



BSI Standards Publication

Soil quality — Vocabulary

National foreword

This British Standard is the UK implementation of EN ISO 11074:2015+A1:2020. It is identical to ISO 11074:2015, including amendment 1:2020. It supersedes BS ISO 11074:2005, which is withdrawn.

ISO amendment A1:2020 is included in its entirety at the end of this document.

BSI, as a member of CEN, is obliged to publish EN ISO 11074:2015+A1:2020 as a British Standard. However, attention is drawn to the existence of potential numbering issues in the amendment which would cause the following conflicts in the standard:

- 3.6.10 through 3.6.14: the amendment instruction to 'add the following new terms definitions' causes conflicts with the existing numbering.

- 4.2.15 through 4.2.24: the amendment instruction to 'Replace definitions 4.2.15 and 4.2.16 with the following considering the new numbering' causes conflicts with the existing numbering.

These issues were raised with ISO and have been logged as comments to be addressed in the upcoming revision of the standard.

The UK participation in its preparation was entrusted to Technical Committee EH/4, Soil quality.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments/corrigenda issued since publication

Date	Text affected
30 September 2020	Inclusion of ISO amendment 1:2020 in its entirety

English Version

Soil quality - Vocabulary - Amendment 1 (ISO
11074:2015/Amd 1:2020)

Qualité du sol - Vocabulaire - Amendement 1 (ISO
11074:2015/Amd 1:2020)

Bodenbeschaffenheit - Wörterbuch - Änderung 1 (ISO
11074:2015/Amd 1:2020)

This amendment A1 modifies the European Standard EN ISO 11074:2015; it was approved by CEN on 5 January 2020.

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European foreword

This document (EN ISO 11074:2015/A1:2020) has been prepared by Technical Committee ISO/TC 190 "Soil quality" in collaboration with Technical Committee CEN/TC 345 "Characterization of soils" the secretariat of which is held by NEN.

This Amendment to the European Standard EN ISO 11074:2015 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2020, and conflicting national standards shall be withdrawn at the latest by August 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 11074:2015/Amd 1:2020 has been approved by CEN as EN ISO 11074:2015/A1:2020 without any modification.

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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).

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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/

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/m³.

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 separable.

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

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 t.m^{-3}) at 4°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 $<2 \mu\text{m}$

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°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°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

[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_{oc}*).

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

3.3.33

soil-water partition coefficient

K_d

ratio of the concentration of a substance in the soil solid phase to that in the soil-water phase

3.3.34

sorption

reversible binding of a substance by soil constituents

Note 1 to entry: Mechanisms of sorption include, for example, ion exchange, surface absorption, and dissolution of organic chemicals in the soil organic matter.

3.3.35

source

place from which a substance or agent is released giving rise to potential exposure of one or more receptor

3.3.36

substance input

movement of a substance from another environmental compartment into a soil

3.3.37

substance output

movement of a substance from the soil into another environmental compartment

3.3.38

translocation

movement of substances within or on the surface of the soil caused by water, air, and human activities or soil organisms

3.3.39

ultimate biodegradation

biodegradation leading to complete mineralization

[SOURCE: ISO 6107-6:1986]

3.4 Terms and definitions relating to contamination

3.4.1

aliphatic hydrocarbon

acyclic or cyclic, saturated or unsaturated carbon compound, excluding aromatic compounds

[SOURCE: ISO 11504:2012]

3.4.2

aromatic hydrocarbon

hydrocarbon of which the molecular structure incorporates one or more planar sets of six carbon atoms that are connected by delocalized electrons, numbering the same as if they consisted of alternating single and double covalent bonds

[SOURCE: ISO 11504:2012]

3.4.3

boiling point

BP

point at which the vapour pressure of a liquid equals the external pressure acting on the surface of liquid

Note 1 to entry: It is expressed in degrees Celsius.

[SOURCE: ISO 11504:2012]

3.4.4**carcinogen**

substance that causes the development of malignant cells in animals or humans

[SOURCE: ISO 11504:2012]

3.4.5**compliance point**

location (for example, soil or groundwater) where the assessment criteria shall be measured and shall not be exceeded

[SOURCE: ISO 11504:2012]

3.4.6**contaminant**

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

Note 1 to entry: There is no assumption in this definition that harms results from the presence of the contaminant. See also *pollutant* (3.4.18).

