INTERNATIONAL STANDARD

ISO 18400-107

First edition
2017-01

Soil quality — Sampling —

Part 107: Recording and reporting

Qualité du sol — Échantillonnage —

Partie 107: Enregistrement et notification

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Reference number
ISO 18400-107:2017(E)

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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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 18400-107, together with ISO 18400-101 and ISO 18400-104, cancels and replaces ISO 10381-1:2002, which has been technically revised. The ISO 18400 series is based on a modular structure and cannot be compared to ISO 10381-1 clause by clause.

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

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Introduction

Assembly of the field data and its presentation in an easily readable and understandable form in the sampling report is an essential precursor to understanding the laboratory results and their proper presentation and interpretation in the overall investigation report.

Documentation and data management related to sampling within an investigation programme consist of reporting the sampling procedures, recording field data and observations, and describing the samples.

Usually, the results from examinations of samples are used to gain information about the total material or population the samples were taken from.

For a final assessment, a wide variety of information sources will be used.

The sampling report deals with five major activities:

— the instruction of the sampler and any deviation from the sampling plan;

— the field observations and measurements;

— the instructions for testing and analysis;

— comments on sources of uncertainty;

— comments on accuracy, precision and variability.

The degree of detail of information required depends on the objectives of the sampling programme. This has to be defined in the sampling plan.

This document is part of a series on sampling standards for soil. The role/position of the International Standards within the total investigation programme is shown in Figure 1.

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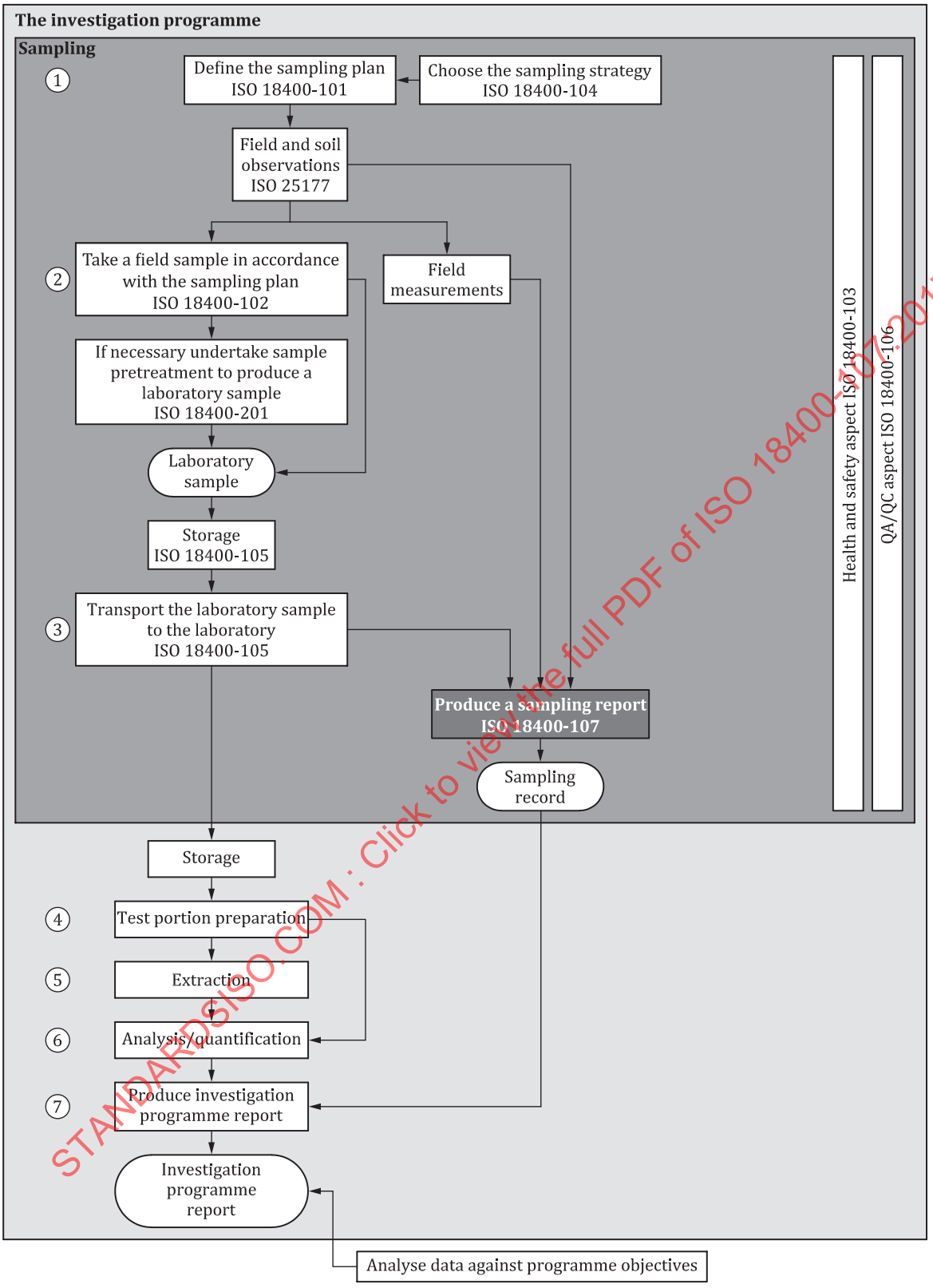

