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**Soil quality — Vocabulary**

**Qualité du sol — Vocabulaire**

**Bodenbeschaffenheit — Wörterbuch**  
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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.

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](http://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](http://www.iso.org/patents)).

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 190, *Soil quality*, Subcommittee SC 1, *Evaluation of criteria, terminology and codification*.

This second edition cancels and replaces the first edition (ISO 11074:2005), which has been technically revised.

# Soil quality — Vocabulary

## 1 Scope

This International Standard defines a list of terms used in the preparation of the standards in the field of soil quality.

The terms are classified under the following main headings:

- general terms (terms relating to soil, soil materials, land, and sites);
- description of soil (soil characteristics, soil water, properties of soils and substances, processes in soil, contamination, pollution, background content);
- sampling (general terms, sample types/sampling type, sampling stages, execution of sampling, quality control samples, sample pretreatment);
- terms relating to the assessment of soils (quality, assessment of soil and sites with respect to risk, hazard and exposure, soil protection);
- remediation (general terms, principal remediation types, engineering-based methods, process-based treatment methods);
- soil ecotoxicology.

NOTE See also the ISO online browsing platform (OBP): [www.iso.org/obp/ui/](http://www.iso.org/obp/ui/)

## 2 General terms and definitions

### 2.1 Terms and definitions relating to soil

#### 2.1.1

##### **aerobic**

descriptive of a condition with molecular oxygen available

#### 2.1.2

##### **anaerobic**

descriptive of a condition with no molecular oxygen available

#### 2.1.3

##### **available water capacity**

soil water content usable by plants based on the effective root penetration depth

Note 1 to entry: The usable field capacity in the effective root zone is expressed in mm water column.

Note 2 to entry: The available water capacity (AWC) is generally taken to be the water content between field capacity (FC) and the permanent wilting point (PWP) or 10 kilopascals to 1 500 kilopascals. See readily available water capacity.

#### 2.1.4

##### **dissolved organic carbon**

##### **DOC**

concentration of organic carbon remaining in solution after filtration and/or centrifugation under defined conditions

Note 1 to entry: It is expressed in mg/l, g/m<sup>3</sup>.

**2.1.5**

**field capacity**

maximum water content expressed in percent (w/w or v/v) that an unsaturated soil can retain against gravity under undisturbed soil conditions (conventionally stated as water content two days to three days after full saturation with water)

Note 1 to entry: Conventionally stated as water content 48 h after saturation under conditions of free drainage.

**2.1.6**

**humus**

total of all dead plant and animal substances and their organic transformation products, as well as organic material inserted through anthropogenic activities appearing in and on mineral soil

Note 1 to entry: Living plants and soil organisms, as well as coal, are not counted among humus but are often methodically not separatable.

**2.1.7**

**organic carbon**

summarizing parameter including all of the carbon forms for dissolved (DOC: dissolved organic carbon – see [2.1.4](#)) and total organic compounds (TOC: total organic carbon- see [2.1.22](#))

Note 1 to entry: Organic carbon is not synonymous with organic matter content (see [2.1.8](#)).

**2.1.8**

**organic matter**

matter consisting of plant and/or animal organic materials, and the conversion products of those materials

EXAMPLE Humus.

**2.1.9**

**parent material**

unweathered inorganic solid or unconsolidated rock from which soil developed or originated

Note 1 to entry: It can include material from alluvial, colluvial, and aeolian origins.

**2.1.10**

**perched groundwater**

groundwater above a non-saturated zone

**2.1.11**

**soil**

upper layer of the Earth's crust transformed by weathering and physical/chemical and biological processes and composed of mineral particles, organic matter, water, air, and living organisms organized in generic soil horizons

Note 1 to entry: In a broader civil engineering sense, soil includes topsoil and sub-soil; deposits such as clays, silts, sands, gravels, cobbles, boulders, and organic matter and deposits such as peat; materials of human origin such as wastes; ground gas and moisture; and living organisms.