[SOURCE: ISO 19258:2005]

3.4.7**equivalent carbon number**

empirically determined parameter related to the boiling point of a chemical normalized to the boiling point of the *n*-alkanes or its retention time in a boiling-point gas chromatographic (GC) column

[SOURCE: ISO 11504:2012]

3.4.8**extractable fraction**

amount of an element determined with a complexing agent, salt solutions, or water used to mimic different kinds of bioavailability including plant uptake or exposure routes related to the pore water concentration of a substance

3.4.9**fraction**

group of aromatic and/or aliphatic hydrocarbons with similar physic-chemical properties

Note 1 to entry: In this International Standard, group of aromatic or aliphatic compounds with leaching and volatilization factors differ by approximately one order of magnitude.

[SOURCE: ISO 11504:2012]

3.4.10**gas chromatography**

analytical method that is used to separate and determine the components of complex mixtures based on partitioning between a gas phase and a stationary phase

[SOURCE: ISO 11504:2012]

3.4.11**hydrocarbon**

compound of hydrogen and carbon which are the principal constituents of crude oil, refined petroleum products, and products derived from the carbonization of coal (at a high or low temperature)

[SOURCE: ISO 11504:2012]

3.4.12**indicator compound**

compound chosen to describe properties, primarily toxicity, of a petroleum mixture or fraction

Note 1 to entry: This method is often used to assess carcinogenic compounds.

[SOURCE: ISO 11504:2012]

3.4.13

limit test

test used in determination of acute toxicity to *Eisenia fetida*/*Eisenia andrei* in which four duplicate tests are performed on the test soil without any dilution and on the control soil

[SOURCE: ISO 11268-1]

3.4.14

NSO compounds

organic compounds that contain nitrogen, sulphur, and oxygen

EXAMPLE Asphaltenes.

Note 1 to entry: NSO compounds occur in organic matter and crude oil. NSO compounds can be separated from crude oil by polar solvents such as methanol.

[SOURCE: ISO 11504:2012]

3.4.15

partitioning

extent to which a compound of a hydrocarbon mixture separates into different media (or phases) based on its chemical and physical properties and the size and properties of the media in the specific situation

[SOURCE: ISO 11504:2012]

3.4.16

petroleum hydrocarbon

organic compound comprised of carbon and hydrogen atoms arranged in varying structural configurations which make up the principal constituents of crude oil and petroleum products

Note 1 to entry: Mineral oil is a colloquial term for petroleum hydrocarbons or petroleum products.

[SOURCE: ISO 11504:2012]

3.4.17

polycyclic aromatic hydrocarbon

PAH

compound whose molecules contain two or more simple aromatic rings fused together by sharing two neighbouring carbon atoms

EXAMPLE Naphthalene, anthracene, and phenanthrene.

[SOURCE: ISO 11504:2012]

3.4.18

pollutant

substance or agent present in the soil (or groundwater) which, due to its properties, amount or concentration, causes adverse impacts on soil functions

3.4.19

potentially harmful substance

substance which by its chemical form, concentration or presence, can be dangerous for humans or the environment

Note 1 to entry: It can be present naturally or as a result of human activity.

3.4.20**pseudo-total concentration**

<for inorganics> amount of an element determined using a strong acid or combination of acids as extractant

Note 1 to entry: Typically, a small insoluble proportion of the element under consideration is not removed from the matrix by the chosen extractants.

Note 2 to entry: Depending on the element and the soil matrix, the pseudo-total concentration is typically 70 % to 90 % of the true total concentration.

3.4.21**residual contamination**

amount or concentration of contaminants remaining in a specific medium, following remediation

3.4.22**surrogate compound**

representative compound with toxicological and/or physical properties indicative of a hydrocarbon fraction, which can therefore be used to represent the fraction in an exposure assessment

[SOURCE: ISO 11504:2012]

3.4.23**total concentration**

<for inorganics> total of an element present in all chemical forms and irrespective of its location in the soil material, including that incorporated in silicate minerals

Note 1 to entry: Determination of the total concentration requires use of an instrumental technique such as X-ray fluorescence analysis or a powerful solvent combination, such as a mixture of hydrofluoric and perchloric acid or alkaline melt. The use of this solvent mixture presents many practical and safety-related problems in the laboratory and is therefore, often avoided.

