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Fertilizers and soil conditioners — Vocabulary

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Contents

Page

Foreword

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The committee responsible for this document is ISO/TC 134, *Fertilizers and soil conditioners*.

This second edition cancels and replaces the first edition (ISO 8157:1984), which has been technically revised.

Fertilizers and soil conditioners — Vocabulary

1 Scope

This International Standard defines terms relating to fertilizers and soil conditioners.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 General terms

2.1.1
fertilizer
substance containing one or more recognized plant nutrient(s), which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth

2.1.2
plant nutrient
chemical element, which is essential for plant growth

2.1.3
fertilizer nutrient
plant nutrient applied in the course of fertilization

Note 1 to entry: Some countries/regions declare/express nutrients in their oxide forms (e.g. CaO) but also in their elementary forms.

2.1.3.1
primary nutrient (element)
elements nitrogen, phosphorus, and potassium only

Note 1 to entry: Macronutrient is also used. These include the following plant food: nitrogen (N), available phosphate (P_2O_5), and soluble potash (K_2O).

Note 2 to entry: The following definition is recognized by some specific countries/regions: macro nutrient is the sum of primary and secondary nutrients, such as N, P, K, and Mg, Ca, as well as S (Na, Si).

2.1.3.2
secondary nutrient (element)
elements calcium, magnesium, and sulfur

Note 1 to entry: Sodium (Na) is one of the secondary nutrients (elements) in some countries/regions.

2.1.3.3
micronutrient; trace element
element, such as boron, manganese, iron, zinc, copper, molybdenum, cobalt, and/or chlorine, which are essential, in relatively small quantities, for plant growth

Note 1 to entry: Nickel (Ni) is also called a micronutrient (element) in some countries/regions, while in Japan, nickel is classified as harmful element.

2.1.4
beneficial substance or elements
substance or element other than primary, secondary, or micronutrient that can be demonstrated by scientific research to be beneficial or may be essential to one or more species of plants, when applied exogenously

2.1.5
inorganic fertilizer
fertilizer without organic material other than those defined as additives

Note 1 to entry: Calcium cyanamide, urea and its condensation products and chelated and complex micronutrients are, by convention, recognized as inorganic fertilizers.

2.1.6
organic fertilizer
material containing carbon or one or more elements other than hydrogen and oxygen, mainly of plant and/or animal origin added either directly to the plant or to the soil, specifically, for the nutrition of plants and that may improve soil structure

2.1.7
organic nitrogenous fertilizer
material of biological origin in which the declarable nitrogen content is organically combined with carbon and which may contain other elements, but which do not have declarable phosphorus or potassium contents

2.1.8
synthetic nitrogenous fertilizer
nitrogenous fertilizer in which the nitrogen is combined with carbon by organic synthesis

2.1.9
organo-mineral fertilizer
semi-organic fertilizer
product in which declared nutrients are of both organic and inorganic origin obtained by mixing and/or chemical combination of organic and inorganic fertilizers

2.1.10
organo-mineral compound fertilizer
organic-inorganic compound fertilizer
compound fertilizer containing an amount of organic fertilizer

2.1.11
slow release fertilizer
fertilizer, of which, by hydrolysis and/or by biodegradation and/or by limited solubility, the nutrients available to plants is spread over a period of time, when compared to a “reference soluble” product, e.g. ammonium sulfate, ammonium nitrate, and urea

2.1.12
controlled-release fertilizer
fertilizer in which nutrient release is controlled, meeting the stated release rate of nutrient and the stated release time at a specified temperature

Note 1 to entry: Typical examples are coated fertilizers, such as, polymer coated fertilizer, PSCU.

2.1.13
partly slow release fertilizer
fertilizer obtained by mixing of slow released fertilizers with rapidly available fertilizers

2.1.14
partly controlled release fertilizer
fertilizer obtained by mixing of controlled released fertilizers with rapidly available fertilizers

2.1.15
coated fertilizer
fertilizer, the granules of which are covered with a thin layer of a different material (polymer, sulphur, and/or other material) in order to improve the behavior and/or modify the characteristics of the fertilizer

2.1.16
stabilized fertilizer
fertilizer product that has been amended with an additive that reduces the rate of transformation of (a) fertilizer compound(s), extending the time of nutrient availability to the plant by a variety of mechanisms relative to its un-amended form

Note 1 to entry: Usually refer to nitrogen-stabilized fertilizer.