**2.1.12**

**soil characterization**

determination of relevant physical, chemical, and biological properties of the soil

**2.1.13**

**soil gas**

gas and vapour in the pore spaces of soils

**2.1.14**

**soil pores**

part of the soil volume, between the solid particles of the soil

**2.1.15****soil quality**

all current positive or negative properties with regards to soil utilization and soil functions

**2.1.16****soil reaction**

characterizing property of the acid base state of soils, which is determined through hydrogen ion concentration of a soil extraction performed under defined conditions

Note 1 to entry: The pH value is stated as negative 10-logarithm of the concentration of hydrogen ions and expressed in moles/l in aqueous solution.

**2.1.17****soil structure**

arrangement of particles and organic matter to form aggregates which produce macro structures and micro structures in the soil

**2.1.18****soil texture**

relative proportions of the various particle size fractions (i.e. sand, silt, clay) in a soil, according to a soil classification system

**2.1.19****standard soil**

field-collected soil or manufactured soil whose main properties (e.g. pH, texture, organic matter content) are within a known range

EXAMPLE Euro-soils, artificial soil, LUFA standard soil.

Note 1 to entry: The properties of standards soils might differ from the test soil.

**2.1.20****subsoil**

natural soil material below the topsoil and overlying the parent material

Note 1 to entry: All or much of the original rock structure has usually been obliterated by pedogenic processes.

**2.1.21****topsoil**

upper part of a natural soil that is generally dark coloured and has a higher content of organic matter and nutrients when compared to the (mineral) horizons below, excluding the humus layer

Note 1 to entry: For arable land, topsoil refers to the ploughed soil depth, while for grassland; it is the soil layer with high root content.

**2.1.22****total organic carbon****TOC**

all carbon present in organic matter

**2.1.23****wilting point**

water content of the soil below which the plants are not able to uptake water with their root system

Note 1 to entry: Permanent wilting point (PWP) is the moisture content below which a sunflower seedling cannot recover from wilt. It is generally taken to equal a suction of 1 500 kilopascals.

## 2.2 Terms and definitions relating to soil materials

### 2.2.1

#### **construction works**

applications where soil materials are not required to have a direct productive use although they can support other layers intended to have a productive use

[SOURCE: for example, earthworks (e.g. embankments), landscape engineering, road construction, construction of waste disposal sites, and back filling of excavated sites or mines]

### 2.2.2

#### **damaged land**

#### **degraded land**

land which, due to natural processes or human activity, is no longer able to properly sustain an economic function and/or the natural or near natural ecological function

### 2.2.3

#### **degraded soil**

soil whose natural properties and soil functions or productivity have been damaged by contamination or physical or other processes

### 2.2.4

#### **dredged material**

material excavated during e.g. maintenance, construction, reconstruction, and extension measures from waters

Note 1 to entry: Dredged material might consist of

- sediments or subhydric soils, and
- soils and their parent material beneath the surface water body.

### 2.2.5

#### **earthwork**

reuse of soil material for civil engineering and construction purposes

Note 1 to entry: The same word can also refer to the material accumulated during an operation of earthwork.

### 2.2.6

#### **excavated soil**

soil material extracted from the ground

EXAMPLE Topsoil, subsoil, altered parent rock, typically arising during construction works.

### 2.2.7

#### **fill material**

#### **made ground**

mixed natural soil materials (often displaced) and can contain wastes such as building rubble, timber, and other wastes coming from urban and industrial sites

### 2.2.8

#### **harm**

measurable adverse effect on a receptor

### 2.2.9

#### **manufactured soil**

manufactured product intended to perform specified soil functions produced by blending combinations of natural, waste, or other soil materials with the addition of nutrients or other additives, when necessary

### 2.2.10

#### **natural soil material**

material coming from soil that has been displaced



**2.2.11  
reclamation  
rehabilitation**

return of damaged, degraded, or derelict land to a beneficial use

Note 1 to entry: The term remediation is commonly reserved for the process of dealing with contaminated/polluted sites.

