



**PRODUCT INFO
& DATASHEET**

SICO® POTASNIT-GG™ greenhouse grade POTASSIUM NITRATES (KNO₃) 13-0-46, IMO Class 5.1-UN 1486 - Made in China – EC fertiliser quality

SICO® POTASNIT-GG water soluble crystalline (powder) Potassium Nitrates are all suitable both as greenhouse grade (GG) & drip fertigation and irrigation or as raw material water soluble fertilisers or as agricultural grade (for soil application). CAS Number 7757-79-1

1/ PRODUCT SPECIFICATIONS/CERTIFICATE OF ANALYSIS

- **Type 1 Normal grade (= topselling grade!)**

Crystalline/powder

<u>Description</u>	<u>Unit</u>	<u>Standard Specification*</u>	<u>Typical Analysis</u>	<u>Reference method</u>
Total Nitrogen (N)	Wt-%	13	13.83	AOAC 2.4.02
Nitrate Nitrogen (NO ₃)	Wt-%		13.57	
Ammoniacal Nitrogen (N-NH ₄)	Wt-%		0.26	
Potassium (K ₂ O)	Wt-%	46	45.84	AOAC 2.5.07
Moisture (H ₂ O)	Wt-%	<0.4	0.16	
Water Insoluble	Wt-%	<0.20	0.1	
pH (0.4%)		6	6.2	
Solubility in water @ 20°C	g/dm ³		400	
Chloride (Cl)	Wt-%	<0.8	0.7	
Sodium (Na)	Wt-%	<1.5	0.08	
Perchlorate	mg/kg		<0.1	Ion Chromatography
Heavy metals				
As	ppm		0.1	EPA 6010C
Co	ppm		0.5	EPA 6010C
Cd	ppm		0.1	EPA 6010C
Ni	ppm		0.25	EPA 6010C
Pb	ppm		0.96	EPA 6010C
Hg	ppm		0.013	SW 7471A

- **Type 2 Selective technical grade**

Crystalline/powder

<u>Description</u>	<u>Unit</u>	<u>Standard Specification*</u>	<u>Typical Analysis</u>	<u>Reference method</u>
Total Nitrogen (N)	Wt-%	13	13.83	AOAC 2.4.02
Nitrate Nitrogen (NO ₃)	Wt-%		13.57	
Ammoniacal Nitrogen (N-NH ₄)	Wt-%		0.26	
Potassium (K ₂ O)	Wt-%	46	46.2	AOAC 2.5.07
Moisture (H ₂ O)	Wt-%	<0.2	0.16	
Water Insoluble	Wt-%	<0.01	0.01	
pH (0.4%)		6	6.2	
Solubility in water @ 20°C	g/dm ³		400	
Chloride (Cl)	Wt-%	<0.2	0.17	
Sodium (Na)	Wt-%	<0.5	0.08	
Perchlorate	mg/kg		<0.1	Ion Chromatography
Heavy metals				
As	ppm		0.1	EPA 6010C
Co	ppm		0.5	EPA 6010C
Cd	ppm		0.1	EPA 6010C
Ni	ppm		0.25	EPA 6010C
Pb	ppm		0.96	EPA 6010C
Hg	ppm		0.013	SW 7471A

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SICO FERTILISERS
EVERY TIME THE RIGHT SOLUTION



• **Type 3 Compact granular grade**

<u>Description</u>	<u>Unit</u>	<u>Standard Specification*</u>	<u>Typical Analysis</u>	<u>Reference method</u>
Total Nitrogen (N)	Wt-%	13	13.83	AOAC 2.4.02
Nitrate Nitrogen (NO3)	Wt-%		13.57	
Ammoniacal Nitrogen (N-NH4)	Wt-%		0.26	
Potassium (K2O)	Wt-%	46	46.2	AOAC 2.5.07
Moisture (H2O)	Wt-%	<0.9	0.86	
Water Insoluble	Wt-%	<0.01	0.01	
pH (0.4%)		6	6.2	
Solubility in water @ 20°C	g/dm3		400	
Chloride (Cl)	Wt-%	<0.2	0.17	
Sodium (Na)	Wt-%	<0.5	0.08	
Perchlorate	mg/kg		<0.1	Ion Chromatography
Heavy metals				
As	ppm		0.1	EPA 6010C
Co	ppm		0.5	EPA 6010C
Cd	ppm		0.1	EPA 6010C
Ni	ppm		0.25	EPA 6010C
Pb	ppm		0.96	EPA 6010C
Hg	ppm		0.013	SW 7471A

*National Chinese tolerances shall be applied as per local relevant regulations; eg. FCO, SASO, EC2003/2003, GB



Type 1 / Type 2

2/ SALES RATIONALE & ADVANTAGES OF POTASSIUM NITRATE AS A FERTILISER

Main advantages of potassium nitrate are :

- It supplies potassium virtually free of chlorine

An abundance of chlorine can decrease yields and deteriorate quality of many crops. This makes the difference with respect to potassium chloride, which contains 47 % of chlorine and is the most used potassium fertiliser because of its lower price. Potassium nitrate is virtually free of chlorine.

