INTERNATIONAL STANDARD

ISO 25177

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Soil quality — Field soil description

Qualité du sol — Description du sol sur le terrain

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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.

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 25177 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 1, *Evaluation of criteria, terminology and codification*.

This first edition of ISO 25177 cancels and replaces ISO 11259:1998, which has been technically revised.

Introduction

Traditionally, descriptions of soils and their environment were carried out as parts of soil survey and soil inventories, the purpose of which was to describe the pedogenetic context of the soil and assess applied aspects, principally agronomic potentials.

Today, many soil observations are made as part of much wider environmental studies, and include analysis for objectives such as the following:

— the identification of human influences on the soils, particular attention being paid to the negative effects of these influences (for example, pollution and physical deterioration);

— land protection within the context of “sustainable” agriculture;

— the prediction of the fate of contaminants introduced into the soil;

— the assessment of the consequences resulting from changes in the use of the soil;

— setting up monitoring programmes for specific purposes (observation of changes of soil properties in time);

— the development of spatial data bases (used in the context of GIS) aimed at facilitating the geographical representation of these;

— many other uses.

Therefore, this International Standard is based on aspects of the traditional approach to soil description [for example, the Guidelines for soil description FAO ROME (2006)]. The descriptions of soils and sites alone are not sufficient. Field and laboratory measurements, whether physical, chemical or biological, must accompany this description. Care must be taken in the specification of sites and in the methods of sampling and the number of samples. It is therefore imperative that this International Standard be considered in the context of other International Standards developed within the framework of ISO/TC 190, *Soil quality*.

Soil quality — Field soil description

1 Scope

This International Standard is a guide for describing the soil and its environmental context at a given site. Sites can be natural, near-natural, urban or industrial. It is important to realize that a number of soil samples can be taken at a site to support the soil description. The information provided by the descriptions in this International Standard provides the context for the presentation of results from analyses undertaken on soil samples.

NOTE 1 It might not be possible or necessary to record data under all the headings listed in these descriptions.

NOTE 2 Overall guidance for presentation of information from soil surveys is given in ISO 15903.

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 3166-1:2006, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 3166-2:2007, *Codes for the representation of names of countries and their subdivisions — Part 2: Country subdivision code*

ISO 14688-2:2004, *Geotechnical investigation and testing —Identification and classification of soil — Part 2: Principles for a classification*

3 General references

3.1 Site/profile numbers

— Profile number

— Survey number or code

3.2 Location

— Country

Country codes according to ISO 3166-1 and ISO 3166-2 shall be used. For historical research, designations according to ISO 3166-3 should be considered, when necessary.

— Administrative division

To be adapted according to the country: (provinces, states, regions, departments, towns, etc.), both uncoded and coded.

3.3 Geographical coordinates

— Type of geographical reference system (degrees, Lambert, national reference grid)

— Position within the geographical reference system (longitude in deg/min/s, latitude in deg/min/s)

— Altitude (in metres)

3.4 Date of observation

— Year

— Month

— Day

— Time

3.5 Author and organization

— Author's name

— Accreditation

— Name of organization

— Department

— Address

— Telephone

— Fax number

— E-mail address

4 Profile environment

4.1 Previous precipitation

0 No precipitation within the last month

1 No precipitation within the last week

2 No precipitation within the last three days

3 Rainy but no intense precipitation within the last three days

4 Moderate rain for several days or intense rainfall the day before the observation

5 Extreme precipitation or snow melt or inundation just before the observation

6 Not recorded

4.2 Land use at plot level (checked by detailed field survey)

01 Buildings and industrial infrastructures

02 Mining site (current or past)

03 Metal processing sites

04 Chemical processing sites

05 Oil and gas production sites

06 Metal manufacturing sites

07 Food processing sites

08 Waste disposal sites

09 Cultivated lands

10 Horticulture

11 Grazing

12 Orchards, fruit plantations or grapevines

13 Forest, woodlands

14 Mixed land use (agroforestry or agropastoral)

15 Gathering/hunting-fishing (exploitation of natural vegetation, hunting or fishing)

16 Nature protection (for example, nature reserve, protected area, erosion control by terracing)

17 Wetland (for example, marsh, swamp, mangrove, etc.)

18 Snow or ice cover

19 Bare rock or rocky surface

20 Natural lands

21 Natural grasslands

22 Recreation land

23 Other type of unutilized and unmanaged site

4.3 Type of cultivation or vegetation or human utilization (at the plot level)

Be as clear and precise as possible. For cultivated plants, it may be interesting to note the variety, when known.

EXAMPLE Grazing (natural meadow, planted grassland); metal processing (ferrous, non-ferrous); mining site (iron, deep coal, open-cast coal); cultivated lands (maize, oats, rice); horticulture (flowers, vegetables).

4.4 Geomorphology of the site

— The position of the site in the landscape

— The geomorphology of the immediate surroundings of the site (scale: 0,1 km)

4.5 Slope length (in metres)

When flat, note 0 (zero).