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Figure 1 — Links between the essential elements of an investigation programme

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.

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Soil quality — Sampling —

Part 107: Recording and reporting

1 Scope

This document specifies the minimum information required for a sampling report independent of the purpose of the investigation.

The preparation of the overall investigation report is not covered by this document (see ISO/IEC 17025:2005, 5.10.3).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

NOTE ISO 11074 defines the terms “sampling record” and “sampling report” as synonyms, for in many fields of application, there is no sharp distinction between them. Within this document “record” or “recording” are used for the gathering of raw data in the field only. In all other cases, “report” or “reporting” are used.

4 General

The sampling report deals with five major activities:

— the instruction of the sampler (according to the sampling plan) and any deviations from the plan (see Clause 5);

— reporting the field activities, including observations and measurements (see Clause 6);

— the instructions for testing and analysis to the laboratory (see Clause 7);

— identification of any potential and actual uncertainties arising from the sampling (including information on areas that could not be sampled);

— gathering information on anything that might affect accuracy, precision and variability of the test results.

The sampling report should mention that the report has been prepared in accordance with this document.

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The sampling report should be available to relevant staff working on the project (these staff includes those engaged in fieldwork, pretreatment, analysis and assessment) at all the stages above.

The field information should be presented in a neat and legible form, because data sheets are not always retyped, but are submitted to the client and/or filed in their original form.

All reports should be properly cross-referenced.

The sampling report is a factual report. All interpretations and conclusions belong to the overall investigation report that will be elaborated later and are not within the scope of this document.

Photographs of the site and the samples are useful for identification and when available should be part of the report.

Much site derived data including observations on trial pits and boreholes are now recorded electronically on site. The resulting files should also be part of the report.

5 Sampling plan

The sampling plan (see ISO 18400-101) and the observations and recordings of the sampler (see Clause 6) form the basis of the sampling report. Therefore, the sampling report shall refer to the objectives of the investigation programme and to the sampling plan.

Usually, the sampling plan provides at least the following information concerning sampling:

a) a description of the available background information on the site and material to be sampled;

b) a list of the participants involved and their specific interest in the sampling programme;

c) the objectives of sampling;

d) the sampling procedure (sampling approach and technique) including handling, preservation, packaging and storage, as well as considerations relating to QA/QC, health and safety precautions;

e) a list of analyses and tests to be performed on the samples, together with the consequential requirements for sampling [e.g. type and size of sample(s) required].

A detailed sampling plan should specify all the information that is required for each sample before the sampling starts.

Any deviation from the agreed sampling plan shall be documented and justified in the sampling report (including authority for the deviations) and be mentioned in the overall investigation report too.

6 Field activities

6.1 Technical requirements

The contents of the sampling records and the sampling report depend on the sampling objectives. To avoid repetitions, it is useful to differentiate between the information that has to be documented for each individual sample and the information that is common to all of the samples. The following data shall be documented according to the sampling plan:

a) the name of sampling personnel;

b) the location of the site/plot (sufficiently precise for another person to find it without further guidance including coordinates and elevation) and site reference number or site name;

c) the precise location from which the sample was taken including depth and, if applicable, side or from bottom of a trial pit (this might include coordinates);

d) a comprehensive description of the relevant details and features of the site/plot (see 6.2);

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e) the date and time of sample collection and/or site observation;

f) the field measurements (records, results);

g) the observations during sampling;

h) the weather conditions at the time and prior to sampling, including air temperature, precipitation, sunshine, cloud, etc.;

i) the type of device used to take the sample;

j) a record of the origin and generation of the sample (the sampling procedure);

k) area of sampling plot or sampling area (e.g. map, a field sketch);

l) list of samples (number of samples and their labelling);

m) list of analyses that will be performed;

n) the sample amount (e.g. by using the prepared container, bottles, estimating the volume and mass);

o) whether the individual soil samples were kept separate or pooled into composite samples;

p) sample handling: packaging, storage, transport, (including the time elapsed between sampling, transport and post-sampling handling, or until transfer of the sample to another responsible person);

q) pretreatment in the field (see ISO 18400-201);

r) safety requirements concerning the samples;

s) any other factor that might influence the results of subsequent testing and assessment;

t) confirmation that any change to the sampling plan made in the field that might affect the quality of the results was properly authorised;

u) quality control measures performed.