2.1.16.1
Inhibitor
substance, usually synthetic, which delays or stops the activity of specific groups of micro-organisms or enzymes

2.1.16.2
urease inhibitor
substance that inhibits hydrolytic action on urea by the urease enzyme

Note 1 to entry: Primarily targeted to reduce ammonia volatilization.

2.1.16.3
nitrification inhibitor
substance that inhibits the biological oxidation of ammoniacal nitrogen to nitrite nitrogen, thus, slowing the formation of nitrate nitrogen

2.1.17
enhanced efficiency reference product
soluble fertilizer product (prior to treatment by chemical reaction, coating, encapsulation, addition of inhibitors, compaction, occlusion, or by other means) or the corresponding product used for comparison to substantiate enhanced efficiency claims

2.1.18
soil conditioner
material (could be inorganic or organic) added to soils to improve the physical and/or chemical properties, and/or the biological activity of soils without a declarable content of nutrients

2.1.19
synthetic soil conditioner
product made by organic synthesis added to the soil to improve the physical and/or chemical properties, and/or the biological activity of soils without a declarable content of nutrients

2.1.20
inorganic soil conditioner
soil conditioner without organic matter and a declarable content of nutrients, which improves the physical and/or chemical properties and/or the biological activity of soils

2.1.20.1
phosphogypsum
calcium sulfate, with a small amount of phosphates, obtained after extracting phosphoric acid during a specific wet phosphoric acid process

Note 1 to entry: In this process, phosphate rock powder is reacted with concentrated sulfuric acid.

2.1.21
soil improver
material added to soil in situ whose main function is to maintain or improve its physical and/or chemical and/or biological properties or the soil activity with the exception of liming materials

Note 1 to entry: The term "soil amendment" is also used in some countries/regions.

2.1.22
liming material
mineral substances and mixtures whose main function is to correct soil acidity containing either oxides, hydroxides, carbonates, or silicates of the nutrients calcium and/or magnesium

Note 1 to entry: The terms "lime" and "liming soil amendment" are also used, but "liming material" or "agricultural lime" are preferred.

2.1.23
organic soil improver
natural organic material applied principally to improve the physical properties and biological activity of soil

2.1.24
semi-organic soil improver
soil conditioner containing substances and elements of both organic and inorganic origin

2.1.25
water soluble fertilizer
fertilizer, virtual completely soluble in water and suitable for fertigation and sprinkling irrigation, etc.

2.1.25.1
water soluble nutrient
nutrient completely soluble in water

2.1.26
foliar fertilizer
fertilizer designed for application to, and nutrient uptake by, the foliage of a plant

2.1.27
chelated fertilizer
fertilizer in which one or more nutrients are bonded by chelating agents

2.1.27.1
chelated plant nutrient
product of a chemical reaction between a metal cation that is recognized as a plant nutrient and a chelating agent

2.1.27.2
chelate
molecular entity in which exists the presence of bonds (or attractive interactions) between two or more separate binding sites within the same ORGANIC ligand and a single central atom of a metal forming a five- or six-membered ring

2.1.27.3
chelating agent
organic molecule having two or more sites that donate electron pairs to a central metal cation and is large enough to form a five- or six-membered ring structure

EXAMPLE Examples include EDTA, NTA (nitrilotriacetic acid), and IDHA (iminodisuccinic acid).

2.1.27.4
coordinating complex
molecular entity in which exists the presence of bonds (or attractive interactions) between two or more components of organic molecular entities and one central metallic atom

Note 1 to entry: When this metal complex is formed because the interaction of two or more separate binding sites within the same organic ligand and a single central atom forming a five-or six-membered ring, then it becomes a chelate.

2.1.27.5
coordinating agent
sequestering agent
organic molecule having two or more sites that donate electron pairs to a central metal cation, which form a product of sufficient stability with the cation that does not undergo many of free metal typical reactions, e.g. precipitation in basic solution

2.1.28
soil fertility
ability of a soil to support and ensure plant growth

2.1.29
fertilization
any or all aspects of the use of fertilizers and soil conditioners to improve crop growth and soil fertility

Note 1 to entry: The English term "fertilization" has a more restricted meaning than the French term "fertilization" which covers all the techniques of management of fertilizers and soil conditioners.