4.6 Slope value

The average slope value is measured in the vicinity of the soil pit (flat = 0).

Slope may be expressed in percent or degrees:

— slope value, in percent;

— slope value, in degrees.

4.7 Orientation (aspect) of the slope

The orientation of the slope can be expressed in the following ways:

a) N-S-E-W

NE-SE-NW-SW

with VV = variable and AA = flat; or

b) use degrees with the following convention:

0° = north

90° = east

180° = south

270° = west

with VV = variable and AA = flat.

4.8 Nature of the parent material

4.8.1 Modified or artificial material

The nature of the parent material may be modified by the use of the site, or artificial materials may be imported to a site. The knowledge of the history of the site may provide information about the modifications of the natural material.

4.8.2 Natural material

The natural parent material and/or bedrock should be described as completely as possible, according to local knowledge. For example, glacial tills, marine alluvium, metamorphic bedrock, hard limestone, loessic deposit, etc.

4.9 Presence and depth of water table

4.9.1 General

The depth of the water table generally fluctuates during the year, sometimes in relation with the seasons or the tide.

In 4.9.2, note the depth of the water table during the description of the site.

Subclauses 4.9.3 and 4.9.4 are included to describe the variations in water-table depth, when there are some variations in depth and when these variations are known (piezometers, investigations, or as marks on the walls of the profile).

In 4.9.3, the minimum depth of the water table shall be noted (water table at its highest point).

In 4.9.4, the maximum depth of the water table shall be noted (water table at its lowest point).

When the person writing the description does not know these variations in depth, record “unknown” in 4.9.3 and 4.9.4.

When there is no variation in the water-table depth, or when the describer does not know if there are depth variations, do not answer the points in 4.9.3 and 4.9.4.

4.9.2 Depth

The depth can be

a) observed or measured,

b) estimated, or

c) not observed.

If it is estimated, observed or measured, the depth is expressed in centimetres.

4.9.3 Minimum depth of water table

The minimum depth of the water table can be

a) observed or measured,

b) estimated, or

c) not observed.

If it is estimated, observed or measured, the depth is expressed in centimetres.

4.9.4 Maximum depth of water table

The maximum depth of the water table can be

a) observed or measured,

b) estimated,

c) not observed.

If it is estimated, observed or measured, the depth is expressed in centimetres.

4.9.5 Nature of the water

Make a general estimation, without reference to threshold value of soluble salts or of conductivity, or analytical values for pollution or contamination, as follows:

— S = saline;

— B = brackish;

— F = fresh;

— P = polluted or contaminated.

Combinations SP, BP or FP are possible.

5 Surface appearance

5.1 Percentage of land surface occupied by rock outcrops or surface exposures of "non-natural" material (e.g. on an industrial site)

The following categories are widely used in soil description. (Compare the charts shown in Annex A.):

0 None: 0 %

1 Very few: > 0 % and ⩽ 2 %

2 Few: > 2 % and ⩽ 5 %

3 Common: > 5 % and ⩽ 15 %

4 Many: > 15 % and ⩽ 40 %

5 Abundant: > 40 % and ⩽ 80 %

6 Dominant: > 80 %

7 Not observed

5.2 Evidence of erosion

The classes given below are based upon aspects of soil conditions reflecting present erosion (or accumulation) and not past or possible future erosion (or accumulation).

0 No visible evidence of erosion

1 Visible evidence of soil loss

1 Sheet erosion

2 Rill erosion

3 Gully erosion

4 Wind erosion

5 Landslides

2 Visible evidence of accumulation

1 Deposition by water

2 Wind deposition

6 General designation – Soil type

6.1 General

In describing soils in their environment, it is normal to allocate the soil to a reference base in an established soil classification. These allocations are normally based on the expression of pedogenetic processes in the soil profile. There are many classifications with national origins, but the use of the international soil classification system, the World Reference Base (WRB), is suggested.

Pedogenetic processes result in the formation of different layers in the soil, generally more or less parallel to the topographic surface, which are called “horizons”. In the framework of soils deeply modified by human activity, artificial layers may be due to different kinds of deposits (concrete, bricks, etc.). These kinds of layers are simply called “layers”. Artificial soils and soils in industrial and urban landscapes are not readily classified in most established soil classification systems, including WRB. In these conditions, the layers are described from the surface of the soil as described in Clause 7.

6.2 Type of soil classification used

Record which soil classification or which system is used.

Basically, the WRB classification system is recommended.

6.3 Soil type with reference to the soil classification used

EXAMPLE Albic luvisol.

Annex B gives a list of reference soils according to the World Reference Base for Soil Resources, 2006.

NOTE The World Reference Base for soil resources is available on the Internet.

6.4 Type of horizon designation used

Note which type of horizon designation is used, for example FAO (2006) or other national system.

As an example, the FAO system of horizon designation (2006) is given in Annex C, and can be used as a reference if there is no local or regional system of horizon designation.

6.5 Sequence of horizons

Note the succession of horizons described in the profile.

EXAMPLE A/E/B/C (see Annex C).