ICL Fertilizers

ICL Fertilizers, provides customers with a single, convenient source of a broad selection of high-quality fertilizers for agriculture, in multiple grades and formulations – delivered economically, in a short amount of time.

Our customers rely on ICL Fertilizers as one of their main resources for phosphorus (P) and potassium (K) fertilizers. ICL Fertilizers products offer customers high-quality Polysulphate, potash, super phosphates, PK and NPK fertilizers, as well as tailor-made formulae with or without micronutrients.

Our products

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<th>Fertilizer</th>
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- Upon request

Top: ICL Fertilizers Europe, Germany site; middle left: ICL production laboratory, Spain; middle right: ICL Fertilizers Europe, The Netherlands site; bottom: ICL UK production site.
Premium plant nutrition from ICL Fertilizers

Each product in the premium FertilizerpluS range from ICL Fertilizers has extraordinary credentials.

Using strong foundations such as Polysulphate, we create multi-nutrient combinations that precisely meet crop nutritional needs over a prolonged period of time.

With a FertilizerpluS product you are assured of nutrient availability when, where and how your crops prefer it, all season long. Use our products for efficiency and effectiveness - with less nutrient wastage - in fields, orchards and plantations.

- Polysulphate
- ICL PotashpluS
- ICL PKpluS
- Novaphos
- PK+ Micronutrients

Choose from our FertilizerpluS collection to get best crop growth, yield plus quality
Main features

- Multi-nutrient fertilizer: sulphur, potassium, magnesium and calcium in sulphate form
- Natural mined mineral (polyhalite): $K_2Ca_2Mg(SO_4)\cdot 2H_2O$
- Fully soluble, with all nutrients available for plant uptake
- Versatile product; suitable for all kinds of crops and all types of soils
- Extended nutrient availability, reduced risk of sulphate losses through leaching
- Low chloride, ideal for chloride sensitive crops
- Neutral pH
- Very low salinity index
- Delivers superior yields, improved quality and increased profitability

Main uses

- For direct application in fields, orchards and plantations
- Ideal for mechanical spreading, good and uniform spreadability in the fields
- For bulk blending, compatible with all fertilizers

Formula

<table>
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<tr>
<th>K₂O</th>
<th>MgO</th>
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</table>
Main features

• Multi-nutrient fertilizer: sulphur, potassium, magnesium and calcium in sulphate form

• Natural mined mineral (polyhalite): $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$

• Fully soluble, with all nutrients available for plant uptake

• Versatile product; suitable for all kinds of crops and all types of soils

• Extended nutrient availability, reduced risk of sulphate losses through leaching

• Low chloride, ideal for chloride sensitive crops

• Neutral pH

• Very low salinity index

• Delivers superior yields, improved quality and increased profitability

• Completely natural with a low carbon footprint

• Certified for organic agriculture in several countries

Main uses

• As raw material for NPK granulation

• For direct manual application in fields, orchards and plantations

Formula

<table>
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<th>K₂O</th>
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<th>CaO</th>
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Main features

- Multi-nutrient fertilizer: sulphur, potassium, magnesium and calcium in sulphate form
- Natural mined mineral (polyhalite): $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$
- Fully soluble, with all nutrients available for plant uptake
- Versatile product; suitable for all kinds of crops and all types of soils
- Extended nutrient availability, reduced risk of sulphate losses through leaching
- Low chloride, ideal for chloride sensitive crops
- Neutral pH
- Very low salinity index
- Delivers superior yields, improved quality and increased profitability
- Completely natural with a low carbon footprint

Main uses

- For direct application in fields, greenhouses and horticulture
- Optimal solution for manual and mechanical spreading
- Suitable for mixing with other similar sized fertilizers
- Ideal for application in seedbeds, in greenhouses or in planting lines

Formula

<table>
<thead>
<tr>
<th>K$_2$O</th>
<th>MgO</th>
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</table>
Polysulphate Premium