3.4.24**total concentration**

<for organics> concentration derived by applying an analytical technique that cannot distinguish between similar compounds

EXAMPLE For the phenols between monohydric, dihydric, and trihydric compounds.

Note 1 to entry: The term total can be misleading, e.g. not all phenols can be detected by the method and different methods can give different results.

3.4.25**total petroleum hydrocarbons**

method-defined parameter, depending on the analytical method used to measure it

[SOURCE: ISO 11504:2012]

3.5 Terms and definitions relating to background content**3.5.1****background concentration**

concentration of a substance characteristic of a soil type in an area or region arising from both natural sources and non-natural diffuse sources, such as atmospheric deposition

Note 1 to entry: Commonly expressed in terms of average, typical, median, a range of values, or a background value.

3.5.2**background value**

statistical characteristics of the total (natural pedo-geochemical and anthropogenic) content of substances in soil

3.5.3

critical concentration

quantitative estimate of a concentration of one or more pollutants below which, significant harmful effects on specified sensitive elements of the (soil) environment do not occur, according to existing knowledge

3.5.4

critical load

quantitative estimate of the input of one or more pollutants below which, significant harmful effects on specified sensitive elements of the (soil) environment do not occur, according to existing knowledge

3.5.5

essential trace element

element essential in low concentrations for plant or animal (including human) metabolism

Note 1 to entry: An element can be essential at low concentrations but become harmful at higher concentrations.

3.5.6

hazardous substances

substances which, because of their properties, quantities or concentrations, have an adverse effect on soil functions and soil utilization

3.5.7

natural background concentration

concentration of a substance that is derived solely from natural sources (i.e. of geogenic origin), commonly expressed in terms of average, a range of values, or a natural background value

3.5.8

natural background value

statistical characteristics of the natural pedo-geochemical content of a substance in soils

3.5.9

pedo-geochemical background value

statistical characteristics of the pedo-geochemical content

Note 1 to entry: Any estimate of pedo-geochemical background value is prone to a certain amount of error given the uncertainty associated with determining the pedo-geochemical content.

3.5.10

soil salinization

accumulation of water soluble salts in soil

3.5.11

statistical characteristic

numerical value calculated from a variate of a chosen parameter of the population

EXAMPLE Mean, median, standard deviation, or percentiles of the ordered frequency distribution.

3.5.12

trace element

element present in low concentration in soil material in respect to the most commonly observed natural background level

3.5.13**usual background value**

statistical characteristic of the usual content of a substance in soils

Note 1 to entry: The variability of the natural pedo-geochemical content and of the usual content often increases with the size of the portion of the soil mantle investigated, so it is recommended to assess the natural pedo-geochemical value and the usual value at a spatial scale similar to those which it is used for. For instance, if the natural pedo-geochemical value or the usual value is used to evaluate soil contamination at a local scale (i.e. agricultural plot, contaminated site, watershed), it is necessary to refer to natural pedo-geochemical value or usual value which has been determined at the same scale.

Note 2 to entry: As presented here, the background contents are concentrations, e.g. mass of substance for a mass unit of soil. It can be useful to determine the stocks of substances in soil, as a mass of substance for a definite volume or area of soil. To this end, the bulk density of each soil horizon (or layer) and its thickness have to be taken into account.

3.5.14**usual content**

concentration of a substance in soils resulting from both the natural pedo-geochemical content and the moderate diffuse source input into the soil

3.6 Terms and definitions relating to sampling gases**3.6.1****active soil-gas sampling**

sampling by extracting a certain volume of soil gas

3.6.2**dead volume**

volume which is present between the suction opening of the soil-gas probe and the sampling vial, including the volume of the sampling vial or the absorption tube

3.6.3**direct method****direct measuring method**

method of analysis where the soil-gas sample (aliquot) is directly introduced into a suitable equipment without first being concentrated and subjected to analysis

3.6.4**direct-reading detecting tube**

glass tube filled with reagents which, after drawing through certain gaseous compounds, show concentration-dependent chromophoric reactions and which are thus used for qualitative and semi-quantitative analyses as well

Note 1 to entry: It is important that attention be paid to cross-sensitivities.