2.1.30
application
process of administering fertilizers, liming materials, and soil improvers to a crop or soil or both

Note 1 to entry: This term embraces broadcasting, spreading/spraying, or dusting, as well as more specific placement methods including injection into the soil and the combined drilling of seed and fertilizer. It includes nutrient film techniques, foliar application, and the addition of fertilizers to irrigation water (fertigation).

2.1.31
fertigation
application of fertilizer dissolved in irrigation water

2.1.32
dose rate
dose
mass or volume of fertilizer or soil conditioner or nutrient applied per unit area of cultivated land or unit mass of growth medium

2.1.33
solubility of a fertilizer nutrient
mass or volume of a given nutrient which is extracted by a specific medium under specified conditions

Note 1 to entry: Expressed as a percentage by mass or volume of the fertilizer.

2.1.34
solubility of a fertilizer
mass of a fertilizer that will dissolve in a given volume of water at a given temperature (such as kg/m^3 at 298 K)

2.1.35
fertilizer unit
unit mass of a fertilizer nutrient (in the form of the element or an oxide), generally 1 kg

2.1.36
total primary nutrient
sum of total nitrogen, available phosphorus (P_2O_5), and water-soluble potash (K_2O) content, expressed as mass fraction in percent

2.1.37
primary nutrient formula
term used in some countries to express, by numbers, in the order of N-P_2O_5-K_2O, the respective content of these nutrients in a compound fertilizer

Note 1 to entry: In some countries/regions, the mass fraction is expressed as the percentage of either element or oxide, in the order of nitrogen: phosphorus: potassium: secondary nutrients and micro-nutrients, the respective content of these nutrients in a compound fertilizer.

Note 2 to entry: A zero may be used to indicate the absence of an element.

2.1.38
declarable content
content of an element (or an oxide) which, may be given on a label or document associated with fertilizer or soil conditioner, as applicable to regional regulations

Note 1 to entry: In some regions/countries, the term 'declarable content' can also be referred to as 'nutrient guarantee'.

2.1.39
declaration
statement of the nutrient content, or other information, according to regional regulations

2.1.40
marking
statement, symbol, logo, picture, and/or information, that is present on the label or package and identifies or implies a product and its quality, quantity, characteristic, usage, etc.

2.1.41
tolerance
permitted deviation of the measured value of a nutrient content from its declared value

Note 1 to entry: The term Investigational Allowance is also used in some countries/regions; please refer to the country/region's laws/regulations.

2.1.42
guarantee (of composition)
quantitative and/or qualitative characteristics with which a marketed product shall comply for contractual or legal requirements

2.1.43
nutrient ratio
ratio by mass of the primary nutrients in the fertilizer, expressed in the form of the element or an oxide, in the order of nitrogen: phosphorus: potassium

Note 1 to entry: The ratio may be based on nitrogen as unity or on the nutrient with the lowest proportion.

2.1.44
granular fertilizer
solid material formed into particles of a predetermined size and expressed in SGN, D_{50}, and UI, size range, or other specific methods

2.1.45
granulation
technique using processes such as agglomeration, crushing into fine particles, accretion or compaction, to make a granulate fertilizer from fine particles

2.1.46
grain size
dimension which corresponds to the smallest sieve aperture size through which a particle will pass if presented in the most favourable attitude

2.1.47
prill
granule obtained by solidification of droplets of fertilizers or by crystallization under special conditions

2.1.48
powder
solid substance in the form of very fine particles

2.1.49
powdered fertilizer
fertilizer in the form of fine particles, formed by precipitation, crystallization, or grinding of larger particles

2.1.50
liquid fertilizer
general term for fertilizers in suspension or solution and for liquefied ammonia

2.1.51
solution fertilizer
liquid fertilizer free of solid particles

2.1.52
suspension fertilizer
two-phase fertilizer in which solid particles are maintained in suspension in the aqueous phase

2.1.53
additive agent
substance added to fertilizer materials to provide bulk, prevent caking, or serve some purpose other than providing essential plant nutrients

2.1.54
filler
substance added to fertilizer materials to provide bulk other than providing essential plant nutrients