- It has a high and complete water solubility

It is very suitable to be applied in solution. Its solubility is much higher than that of potassium sulphate, which is also a chlorine free potassium source. It is fully water soluble and will not cause clogging of nozzles or pipes.

- The chemical composition of potassium nitrate does not include unnecessary elements

Potassium and nitrate nitrogen can be completely absorbed by plants, leaving no residues that may result in salt accumulation in the soil or other growing media.

- All its nitrogen is in the nitrate form

The nitrate form does not need to be transformed in the soil, and is immediately available for plant uptake, even in cold, wet, acid or fumigated soils and even under semi-dry weather conditions. Nitrate tends to promote the uptake of potassium, magnesium and calcium and to depress that of chloride while ammonium has the opposite effect.

Potassium Nitrate is virtually free of chlorine:

Chlorine is an essential plant micronutrient, meaning plants require it in very small amounts.

As chlorine is an abundant element in nature, its deficiency in crops is very uncommon. High chlorine levels, on the other hand, are detrimental to yield and quality of crops, particularly to those that are more sensitive to this element.

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Harmful amounts of chlorine in crops can result from a high supply of the element by fertilizers, soils, irrigation waters and some pesticides. Animal manure and organic materials also add with some chloride and salts to the soils.

The only consistent or general symptom of excess chlorine is reduced leaf size and slower growth rate, without leaf symptoms. In some plants symptoms occur including burning and firing of leaf tips or margins, bronzing, premature yellowing and absent on of leaves, and less frequently, chlorosis.

Situations when non-chloride fertilizers are preferred:

*** Chlorine sensitive crops**

Most fruit and vegetable crops, as well as beans and peas are sensitive to high chlorine levels. An excess of chlorine in tobacco leaves decreases burn rate, making it useless for smoking purposes.

Potato storage resistance is also harmed by excess of chlorine.

Fruit and vegetable crops as well as tobacco are high value agricultural products and their prices strongly depend on quality.

*** High potassium fertilizer rates**

Adequate potassium nutrition is essential to obtain optimum quality and maximum yield of crops. Since plants extract potassium in large amounts, in many cases considerable quantities of potassium need to be applied as fertilisers. If potassium chloride is used, a correspondingly large amount of chlorine is added to the soil. For example a rate of 180 kg/ha of K_2O can be applied as 300 kg/ha of potassium chloride or as 400 kg/ha of potassium nitrate. In the first case, 140 kg/ha of chlorine, which is a very large amount of this element, will be supplied in addition to potassium. In the case of potassium nitrate 52 kg/ha of nitrogen will be added instead, with less than 4 kg/ha of chlorine.

*** Intensive cropping**

In some regions intensive cropping systems are practiced. Sometimes high value crops such as vegetables and flowers are grown in very intensive, "forced" conditions, like in greenhouses or under plastic covers. In these cases yields are very high, demanding large fertilization rates especially with nitrogen and potassium. Under these conditions potassium nitrate is an ideal fertiliser, supplying enough nutrients without adding unduly amounts of chlorine and salts.

*** High Chlorine soils and irrigation waters**

Chlorine is normally present in soils as well as in irrigation waters. In some regions, mainly under arid and semi-arid conditions, the soil and/or irrigation water may contribute with significant amounts of chlorine.

*** Potassium Nitrate is highly water soluble**

The solubility of potassium nitrate in water is higher than that of potassium sulphate, and increases markedly with temperature. The solubility of both products at constant temperatures are shown in Table 1.

Table 1. - Water solubility of Potassium Nitrate and Potassium Sulphate (g/l) -

<u>Temperature</u>			
<u>degr. C</u>	<u>degr. F</u>	<u>KNO_3</u>	<u>K_2SO_4</u>
0	32	133	76
10	50	209	92
20	68	316	111
30	86	458	130

This high solubility of potassium nitrate makes it a very suitable fertiliser for application in irrigation water (fertigation). In addition, because potassium nitrate is virtually free of chlorine, as well as of unnecessary elements and insoluble matters, it is a very adequate fertiliser for use in foliar feeding.