The documentation of the information listed above ensures the potential value of the laboratory results is fully realized. A lack of information about the sampling and the samples cannot be compensated for during later stages of the investigation.

6.2 Site data

Site data shall be documented according to the specifications of the sampling plan. This usually includes:

— surface relief features of the site;

— appearance of the surface (vegetation, sealing, etc.);

— signs of erosion and soil movement;

— details about land use, including past and present uses of the site;

— current site plan, for example, the presence of concrete or tarmac pathways, of buildings and remains of demolished buildings, vegetation, refuse, domestic pipelines and underground tanks and services;

— geology of the site;

— hydrology of the site, in particular the groundwater regime and fluctuations, soil water conditions, sea water incursions;

— any other features and events which might influence the interpretation of the data gathered;

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— details of sources of information, which have been consulted (including references to background/source material).

Detailed information on all the above aspects is usually available in the report of the preliminary investigation which should have preceded any site works (see ISO 18400-104[1)] and ISO 18400-202[1)]). Consequently, only summary information need be included in the sampling report. However, any deviations from what was expected on the basis of the preliminary investigation report or additional information should be noted.

A plan of the site shall be part of the report.

Additional documentation, e.g. photos and site characterization, is recommended.

6.3 Identification

Each sample shall be given a unique identification (see ISO 18400-105:2017, 5.3).

NOTE 1 The identification can be either numbers or letters or both.

NOTE 2 In cases where the data obtained from a sample is meant for long-term storage in data banks, the same sample number is to be used throughout the whole sampling, analytical and evaluation procedure.

NOTE 3 It might be advantageous to include x- and y-coordinates of the location of sample origin [e.g. conventional Cartesian systems or Universal Transverse Mercator (UTM)] in the sample number for quick reference.

6.4 Sample description

Samples shall be described in the field.

NOTE 1 Many observations of characteristics of the material to be sampled can be made directly in the field. These are usually very helpful for the interpretation of the results of laboratory analysis, for plausibility control, for estimations of the representativeness of the samples and of the spatial distribution of characteristics.

Among these are:

— colour;

— consistency, homogeneity, grain size;

— constituents/components to be identified visually and using a magnifying glass;

— obvious odour.

NOTE 2 In addition to the sample description, it might be necessary to describe the soil type and soil profile (see ISO 25177).

There are several ways to describe a sample, either as an individual sample or as part of a profile. Sampling for agricultural, geotechnical, environmental or scientific purposes requires different information and follows different methods and regulations for documentation. The type of description that is required should be stated clearly in the definition of the objectives. The description should, in addition, include as a minimum:

— whether the sample is disturbed or undisturbed;

— whether a single or composite sample; if composite, give the number and distribution of sampling points;

— volume of sample;

— moisture status of sample when collected;

1) Under preparation.

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— qualitative information about the samples, to reflect subjective observations, for example, smell, pore distribution in undisturbed soil cores, or other observations. Categories might include:

  — not detectable (below detection limit);

  — detectable;

  — readily detectable.

6.5 Sampling

The sampling technique (see ISO 18400-102) shall be documented.

NOTE Details of the sampling technique are entered for the benefit of analysts/interpreters because they might affect the results.

The depth of the sample shall be recorded; for details, see ISO 25177.

Any pretreatment in the field such as sample divisions shall be documented.

Safety precautions taken during sampling should be documented.

Any pretreatment of the sample(s) in the field should be in accordance with ISO 18400-201.

6.6 Transport and storage

The type of the container shall be indicated.

Transport and storage (see ISO 18400-105) information to be documented is:

— transport conditions, e.g. cooled, frozen;

— the time and place of delivery to the laboratory;

— confirmation of receipt by laboratory.

Any special health and safety measures necessary during transport and storage shall be documented.

7 Instructions to the laboratory

The minimum information from the field to the laboratory (chain of custody) is:

a) name of contact person;

b) the date and time of sample collection;

c) list of samples (number of samples and their labelling);

d) the sample amount (e.g. by using the prepared container, bottles, estimating the volume and mass);

e) whether the individual soil samples were kept separate or pooled into composite samples;

f) sample handling: packaging, storage, transport, (including the time elapsed between sampling, transport and post-sampling handling, or until transfer of the sample to another responsible person);

g) results from field measurements that might influence the sample pretreatment, the measurement process, or the interpretation of the measurement results;

h) any other factor that might influence the results of subsequent testing and assessment;

i) safety requirements concerning the samples.

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