3.6.5**gas migration**

movement of gas and vapour from the wastes within a landfill or through the ground to the adjoining strata or emission to the atmosphere

3.6.6**gas monitoring well**

standpipe suitably installed inside a borehole from which gas samples can be taken to measure soil-gas concentrations and to monitor changes in composition of soil gas or soil-gas migration

3.6.7**gas sampling**

collection of a proportion of material for testing such that the material taken is representative of the gas in the pore space of the location of sampling

3.6.8

lower explosive limit

LEL

lowest percentage (volume fraction) of a mixture of flammable gas with air which propagates an explosion in a confined space at 25 °C and atmospheric pressure

3.6.9

one-stage soil-gas sampling

sampling of soil gas directly from a soil-gas probe placed in soil, without pre-drilling

3.6.10

passive soil-gas sampling

sampling based on the absorption of soil gas on an absorbent placed in soil, without employing negative pressure

3.6.11

permanent gas

element or compound that is a gas at all ambient temperatures likely to be encountered on the surface of the earth

Note 1 to entry: Under extremely hot circumstances, some substances might become gases that would not otherwise be. These are not permanent gases.

3.6.12

soil gas monitoring installation

borehole finished with suitable material for stabilization of the borehole wall and/or for limiting the sampling area

Note 1 to entry: Depending on the type and stability of fitting, a difference is made between temporary (for single or short-term repeated soil sampling) and stationary (for long-term observations) soil-gas measuring points.

3.6.13

soil-gas probe

soil-gas sampling probe

probe, generally a tube, which is installed directly into soil (one-stage soil-gas sampling) or in a borehole (two-stage soil-gas sampling) to take soil-gas samples

Note 1 to entry: By applying a negative pressure to the upper end of the soil-gas probe (head), the soil gas at the lower end (tip) is drawn through the suction opening(s) and transferred to a gas collecting equipment and online measurement equipment (direct measuring method) or to an absorbent (concentration method), which are installed either in or at the head of the soil-gas probe or subsequently used.

3.6.14

soil-gas suction test

continuous soil gas sampling from a borehole well over a controlled period of time (mostly several hours up to days) to observe the variations over time of the gas concentrations and of the pressure distribution in the soil

3.6.15

two-stage-soil-gas sampling

sampling done firstly through installation of a borehole with the aid of a drilling instrument or by small boring and secondly, by sampling of soil gas from a soil-gas probe installed in the borehole

4 Sampling

4.1 General terms and definitions

4.1.1

actual increment size

amount of material that is present in an increment

4.1.2**actual sample size**

amount of material that is present in the sample

4.1.3**analytical sample**

portion of material, resulting from the original sample or composite sample by means of an appropriate method of sample pretreatment and having the size (volume/mass) necessary for the desired testing or analysis

4.1.4**bulk sample**

sample resulting from the planned aggregation or the combination of sample units

[SOURCE: IUPAC Compendium of Chemical Terminology, 1997]

4.1.5**characteristic**

property or attribute of a material that is measured, compared, or observed

4.1.6**heterogeneous**

having properties which vary from point to point when viewed at a scale suitable to the job at hand

Note 1 to entry: This is the opposite of homogeneous.

4.1.7**homogeneous**

having the same properties at all points when viewed at a scale suitable to the job at hand

Note 1 to entry: This is the opposite of heterogeneous.

4.1.8**increment**

individual portion of material collected by a single operation of a sampling device

[SOURCE: CEN/TR 15310-1:2006]

4.1.9**measurement uncertainty**

estimate attached to a test result which characterizes the range of values within which the true value is asserted to lie

4.1.10**minimum increment size**

minimum mass or volume of material in an increment obtained during composite sampling to ensure that it is representative of the material sampled

Note 1 to entry: The fact that every particle in the material to be sampled shall have the same probability of being part of a sample results in requirements for the size of the sampling equipment. These requirements determine the amount of material that is obtained with a single sampling operation.