Potassium Nitrate supplies immediately available Nitrogen. Potassium nitrate provides quick acting nitrogen because all of it is in the nitrate form. Nitrate nitrogen can be directly absorbed by the plant roots without any soil bacterial action having to take place. In addition, it travels through the soil more easily than the ammonium form of nitrogen. The time of nitrogen availability to plants is better controlled using nitrate nitrogen.

3/ USE OF POTASSIUM NITRATE

- Use**
- Direct application to soil- Bulk blending
 - Granulation of fertilisers
 - Fertigation (irrigation water)
 - Liquid fertiliser solutions
 - Foliar feeding

Table 2. - Conversion of kg of Potassium Nitrate into kg of Nitrogen and Potassium -

<u>KNO_3</u>	<u>N</u>	<u>K_2O</u>
100	13	44
150	20	66

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200	26	88
250	33	110
300	39	132
400	52	176
450	59	198
500	65	220
550	72	242
650	85	286
600	78	364
700	91	308
750	98	330
800	104	352
850	111	374
900	117	396
950	124	418
1000	130	440

Direct Application

Potassium nitrate can be directly applied to the soil. In annual crops, because of its potassium content, is usually used in the base fertilisation at seeding or transplanting time. Because of its wide N:K₂O ratio of 1:3.5 potassium nitrate can be applied in combination with a phosphate fertiliser, later on more nitrogen can be supplied in one or more applications.

Examples of application rates for several crops are given in Table 3. These rates are just a reference since actual application rates will depend on specific conditions at each case.

In some cases as in sandy soils, potassium nitrate is applied also after seeding time as a top or side dressing, to boost early plant growth with readily available nitrogen. In perennial crops it is used in one or more applications as needed.

Table 3. Examples of rates of potassium nitrate for several crops

Crops	Rate of application			
	KN ₃	N	P ₂ O ₅	K ₂ O
Citrus	450	60	0	200
Apples	400	52	0	176
Vineyards	300	39	0	132
Tobacco Virginia	300	39	0	132
Tobacco Burley/dark	550	72	0	242
Cotton	250	33	0	110
Tomato	350	46	0	154
Melons	300	39	0	132
Cabbage	350	46	0	154

Bulk Blends

Potassium nitrate can be physically mixed with other granular fertilisers in special plants. Bulk blends allow production of a wide variety of NPK and NK formulations according to specific farmer's needs. Use of bulk blends by farmers is growing in many countries.

Granulation

Potassium nitrate can be ammoniated or mixed with other fertiliser materials by means of industrial processes. The objective is to obtain a granular product with all the granules having the same composition (complex fertiliser).

Liquid Fertiliser Solutions

Potassium nitrate can be used as a component of liquid fertilisers or suspension fertilisers, manufactured by some industries.

Fertigation

Potassium nitrate is an ideal fertiliser to apply through the irrigation water. Drip irrigation and sprinkler irrigation systems are especially well adapted to apply potassium nitrate.

The dissolving process of potassium nitrate lowers the temperature of the resulting solution ("endothermic reaction"), which influences its solubility. For practical purposes, to prepare a mother solution of potassium nitrate, its solubility is generally assumed to be of 130 grams/litre. In case of drip irrigation, the final concentration of potassium nitrate emitted to the soil is usually of 0.25 to 0.5 grams/litre, depending on crop requirements.

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Concentrations in excess may increase the electrical conductivity and pH of the solution to undesirable levels. Lower concentrations should be used when the water contains significant amounts of dissolved salts.

Foliar Fertilisation

One or several sprays of potassium nitrate dissolved in water can be applied to obtain a rapid improvement of crop nutrition. Potassium nitrate is compatible with a wide range of agrochemicals.

Concentrations of potassium nitrate in the solution vary according to plant species and are more concentrated when small volume sprays are applied. In general, 2-5% (kg of KO_3 /100 l of water) can be used for citrus, olives, pineapples and cotton; 1-3 % for vegetables and mango and 0.5-1.0 % for deciduous trees and grapes. Aerial applications can be more concentrated because less water volume is used.

4/ PACKING

in 25 kg IMO approved pp + pe multicolor & language bags on plastic wrapped HT pallets of 1250 kgs, 25 MT/20' container (we can also supply in loose bags, without pallets, about 27 MT/20' container). The bag leaves a space for a small label with country & client specifics.

5/ STORAGE

Shelf life: min. 2 years, if stored properly: dry, away from direct sunlight in well ventilated warehouse.

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