Main features

- Multi-nutrient fertilizer: sulphur, potassium, magnesium and calcium in sulphate form
- Natural mined mineral (polyhalite): $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$
- Fully soluble, with all nutrients available for plant uptake
- Versatile product; suitable for all kinds of crops and all types of soils
- Extended nutrient availability, reduced risk of sulphate losses through leaching
- Low chloride, ideal for chloride sensitive crops, neutral pH, Very low salinity index
- Delivers superior yields, improved quality and increased profitability
- Uniform, robust spheres of natural, multi-nutrient fertilizer
- Smooth surface protects from abrasion, humidity or damage
- Spherical shape gives consistent flow rate
- Consistent broad spread during application
- Easily blended, attractive appearance in blends with other granulated fertilizer ingredients

Main uses

- For direct application in fields, orchards and plantations
- Ideal for mechanical spreading, good and uniform spreadability in the fields
- For bulk blending, compatible with all fertilizers

Formula

<table>
<thead>
<tr>
<th>K$_2$O</th>
<th>MgO</th>
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Mined in the UK, ICL is the first – and only – producer in the world to mine polyhalite, marketed as Polysulphate.
Granular ICL PotashpluS

Main features

• Granular premium potassium fertilizer, specially formulated using a combination of potash (MOP - KCl) and Polysulphate

• Multi-nutrient fertilizer: provides crops with vital potassium along with sulphur, magnesium and calcium in one application

• There is no need to choose between using chloride or sulphate with your potash. 20% of the potassium is in sulphate form, which reduces by 50% the chloride input (as compared with MOP)

• Fully soluble, with all nutrients available for plant uptake

• Versatile product; suitable for all types of soils and all kinds of crops, including high demanding potassium and sulphur crops

• Extended nutrient availability, reduced risk of sulphate losses through leaching

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantations

• Ideal for mechanical spreading, good and uniform spreadability in the fields

• For bulk blending, compatible with all fertilizers

Formula

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Mined in the UK, ICL is the first – and only – producer in the world to mine polyhalite, marketed as Polysulphate.
Main features

• PK premium granulated fertilizers with Polysulphate technology

• Five nutrients in one: phosphorus, sulphur, potassium, magnesium and calcium in one single application

• Partially replaces the alternative source of potassium – potassium chloride – in the manufacturing process and thus adds greater value to ICL PKpluS products

• A considerable proportion of the potassium content is in sulphate form (20–35%), allowing flexible use in many crops

• Fully soluble, with all nutrients available for plant uptake

• Versatile product; suitable for all kinds of crops and all types of soils

• Extended nutrient availability, reduced risk of sulphate losses through leaching

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantation

• For bulk blending with nitrogen (N) fertilizers

Formulas

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Main features

• A source of phosphorus for acidic soils

• Longer release of P with residual value due to partly acidulation, less leaching and P fixation thus more efficient P fertilization

• Available in various levels of acidulation and phosphorus content

• Effective calcium source for raising soil pH, improving cell firmness in plant tissue

• Available in granular form

• Tailor made formulae with additional MgO or micronutrients

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

• Specifically designed for acidic soils with low pH, and/or tropical and subtropical soils

• Ideal for perennial crops, such as pastures, as a maintenance P fertilizer with additional supply of S and Ca

Formulas

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Granular PK Fertilizers

Main features

• Source of P and K for all crops and soils

• **Tailor made formulae with additional MgO, S and micronutrients**

• Fully soluble, with all nutrients available for plant uptake

• Easy and uniform distribution in the field with all modern mechanical spreaders

• Good hardness, guarantees maintenance of the quality during handling, bulk blending and field application

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

Formulas

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Granular NPK Fertilizers

Main features

• Source of N, P and K for all crops and soils

• Tailor made formulae with additional MgO and micronutrients

• Fully soluble, with all nutrients available for plant uptake

• Easy and uniform distribution in the field with all modern mechanical spreaders

• Good hardness, guarantees maintenance of the quality during handling, bulk blending and field application