**2.2.12  
reuse of soil material**

useful and harmless utilization of soil materials

Note 1 to entry: Reuse can mean the transfer of soil materials to another location for use in agriculture, horticulture, forestry, gardens, recreational areas, and construction sites.

**2.2.13  
sediment**

solid material, both mineral and organic, that is in suspension or has been moved from its site of origin by water or other processes

**2.2.14  
stockpile**

temporary deposit of soil material

Note 1 to entry: Stockpiles can contain soil material.

Note 2 to entry: The soil material can be stored in a loosely dumped heap or can be lying in a predefined deposit above or below the surface of the location, etc.

**2.2.15  
subhydric soils**

soils formed below water or which are formed on parent material that was deposited in water or through alluvial processes

**2.2.16  
treated soil**

soil subject to a based *ex situ* or *in situ* process

**2.2.17  
treated soil material**

material coming from treated soil and displaced and/or modified by human activity

**2.3 Terms and definitions relating to land and sites**

**2.3.1  
abandoned hazardous site**

hazardous site left by the owner or other responsible party in unmanaged condition

**2.3.2  
abandoned industrial site**

industrial site left by the owner or other responsible party in unmanaged condition

**2.3.3  
abandoned potentially hazardous site**

abandoned site whose history leads to a suspicion that it can be hazardous

**2.3.4  
abandoned waste disposal site**

waste disposal site left by the owner or other responsible party in unmanaged condition

**2.3.5**

**contaminated site**

site where *contamination* (2.3.6) is present

Note 1 to entry: There is no assumption in this definition that harms results from the presence of contamination.

**2.3.6**

**contamination**

substance(s) or agent(s) present in the soil as a result of human activity

[SOURCE: ISO 23611-6:2012, 3.2.4]

**2.3.7**

**derelict site**

site so damaged by human activity as to be incapable of beneficial use without treatment

Note 1 to entry: Damage can be to the aesthetic, physical, engineering, environmental, or contamination aspects of the site.

**2.3.8**

**donor site**

site from which soil material is removed for use on a target site

**2.3.9**

**hazardous site**

site which, by reason of the substances or agents present, is judged to be hazardous to human health and safety or to the environment

**2.3.10**

**orphan site**

site for which no owner or other responsible party for pollution can be identified

**2.3.11**

**site**

defined area

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**2.3.12**

**site characterization**

collection of data connected to a site providing appropriate information for the assessment in question

Note 1 to entry: In connection with risk assessment, specifically the source identification and characterization element of the exposure assessment.

**2.3.13**

**suspect site**

site whose history or any other information leads to a suspicion that it can be hazardous for human health or environment

**2.3.14**

**target site**

site at which soil is to be reused

**2.3.15**

**uniformly contaminated site**

site with a generally uniform concentration of a hazardous substance

Note 1 to entry: The extent of the contamination is usually large and the gradient of concentration within the site is rather shallow.

### 3 Description of soil

#### 3.1 Soil characteristics

##### 3.1.1

##### **bulk density**

ratio of the mass of a quantity of material (or one phase) and the total volume occupied by this material (including other phases)

Note 1 to entry: This is typically a volumetric mass but it is commonly named as “density”. The numerical values are identical or divided by the volumetric mass of water ( $1 \text{ t.m}^{-3}$ ) at  $4 \text{ }^\circ\text{C}$ .

##### 3.1.2

##### **bulk volume**

volume, including the solids and pores, of an arbitrary soil mass

##### 3.1.3

##### **clay content**

proportion of soil particles with a particle size  $<2 \text{ }\mu\text{m}$

##### 3.1.4

##### **concentration**

mass of test substance per unit mass of material

Note 1 to entry: Concentration is expressed as a mass fraction, in milligrams per kilogram (mg/kg) of dry soil.

##### 3.1.5

##### **maximum particle size**

$D_{95}$

particle size such as 5 % of the mass of the material correspond to particles having larger size

##### 3.1.6

##### **particle size distribution**

distribution of the soil mineral particles according to predefined classes of size

##### 3.1.7

##### **porosity**

volume of pores in a soil sample (non-solid volume) divided by the bulk volume of the sample

##### 3.1.8

##### **specific surface area**

the surface area of the soil or a size fraction of the soil particles

Note 1 to entry: Surface area can be measured by a variety of means that might give differing results such as

- 1) ratio of surface area to mass of solid particles, and
- 2) ratio of surface area to volume of solid particles.

