

TESSENDERLO
Kerley


K-Leaf[®]

EST. 1919

APPLICATION GUIDE

HIGH GRADE FOLIAR
POTASH BOOSTER

TESSENDERLO
Kerley



K-Leaf® is a new, fast dissolving, highly soluble potassium booster specially developed by Tessenderlo Kerley International for foliar application.

Its unique properties enable growers to apply foliar sprays with maximum efficiency, providing fast potassium nutrition and quick correction in the event of a deficiency. Moreover, K-Leaf penetrates the leaves efficiently and, in addition, stimulates better absorption of potassium from the soil.

As a supplement to broadcast soil application of fertilizer, foliar application of K-Leaf offers a cost-effective means of achieving the highest quality crops. As well as assisting growers in producing crops with maximum export value, K-Leaf also helps to optimize crop yield and protect sensitive environments.

K-LEAF

- **Offers a nitrogen-free source of potassium**
Evidence suggests that an excessive supply of nitrate when crop tubers, grains or fruit are forming can be detrimental to quality. K-Leaf enables growers to develop fertilization programs that exactly match crop requirements.
- **Is virtually chloride-free**
An excess of chloride can be detrimental to the quality of many cash crops with poor chloride tolerance.
- **Is an important source of potassium and sulfur for broad-acre crops**
Potassium is considered both a quality element and an essential yield component in broad-acre crops. Since foliar applied fertilizers are taken up more efficiently by the plant than those applied to the soil, K-Leaf offers an economical means of increasing both the yield and quality of broad-acre crops as a complement to soil applied fertilizers.
- **Improves the yield and quality of fruit and vegetables**
The use of K-Leaf gives high quality products with outstanding flavor. In many cases, size and consistency, as well as yield, are improved. Increased pigment content gives better color and appearance. Higher levels of sugar and juice, combined with a reduced acidity, provide better flavor and aroma.
- **Enhances nutritional value**
The product has a positive effect on the plant's production of vitamins, oil, starch, and sugar. These are, the basic factors for high nutritional value.
- **Provides increased durability and resistance**
The use of K-Leaf ensures firmer fruit and vegetables with a better resistance to bruising. K-Leaf can also increase the suitability of fruit and vegetables for canning or processing.
- **Contains the important secondary nutrient sulfur**
Delivered in the sulfate form, which is easily taken up by the plant. Sulfur is an important constituent of amino acids and proteins, and it is also required for photosynthesis.
- **Is cost-effective**
Treatments with K-Leaf are competitively priced relative to other foliar potash products.
- **Can be applied at higher doses** than certain other foliar potassium fertilizers.

CHARACTERISTICS

Specifications

K-Leaf combines the essential nutrients potassium and sulfur in an optimal form that is **highly soluble** and **readily available to plants**.

A 52% K₂O (43% K) and 47% SO₃ (18.8% S) content enables K-Leaf to supply a **very high concentration of nutrients**. K-Leaf is **virtually chloride-free** with a typical Cl content of only 0.3%.

Potassium sulfate		Method of analysis
- K ₂ O (w/w)	Min. 51.5%	Potentiometric
- Cl (w/w)	Max. 0.5%	Potentiometric
- S (w/w)	18.7%	X-Ray fluorescence



Typical properties

K-Leaf is a very fine white powder, which dissolves very rapidly to give an **acidic solution**. At a low pH, the **risk of clogging the sprayer is minimized**.

K-Leaf is **compatible with most other foliar fertilizers** within normal concentration ranges, except those containing calcium, which cause precipitation of calcium sulfate (CaSO_4). It is also compatible with most pesticides and fungicides for foliar application.

- Appearance/color	Fine white powder
- Bulk density (struck/loose)	1.53 kg/l / 1.25 kg/l
- Angle of repose	35°
- pH (1% solution)	2.9
- Residues (5% solution)*	0.03%
- Solubility at 25°C	120 g/l pure water
- Dissolved after 1 min with stirring	90%
- K_2O (w/w)	52%
- K (w/w)	43%
- Cl (w/w)	0.2%
- SO_3 (w/w)	47%
- H_2O (w/w)	0.07%
- Chemical formula	K_2SO_4

* After stirring for 10 minutes at 25°C

Typical particle size distribution

Particle size	Sieve analysis
> 0.125 mm	1%
> 0.063 mm	77%
< 0.063 mm	23%

Conversion factors

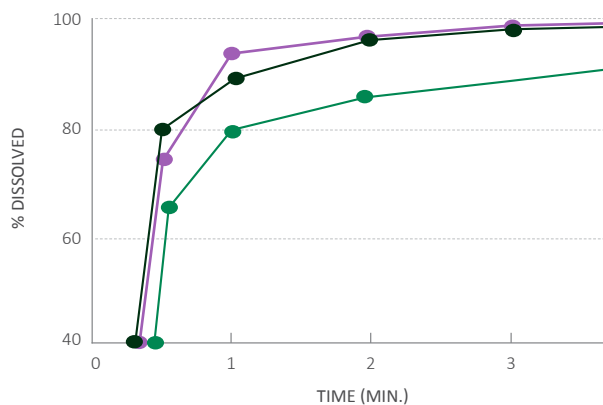
K_2O to K: multiply by 0.8301

SO_3 to S: multiply by 0.4

DISSOLUTION SPEED

K-Leaf is highly soluble in water. It **dissolves very rapidly and completely** to give a clear solution with no residue.