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

Formulas

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</table>
Main features

• Source of N, P and K for all crops and soils, containing sulphur and low chloride

• Tailor made formulae with additional MgO and micronutrients

• Fully soluble, with all nutrients available for plant uptake

• Suitable for chloride sensitive crops

• Easy and uniform distribution in the field with all modern mechanical spreaders

• Good hardness, which guarantees maintenance of the quality during handling, bulk blending and field application

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

Formulas

<table>
<thead>
<tr>
<th>N</th>
<th>P₂O₅</th>
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</table>
Granular NP Fertilizers

Main features

• Source of N and P for all crops and soils

• **Tailor made formulae with additional MgO and micronutrients**

• Fully soluble, with all nutrients available for plant uptake

• Suitable for chloride sensitive crops

• Easy and uniform distribution in the field with all modern mechanical spreaders

• Compatible with urea and ammonium nitrate in blends

• Good hardness, guarantees maintenance of the quality during handling, bulk blending and field application

• Delivers superior yields, improved quality and increased profitability

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

Formulas

<table>
<thead>
<tr>
<th>N</th>
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Main features

- Most common potassium fertilizer used in agriculture
- Ideal K source for all chloride tolerant crops and soils
- Fully soluble, with all nutrients available for plant uptake
- Easy and uniform distribution in the field with all modern mechanical spreaders
- Delivers superior yields, improved quality and increased profitability

Main uses

- For direct application in fields, orchards and plantations
- For bulk blending with other fertilizers

Formula

| K₂O | 60 |
Main features

• Triple Super Phosphate is a high source of phosphorus

• TSP is produced by grinding and acidulating phosphate rock

• Grinding increases Phosphate rock reactivity, and acidulation with phosphoric acid makes the phosphate water-soluble, which enables the plants to take up the nutrients

• The high water-solubility of the P in TSP increases the effectiveness of the fertilizer

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

Formula

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Granular Single Super Phosphate (SSP)

Main features

• Single Super Phosphate is a phosphate fertilizer produced by grinding and acidulating phosphate rock

• Grinding increases the reactivity, and acidulation with sulphuric acid makes the Phosphate water-soluble, which enables the plants to take up the nutrients

• The high water-solubility of the P in SSP increases the effectiveness of the fertilizer

• Because of the use of sulphuric acid in its production, SSP contains a large amount of soluble sulphur, which makes it ideal for soils with S-deficiency

• An additional 0.5% of boron can be included

Main uses

• For direct application in fields, orchards and plantations

• For bulk blending with other fertilizers

• Ideal for crops with high sulphur (S) requirements, such as legumes (alfalfa, clover, soybean) and cruciferae (canola, rapeseed)

• Ideal for drilling with grain legume seeds (such as soybean) that require ample supplies of P and S

• Ideal for top-dressing of pastures: S promotes legume production, thus raising both the forage quality and the N status of the pasture

Formulas

<table>
<thead>
<tr>
<th>P₂O₅</th>
<th>S</th>
<th>CaO</th>
<th>B</th>
</tr>
</thead>
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<tr>
<td>18</td>
<td>11.3</td>
<td>30.6</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>11.3</td>
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Our nutrients play an essential role in your success

- **NITROGEN**
- **PHOSPHORUS**
- **POTASSIUM**
- **MAGNESIUM**
- **SULPHUR**
- **CALCIUM**
N is a significant component of nucleic acids such as DNA, the genetic material that allows plants to grow and reproduce.

N is an essential part of living cells and a component of proteins and enzymes essential for metabolic processes.

N is a component of ATP, the energy-transfer compound which allows cells to use the energy released in metabolism.

N is a major component of chlorophyll, the compound by which plants use sunlight energy during photosynthesis.

N stimulates root growth and crop development as well as uptake of other nutrients.

N deficiency symptoms:

General yellowing of older leaves (bottom of plant). The rest of the plant is often light green.

Growth is usually stunted.

Since nitrogen is mobile within the plant, deficiency symptoms appear on lower and older leaves first.