4.1.11**minimum sample size**

minimum mass or volume of material in a sample for which the variability caused by the individual particles within that material has a negligible effect

Note 1 to entry: The minimum sample size is calculated based on an equation in which different factors result in an estimation of the minimum sample size. One of these factors is the variability that is accepted to be caused by the differences between individual particles. When a large amount of variability is chosen for this factor, there will no longer be a “negligible effect”, as mentioned in the definition. However, in normal circumstances, a low value is chosen, accepting only a relatively small amount of variability.

4.1.12

population

totality of items under consideration

Note 1 to entry: In the case of a random variable, the probability distribution is considered to define the population of that variable.

[SOURCE: ISO 3534-1:1993]

4.1.13

primary objective

short description of what is to be achieved by the sampling in terms of, for example, questions to be answered, characteristics to be determined, or whether spatial information or average information is required

4.1.14

project manager

individual responsible for the development of both the sampling plan and the sampling programme

4.1.15

representative sample

sample in which the characteristic(s) of interest is (are) present with a reliability appropriate for the purpose of the testing programme

[SOURCE: CEN/TR 15310-1]

4.1.16

safety

freedom from unacceptable risk of harm

Note 1 to entry: In standardization, the safety of products, processes, and services is generally considered with a view to achieving the optimum balance of a number of factors, such as human behaviour, that eliminates avoidable risks of harm to persons and goods to an acceptable degree.

[SOURCE: ISO/IEC Guide 2:1996]

4.1.17

sample

portion of soil material selected from a larger quantity of material

Note 1 to entry: The manner of selection of the sample should be described in the sampling plan.

4.1.18

sampler

sampling personnel

person or a group of persons carrying out the sampling procedures at the sampling locality

Note 1 to entry: Tools and other devices to obtain samples are sometimes also designated as “samplers”. In this case, write “sampling devices” or “sampling equipment”.

4.1.19

sample volume

volume of sample which is taken from soil

4.1.20

sampling

process of drawing or constituting a sample

Note 1 to entry: For the purpose of soil investigation, “sampling” also relates to the selection of locations for the purpose of *in situ* testing carried out in the field without removal of material.

[SOURCE: ISO 3534-1:1993]

4.1.21**sampling design**

decisions as to types of samples to be obtained, sampling locations, how samples are to be handled, etc.

4.1.22**sampling error**

part of the total error (the estimate from a sample minus the population value) associated with using only a fraction of the population and extrapolating to the whole, as distinct from analytical or test error

Note 1 to entry: It arises from a lack of homogeneity in the investigated population.

4.1.23**sampling objective**

technical description of the purpose of sampling

4.1.24**sampling plan**

predetermined procedure for implementation of the sampling strategy

4.1.25**sampling procedure**

operational requirements and/or instructions as to how sampling is to be carried out

[SOURCE: ISO 3534-1:1993, modified]

4.1.26**sampling programme**

total sampling operation, from the first step in which the purpose of sampling is defined to the last step in which the analytical results are compared with the relevant test level(s)

4.1.27**sampling strategy**

arrangement by which a sampling programme is to be conducted

Note 1 to entry: The purpose of designing a sampling programme is to provide the most efficient and economical methods of reaching valid and relevant conclusions from the investigations of a site. The design is a function of many considerations such as the aim of the investigation, the homogeneity of the soil/site under consideration, and the cost of performing the investigation.

4.1.28**sampling uncertainty**

part of the total measurement uncertainty attributable to sampling

4.1.29**secondary objective(s)**

detailed definition of technical activities required to achieve the primary objective(s) of the investigation

Note 1 to entry: The secondary objectives address items such as the population to be sampled, the components to be determined, the statistical parameter to be determined, the scale of sampling, and the desired precision and confidence.

4.1.30**segment**

<bulk materials> each of the single, large portions of material pre-existing either in space (e.g. bags, bales, drums) or accumulated during a fixed time (e.g. discharge from a conveyor belt) or formable as increments by a sampling device

Note 1 to entry: A segment can be actual or conceptual.

4.1.31**slot sample**

sample taken as a vertical slot from within a stratum or other subpart which is putatively homogeneous