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**Fertilizers, soil conditioners and  
beneficial substances — Classification**

*Engrais, amendements et substances bénéfiques — Classification*

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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)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 134, *Fertilizers, soil conditioners and beneficial substances*.

ISO 7851:2022

This second edition cancels and replaces the first edition (ISO 7851:1983), which has been technically revised.

7851-2022

The main changes are as follows:

- "beneficial substances" and related classifications have been added ([Clause 6](#));
- the "main classification principle" ([4.1](#)) and the "auxiliary classification principle" ([4.2](#)) have been added;
- definitions have been modified according to ISO 8157;
- [Figure A.1](#) has been modified to reflect the three changes highlighted in this list.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Fertilizers, soil conditioners and beneficial substances — Classification

## 1 Scope

This document establishes a system of classification for fertilizers, soil conditioners and beneficial substances. The system of classification is in accordance with:

- the nutrient contents of the fertilizer;
- the effect of the fertilizer;
- the type of product; and
- the acidity and alkalinity of the product as a supplement.

It is applicable to fertilizers, soil conditioners and beneficial substances. The classification scheme for fertilizers, soil conditioners and beneficial substances (in accordance with nutrient contents) is shown in [Annex A](#).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8157, *Fertilizers and soil conditioners — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8157 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Classification for fertilizers

### 4.1 Main classification principle (in accordance with nutrient contents)

#### 4.1.1 Inorganic fertilizers

##### 4.1.1.1 Overview

This subclause concerns fertilizers without organic material other than those defined as additives.

NOTE Calcium cyanamide, urea and its condensation products and chelated and complex micronutrients (elements) are, by convention, recognized as inorganic fertilizers.

#### 4.1.1.2 N, P, K fertilizers

##### 4.1.1.2.1 Straight N, P, K fertilizers

###### 4.1.1.2.1.1 Straight nitrogenous fertilizers (N)

Fertilizers which have a declarable nitrogen content (compliant with local/region regulation/laws) and which may contain other elements, but which do not have declarable phosphorus and/or potassium contents.

###### 4.1.1.2.1.2 Straight phosphatic fertilizers (P)

Fertilizers which have a declarable phosphorus content (compliant with local/region regulation/laws) and which may contain other elements, but which do not have declarable nitrogen and/or potassium contents.

###### 4.1.1.2.1.3 Straight potassic fertilizers (K)

Fertilizers which have a declarable potassium content (compliant with local/region regulation/laws) and which may contain other elements, but which do not have declarable nitrogen and/or phosphorus contents.

##### 4.1.1.2.2 N, P, K fertilizers

###### 4.1.1.2.2.1 NP binary fertilizers

Fertilizers which have declarable nitrogen and phosphorus contents and which may contain other elements, but which do not have declarable potassium contents.

###### 4.1.1.2.2.2 NK binary fertilizers

Fertilizers which have declarable nitrogen and potassium contents and which may contain other elements, but which do not have declarable phosphorus contents.

###### 4.1.1.2.2.3 PK binary fertilizers

Fertilizers which have declarable phosphorus and potassium contents and which may contain other elements, but which do not have declarable nitrogen contents.

###### 4.1.1.2.2.4 NPK ternary fertilizers

Fertilizers which have declarable nitrogen, phosphorus and potassium contents and which may contain other elements as secondary nutrients (elements) (Ca, Mg, Na, S), micronutrients (elements) (Zn, Cu, Mn, B, Fe, etc.) and organic or mineral additives with the sole function of influencing the colour and/or the structure of the fertilizer.

#### 4.1.1.3 Secondary nutrient (element) fertilizers (Ca, Mg, S fertilizers)

Fertilizers which contain one or more of the elements calcium, magnesium and sulfur and which do not have declarable nitrogen, phosphorus or potassium contents and are, therefore, not classified as straight or compound N, P, K fertilizers.

These products differ from Ca, Mg, S soil conditioners in that their principal function is the nutrition of plants.

NOTE Sodium (Na) is also considered as one of the secondary nutrients (elements) in some countries/regions.