N deficiency in corn
**P** is a vital component of ATP, the main energy-transfer compound which allows cells to conserve and use the energy released in metabolism.

P has an essential role in photosynthesis.

P stimulates root development.

P improves flower formation and seed production and promotes more uniform and earlier crop maturity.

P is very important in cell division and development of new tissues.

P is an essential component of DNA, the genetic material that allows plants to grow and reproduce.

**P deficiency symptoms**

Small leaves take on a reddish-purple tint; leaf tips look burnt and older leaves become almost black.

Stunted growth and poor rooting.

Since phosphorus is mobile within the plant, deficiency symptoms appear on lower and older leaves first.
K is essential in sugar and starch formation. K is involved in the movement of nutrients through plants. K promotes healthy root systems.

K deficiency symptoms:
- Older leaves look scorched around the edges and/or wilted.
- Interveinal chlorosis (yellowing between the leaf veins) develops.
- An increase in the plants susceptibility to drought, lodging and plant pathogens is also seen.
- Since potassium is mobile within the plant, deficiency symptoms appear on lower and older leaves first.

K deficiency in lettuce
Mg deficiency in tomato

Mg deficiency symptoms

Slow growth and leaves turn pale yellow, sometimes just on the outer edges, which then develop interveinal chlorosis.

New growth may be yellow with dark spots.

Since magnesium is mobile within the plant, deficiency symptoms appear on lower and older leaves first.

Mg is the central component of chlorophyll, the pigment molecule responsible for absorbing sunlight during photosynthesis.

Mg is involved in the activation of several enzyme systems.

Mg acts as a phosphorus carrier in plants and is essential for phosphate metabolism.

Mg is essential for plant respiration.

Mg is necessary for cell division and protein formation.
S deficiency in citrus

New leaves turn pale yellow, older growth stays green. Leaf veins lighter than surrounding areas.

Plants are small and their growth is stunted.

Since sulphur is immobile within the plant, deficiency symptoms appear on younger leaves.

Leguminous plants need S for efficient nitrogen fixation

S is especially important to plants with high oil content

S activates a number of enzymes

S is vital to the formation of amino acids and is crucial in the production of proteins

S has an important role in photosynthesis

S improves crop winter hardiness

S is vital to the formation of amino acids and is crucial in the production of proteins

S is especially important to plants with high oil content

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S is vital to the formation of amino acids and is crucial in the production of proteins

S has an important role in photosynthesis

S improves crop winter hardiness

S is vital to the formation of amino acids and is crucial in the production of proteins

S has an important role in photosynthesis

S improves crop winter hardiness
Ca deficiency in grapes

Ca deficiency symptoms

- New leaves are distorted, curled or hook-shaped. The growing tip may die.
- Root tips die and root growth is slow.
- Contributes to blossom end rot in tomatoes, tip burn of cabbage and brown/black heart of escarole and celery.
- Since calcium is immobile within the plant, deficiency symptoms appear on younger leaves.

Ca is responsible for plant cell division and for strengthening cell walls

Ca helps convert nitrate-nitrogen into forms needed for protein formation

Ca activates a number of plant growth-regulating enzyme systems

Ca contributes to improved disease resistance

Ca improves the absorption of other nutrients by roots and their translocation within the plant
Sulphate behaves like nitrate in the soil. In the plant nitrogen and sulphur are both essential building blocks for proteins. Sulphur deficiency will severely reduce the efficient use of nitrogen and limit protein synthesis.

Sulphur can only be taken up by plants from the soil solution as sulphate (SO$_4^{2-}$). As with readily-available nitrate, it can be liable to loss through leaching. Spring application of sulphate fertilizer is therefore recommended so that the plant can take it up during its period of active growth, the same principle applies to nitrate. Sulphur is required, together with nitrogen, for the formation of proteins and the uptake timings for both are similar.
Sulphate in fertilizer

Crop residues

Sulphate in soil solution

Dung/urine

S in organic material

Immobilization

Mineralization

Leaching