Note 2 to entry: Because both definitions are in use, this term is to always be defined explicitly wherever it is used.

##### 3.1.9

##### **water content**

$W_w$

<gravimetric water content> mass of water evaporating from the soil when dried to a constant mass at  $105 \text{ }^\circ\text{C}$ , expressed as the mass of water divided by the original dry mass of the soil sample

##### 3.1.10

##### **water content**

$W_v$

<volumetric water content> volume of water evaporating from the soil when dried to constant mass at  $105 \text{ }^\circ\text{C}$ , referred to the volume of the original undisturbed sample

### 3.1.11

#### **water content on a dry mass basis**

mass of water evaporating from the soil when dried to a constant mass at 105 °C, divided by the dry mass of the soil and multiplied by 100

[SOURCE: ISO 11465:1993, 3.2]

## 3.2 Terms and definitions relating to soil water

### 3.2.1

#### **bedrock**

*in situ* naturally consolidated rock either underlying drift deposits such as glacial till or exposed by past or current erosion processes

[SOURCE: EN 16039]

### 3.2.2

#### **capillary water**

water held on soil particles due to unbalanced inter-molecular attraction at the liquid boundary

EXAMPLE The rise or depression of liquids in narrow tubes, the formation of films, drops, bubbles, etc.

### 3.2.3

#### **groundwater**

water which is being held in and can be recovered from an underground formation, except capillary water

Note 1 to entry: Groundwater is usually taken to include any water, beneath the surface of the land or beneath the bed of any stream, lake, reservoir, or other body of surface water, whatever the geological formation or structure in which such water occurs; but water within the beds of streams, etc. is often excluded.

### 3.2.4

#### **groundwater surface**

#### **water table**

upper boundary surface of the groundwater

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[SOURCE: ISO 22475-1]

### 3.2.5

#### **percolating water**

infiltrating water that moves downward in the pore space due to gravity

### 3.2.6

#### **saturated zone**

zone of the ground in which the pore space is filled completely with liquid at the time of consideration

### 3.2.7

#### **soil water**

all water of the unsaturated and saturated zone

### 3.2.8

#### **unsaturated zone**

zone of the soil in which the pore space is not filled completely with liquid at the time of consideration

### 3.2.9

#### **vadose zone**

zone of the soil which is connected to the atmosphere and which is aerated either permanently or regularly

### 3.3 Terms and definitions relating to processes in soils

#### 3.3.1

##### **abiotic decomposition**

decomposition by physical and/or chemical processes (e.g. photolysis, hydrolysis, oxidation, and reduction)

#### 3.3.2

##### **abiotic degradation**

degradation by physical and/or chemical processes

#### 3.3.3

##### **accumulation**

increase of the concentration of a substance in soil due to the fact that the substance input is larger than the substance output

Note 1 to entry: Substance output includes material which is broken down.

#### 3.3.4

##### **aggressive soil conditions**

soil conditions potentially damaging to buildings and construction materials

#### 3.3.5

##### **bioconcentration factor**

##### **BCF**

ratio of the concentration of a substance in an organism to that in the soil

#### 3.3.6

##### **biodegradation**

physical and chemical breakdown of a substance by living organisms, mainly bacteria, and/or fungi

#### 3.3.7

##### **decomposition**

breakdown of complex organic substances into simpler molecules or ions by physical, chemical, and/or biological processes

#### 3.3.8

##### **degradation**

physical and chemical breakdown of the substances

#### 3.3.9

##### **diffuse source input**

input of a substance emitted from moving sources, from sources with a large area, or from many sources

Note 1 to entry: The sources can be cars, application of substances through agricultural practices, emissions from town or region, deposition of sediment through flooding of a river.