#### 4.1.1.4 Micronutrient (element) fertilizers

Fertilizers which contain one or more of the elements, such as boron, manganese, iron, zinc, nickel, copper, molybdenum, and/or chlorine, which are essential in relatively small quantities for plant growth.

NOTE 1 Cobalt is also called a micronutrient (element) in some countries/regions, while in China, cobalt is classified as a harmful element.

NOTE 2 In Japan, Sri Lanka, China and the EU, Nickel is classified as a harmful element.

NOTE 3 In some regions, regulations allow for other nutrients/elements to be recognized.

#### 4.1.2 Organic fertilizers

##### 4.1.2.1 Overview

This subclause concerns material containing organic carbon and/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.

NOTE Calcium cyanamide, urea and its condensation products, chelated and complex micronutrients (elements) are conventionally recognized as inorganic fertilizers.

##### 4.1.2.2 Organic nitrogenous fertilizers

Material of organic origin in which the declarable nitrogen content is bonded directly to carbon and which may contain other elements, but which does not have declarable phosphorus or potassium contents.

##### 4.1.2.3 Synthetic nitrogenous fertilizers

Nitrogenous fertilizer in which the nitrogen is combined with carbon by organic synthesis.

##### 4.1.2.4 NP organic fertilizers

Organic fertilizers which have, in addition to nitrogen, a declarable content of phosphorus of vegetable and/or animal origin and which may contain other elements, but which do not have a declarable potassium content.

##### 4.1.2.5 NK organic fertilizers

Organic fertilizers which have, in addition to nitrogen, a declarable content of potassium of vegetable and/or animal origin and which may contain other elements, but which do not have a declarable phosphorus content.

##### 4.1.2.6 PK organic fertilizers

Organic fertilizers which have, in addition to phosphorus, a declarable content of potassium of vegetable and/or animal origin and which may contain other elements, but which do not have a declarable nitrogen content.

##### 4.1.2.7 NPK organic fertilizers

Organic fertilizers which have, in addition to nitrogen, a declarable content of phosphorus and potassium of vegetable and/or animal origin and which may contain other elements.

### 4.1.3 Organo-mineral fertilizers (semi-organic fertilizers)

#### 4.1.3.1 Overview

This subclause concerns products in which the declarable nutrients are of both organic and inorganic origin obtained by blending and/or complex combination of organic soil conditioners and/or organic fertilizers with inorganic fertilizers.

#### 4.1.3.2 N organo-mineral fertilizers

Products which have a declarable content of nitrogen obtained by blending and/or complex combination of organic soil conditioners and/or organic fertilizers with inorganic fertilizers, and which may contain other elements.

#### 4.1.3.3 NP organo-mineral fertilizers

Products which have a declarable content of nitrogen and phosphorus obtained by blending and/or complex combination of organic soil conditioners and/or organic fertilizers with inorganic fertilizers, and which may contain other elements.

#### 4.1.3.4 NK organo-mineral fertilizers

Products which have a declarable content of nitrogen and potassium obtained by blending and/or complex combination of organic soil conditioners and/or organic fertilizers with inorganic fertilizers, and which may contain other elements.

#### 4.1.3.5 NPK organo-mineral fertilizers

Products which have a declarable content of nitrogen, phosphorus and potassium obtained by mixing and/or chemical combination of organic soil conditioners and/or organic fertilizers with inorganic fertilizers, and which may contain other elements.

### 4.1.4 Fertilizers (mineral or organic) with added beneficial substances

Fertilizers (mineral or organic) to which some quantities of beneficial substances are added. These beneficial substances can be plant biostimulants (6.1), in the form of substance(s), beneficial nutrients (6.2) or a mixture thereof.

### 4.1.5 Fertilizing product blends

A fertilizing product blend is composed of two or more fertilizing products. The blending shall not change or modify the nature of each component and shall not have adverse effects on human, animal or plant health, or on safety or on the environment, under reasonably foreseeable conditions of storage or use of the fertilizing product blend.

## 4.2 Auxiliary classification principle

### 4.2.1 Classification by acidity or alkalinity

#### 4.2.1.1 Acidic fertilizers

Fertilizers which are chemically acidic if in an aqueous solution.

