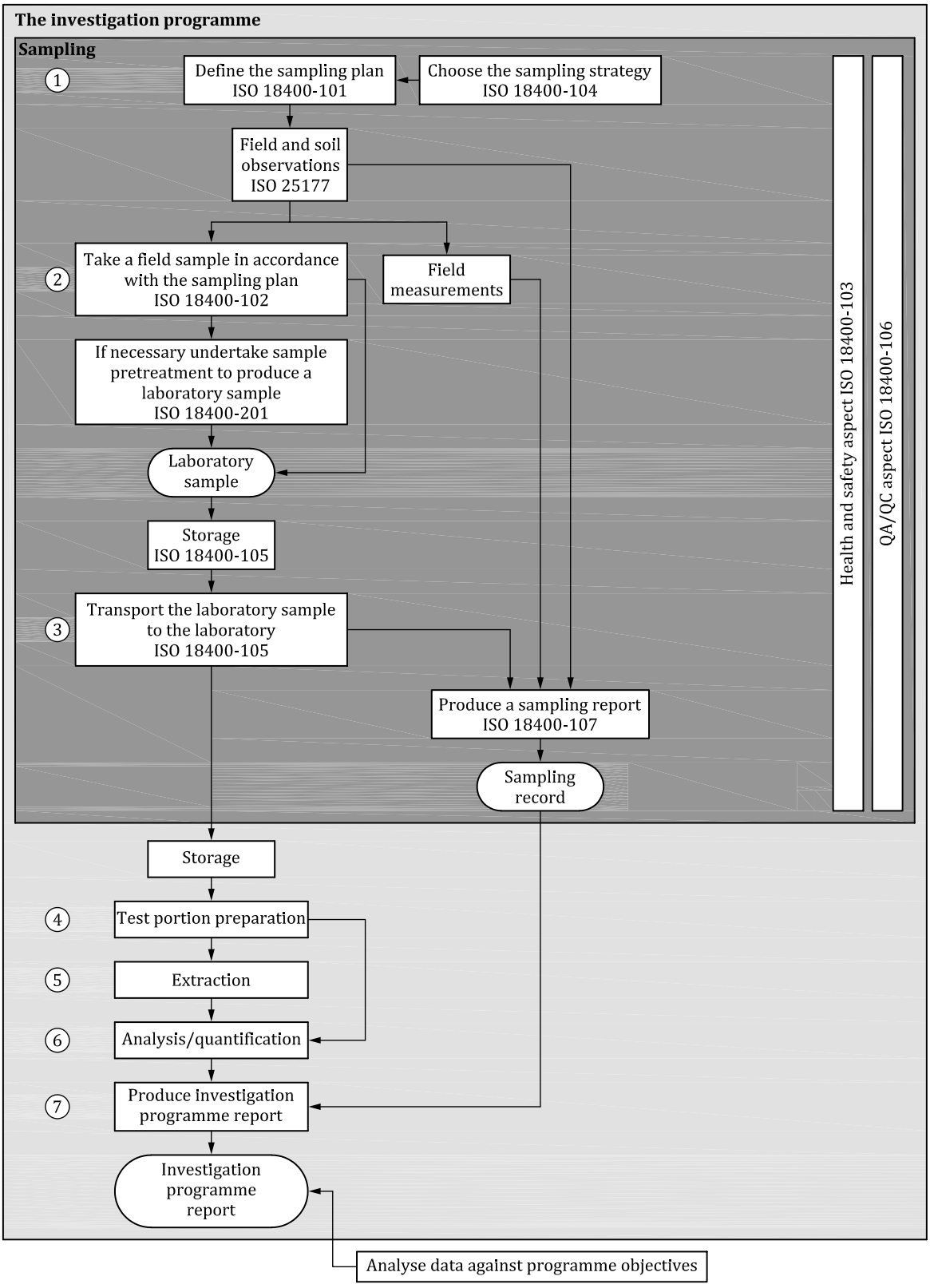

Figure 1 — Links between the essential elements of an investigation programme

NOTE 1 The numbers in circles in Figure 1 define the key elements (1 to 7) of the investigation programme.

NOTE 2 Figure 1 displays a generic process which can be amended when necessary.

Soil quality — Sampling —

Part 204: Guidance on sampling of soil gas

1 Scope

This document contains guidance on soil gas sampling using

— active sampling (adsorbents, filters, air containers), and

— passive sampling

applied at permanent or temporary monitoring wells or other installations in soils or underneath buildings (sub-slab).

It provides guidance on:

— development of a sampling plan;

— construction of monitoring installations;

— transport, packaging and storage soil gas samples;

— quality assurance.

This document also gives basic information about

— soil gas dynamics, and

— identification of soil gas sources

relevant to permanent or temporary boreholes in soils or underneath buildings (sub-slab).

The compounds covered by this document are:

— volatile organic compounds (VOCs);

— inorganic volatile compounds (e.g. mercury, HCN);

— permanent gases (i.e. CO_2, N_2, O_2, CH_4).

This document does not give guidance on:

— risk evaluation and characterization;

— selection and design of protective measures;

— the verification of protective measures, although the site investigation methodologies described can be used when appropriate;

— the sampling of atmospheric or indoor gases;

— the measurement of gases from the soil entering into the atmosphere;

— monitoring and sampling for radon.