Note 2 to entry: Diffuse source input usually leads to sites that are relatively uniformly contaminated. At some sites, the input conditions can nevertheless cause a higher local input near the source or where atmospheric deposition/rain is increased.

#### 3.3.10

##### **filter characteristics**

ability of a soil to retain or bind solid, dissolved, or gaseous substances

#### 3.3.11

##### **habitat function**

ability of soil/soil materials to serve as a habitat for micro-organisms, plants, soil living animals, and their interactions (biocenosis)

**3.3.12**

**Henry's coefficient**

partition coefficient between soil air and soil water

**3.3.13**

**humification**

decomposition of organic material followed by a synthesis of humic substances

**3.3.14**

**immobilization**

conversion of substances or soil particles into a (temporarily) immobile form

Note 1 to entry: See *accumulation* (3.3.3).

**3.3.15**

**leaching**

dissolution and movement of dissolved substances by water

**3.3.16**

**leaching potential**

potential for substances present in the soil/soil material to be moved due to the movement of water

**3.3.17**

**lessivage**

translocation of solid particles within the soil profile

Note 1 to entry: Lessivage is the combination of eluviation (process of material being leached from the upper part of the soil profile) and illuviation (accumulation of that material lower in the soil profile).

**3.3.18**

**limiting factor**

any condition that limits soil functions and/or the utilization of a soil

**3.3.19**

**mineralization**

final stage of the biodegradation of organic matter or organic substances into carbon dioxide, water and the hydrides, oxides or other mineral salts

**3.3.20**

**mobilization**

conversion of substances or soil particles into a mobile form

**3.3.21**

**non-point source input**

any source other than a point source

Note 1 to entry: See *diffuse sourceinput* (3.3.9).

**3.3.22**

**partition coefficient**

ratio between the concentrations of a substance in two different media and e.g. environmental compartments

**3.3.23**

**partition coefficient between soil and plant**

ratio between the concentration of a substance in the soil and in plant material

**3.3.24****partition coefficient between soil organic matter and soil water**

ratio of the concentration of a substance in the soil organic matter fraction to that in the soil-water phase

Note 1 to entry: This partition coefficient is often expressed in relation to the soil organic carbon content (hence: *K<sub>oc</sub>*).

**3.3.25****persistence**

resistance of a substance to chemical changes

Note 1 to entry: Persistence is always related to environmental conditions. Thus, a substance can be persistent in one soil, but not in another.

Note 2 to entry: Persistence can be expressed as the half-life of a substance under clearly defined environmental conditions.

**3.3.26****phytoavailability**

availability of a chemical species present in the soil for plants

Note 1 to entry: It is estimated by partial chemical extraction, also called “selective”.

**3.3.27****point source input**

input of a substance from a stationary discrete source of definite size

Note 1 to entry: The sources can be stack emissions, accidental spills, waste dumps, spills on industrial sites, major leaks from sewers and other pipelines.

Note 2 to entry: Point source input can cause both locally contaminated sites and relatively uniformly contaminated sites.

**3.3.28****primary degradation**

degradation or alteration of the molecular structure of a substance to an extent sufficient to remove some characteristic property

[SOURCE: ISO 6107-6:1986, modified]

**3.3.29****receptor**

defined entity that is vulnerable to the adverse effect(s) of a hazardous substance or agent

EXAMPLE Human, animal, water, vegetation, building services, etc.

**3.3.30****retention function**

ability of soils/soil materials to absorb pollutants in such a way that they cannot be mobilised through the water pathway and translocated into the terrestrial food chain

**3.3.31****soil functions**

description of the significance of soils to man and the environment

EXAMPLE Control of substance and energy cycles as compartment of ecosystems, basis for the life of plants, animals, and man, basis for the stability of buildings and roads, basis for the yield of agriculture, horticulture, and forestry, carrier of genetic reservoir, document of natural history, archaeological and paleoecological document.

**3.3.32****soil processes**

physical or reactive geochemical and biological processes, which can attenuate, concentrate, immobilise, liberate, degrade, or otherwise transform substances in soil