#### 4.2.1.2 Neutral fertilizers

Fertilizers which are chemically neutral if in an aqueous solution.



**4.2.1.3 Alkaline fertilizers**

Fertilizers which are chemically alkaline if in an aqueous solution.

**4.2.1.4 Physiological acidic fertilizers**

Fertilizers of which the residual leads to a reduction of medium pH after the ionic nutrients of the fertilizers are absorbed by plants.

**4.2.1.5 Physiological neutral fertilizers**

Fertilizers which remain non-residual or the residual of which leads to no change of medium pH after the ionic nutrients of the fertilizers are absorbed by plants.

**4.2.1.6 Physiological alkaline fertilizers**

Fertilizers of which the residual leads to an increase of medium pH after the ionic nutrients of the fertilizers are absorbed by plants.

**4.2.2 Classification by product types****4.2.2.1 Solid fertilizers****4.2.2.1.1 Overview**

This subclause concerns fertilizers including powdered fertilizer, granular fertilizer and other fertilizers which are solid at room temperature.

**4.2.2.1.2 Powdered fertilizers**

Fertilizer in the form of powder, formed by precipitation, crystallization, or grinding of larger particles.

**4.2.2.1.3 Granular fertilizers**

Solid fertilizer material in the form of particles of a predetermined size and expressed in SGN, D50 and UI, size range, or other specific methods.

**4.2.2.2 Liquid fertilizers****4.2.2.2.1 Overview**

This is a general term for fertilizers in suspension or solution and for liquefied ammonia.

NOTE Some products listed in this classification structure are not considered applicable in various countries/regions.

**4.2.2.2.2 Solution fertilizers**

Liquid fertilizer free of solid particles.

**4.2.2.2.3 Suspension fertilizers**

Two-phase fertilizer in which solid particles are maintained in suspension in the liquid phase.

**4.2.2.3 Gaseous fertilizers (gas fertilizers)**

Fertilizer that is gaseous at normal temperature and pressure.

### 4.2.3 Classification by fertilizer efficiency

#### 4.2.3.1 Rapidly-available-nutrient fertilizers

Fertilizers in which the nutrients are easily liberated from the fertilizer then absorbed and utilized by plants.

#### 4.2.3.2 Slow-release fertilizers

##### 4.2.3.2.1 Overview

This subclause concerns fertilizers in which, by hydrolysis and/or by biodegradation and/or by limited solubility, the nutrients available to plants are spread over a period of time when compared to a “reference soluble” product, e.g. ammonium sulfate, ammonium nitrate and urea.

##### 4.2.3.2.2 Controlled-release fertilizers

Fertilizer in which nutrient release is controlled, meeting the stated release rate of the nutrient and the stated release time at a specified temperature.

##### 4.2.3.2.3 Coated fertilizers

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 behaviour and/or modify the characteristics of the fertilizer.

##### 4.2.3.2.4 Synthetic slow-release fertilizers

Fertilizers including reaction products of urea and aldehyde(s) [such as urea formaldehyde (UF), methylene urea (MU), crotonylidene diurea (CDU), isobutylidene diurea (IBDU), triazone, etc.] and inorganic slightly soluble synthetic fertilizer (such as metal ammonium phosphate potassium salt, etc.).

##### 4.2.3.2.5 Slow-release fertilizers in matrix

Slow-release fertilizers whose particles are incorporated throughout the carrier matrix.

##### 4.2.3.2.6 Adhesive slow-release fertilizers

A type of slow-release fertilizer which is granulated by using UF binder.

#### 4.2.3.3 Stabilized fertilizers

Fertilizer product that has been amended with an additive that reduces the rate of transformation of the nutrient(s) in comparison with its un-amended form, extending the time of nutrient(s) availability to the plant by a variety of mechanisms.

NOTE Nitrogen-stabilized fertilizers are the type of stabilized fertilizer most commonly referred to.

### 4.2.4 Classification by solubility

#### 4.2.4.1 Water-soluble fertilizers

Fertilizer, completely soluble in water and suitable for fertigation and sprinkling irrigation, etc.

#### 4.2.4.2 Foliar fertilizers

Fertilizer designed for application to, and nutrient uptake by, the foliage of a plant.