2.1.55
container
closed receptacle directly in contact with a fertilizer or soil conditioner whereby the fertilizer or soil conditioner may be transported or stored in unit quantities (for example a bag, bottle, tank, barrel)

2.1.56
packaging
<product> any product to be used for the containment, protection, handling, delivery, storage, transport, and presentation of goods, from raw material to processed goods, from the producer to user or consumer, including processor, assembler, or other intermediary

2.1.57
package
packaging (2.1.56) and its contents

2.1.58
big bag
flexible container, holding 250 kg to 1 500 kg

2.1.59
label
piece of paper or plastic, or a printed area of a package or container, marked with the necessary information to identify the product and make known its essential characteristics

2.1.60
bulk
means a fertilizer distributed in non-packaged form

2.1.61
availability
extent to which fertilizer nutrients can be taken up by plants

2.1.62
non-nutritive trace elements
elements above critical levels which are harmful to ecological systems and/or human health and regulated with different regional/national classifications, for example As, Cd, Cr(VI), Pb and Hg

Note 1 to entry: In some countries, historically also refer to heavy metal.

Note 2 to entry: In some countries, F^-, Cl^-, Br^-, I^-, NO^{2-}, SCN^- may be also referred.

2.2 Terms relating to products

NOTE Nutrition content should meet the law/regulation of each country/region.

2.2.1 Nitrogen product

2.2.1.1
aqueous ammonia
solution containing water and ammonia in any proportion

Note 1 to entry: This is usually qualified by a reference to nitrogen content.

2.2.1.2
calcium nitrate
chemically obtained product containing calcium nitrate as its essential ingredient

2.2.1.3
calcium ammonium nitrate
nitrogen fertilizer consisting of a hydrated double salt of calcium nitrate and ammonium nitrate with water of crystallization, with the chemical formula of $5Ca(NO_3)_2.NH_4NO_3.10H_2O$

Note 1 to entry: In some countries/regions, it is also called calcium nitrate.

2.2.1.4
calcium cyanamide
chemically obtained product containing calcium cyanamide as its essential ingredient

2.2.1.5
ammonium sulfate
sulfate of ammonia
chemically obtained product containing ammonium sulfate as its essential ingredient

2.2.1.6
ammonium chloride
chemically obtained product containing ammonium chloride as its essential ingredient

2.2.1.7
ammonium sulfated nitrate
chemically obtained product containing ammonium nitrate and ammonium sulfate as its essential ingredients

2.2.1.8
ammonium nitrate
chemically obtained product containing ammonium nitrate as its essential ingredient, which may contain fillers such as ground limestone, calcium sulfate, ground dolomite, magnesium sulfate, and kieserite

2.2.1.9
urea
white crystalline, or granular, solid synthesized from ammonia and carbon dioxide under high temperature and pressure by a number of processes

2.2.1.10
urea ammonium nitrate fertilizer solution
UAN
solution of urea and ammonium nitrate in water used as fertilizer

2.2.1.11
urea-ammonium mixed nitrogen fertilizer
solid straight nitrogen fertilizer containing ureic nitrogen and ammoniacal nitrogen only

2.2.1.12
sulfur coated urea
SCU
coated controlled release fertilizer consisting of urea particles coated with sulfur

Note 1 to entry: The product is usually further coated with a sealant and, if necessary, a conditioner to avoid tackiness from the sealant.

2.2.1.13
polymer
chemical compound or mixture of compounds consisting of repeating structural units created through polymerization

2.2.1.14
polymer coated urea
PCU
coated controlled release fertilizer consisting of urea particles coated with a polymer

Note 1 to entry: It is a source of controlled release nitrogen.

2.2.1.15
polymer sulfur coated urea
PSCU
coated slow release fertilizer consisting of urea particles coated with a polymer and sulfur

2.2.2 Phosphorus product

2.2.2.1
single superphosphate
product obtained by reaction of ground mineral phosphate with sulphuric acid and containing monocalcium phosphate as an essential ingredient, as well as calcium sulfate

2.2.2.2
dicalcium phosphate
product obtained by precipitation of solubilized phosphoric acid from mineral phosphates or bones and containing dicalcium phosphate dihydrate as its essential ingredient