K-LEAF DISSOLUTION SPEED*



- K-Leaf foliar grade SOP
- High quality fertigation grade SOP
- Potassium nitrate (NOP)



Results from a 4% solution after spraying: fertigation grade sulfate of potash does not dissolve completely, leaving undissolved product in the sprayer tank

*100 g product per liter of water at 20°C with mechanical stirring

K-LEAF FOLIAR APPLICATION PROGRAMS

K-Leaf foliar sprays have proven to be effective in terms of either curing or preventing potassium deficiency in many broad-acre crops and fruit and vegetables under the following conditions:

- When **plant potassium demand is very high** (e.g. during tuber, grain or fruit formation and growth)
- When the **soil has a high potassium fixation capacity** and potassium uptake by the roots is limited

Foliar sprays of K-Leaf have also proven to be efficient in situations where there is no potassium deficiency. As a supplement to broadcast soil application of fertilizer or fertigation, foliar application of K-Leaf offers a cost-effective means of achieving the best yields and the highest quality crops.

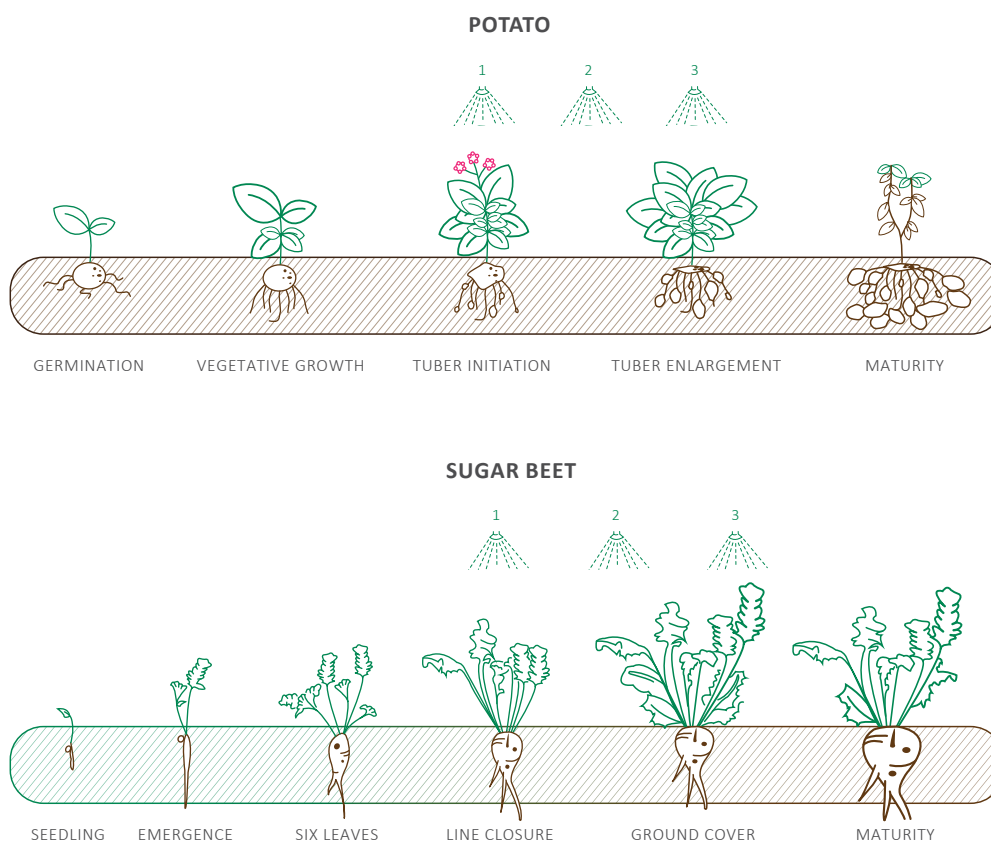
Root and tuber crops

Various trials have indicated that foliar application of K-Leaf on potatoes not only increases yield, but also increases average tuber size. For sugar beet, foliar application of K-Leaf results in a better metabolism for concentrating sugar and the transport of assimilates to the roots. This translates into an enhanced yield as well as a higher sugar content.

Recommended application (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Potato	Starting at tuber initiation (BBCH 40), every 10-14 days	2 - 3	8 - 12
Sugar beet	From beginning of line closure (BBCH 31), every two weeks	2 - 3	15 - 20
Carrot	From 6th true leaf unfolded stage (BBCH 16), every two weeks	3	10 - 15
Onion	From initiation of bulb formation (BBCH 41), every two weeks	3	10 - 15

Crop growth stages



Cereals

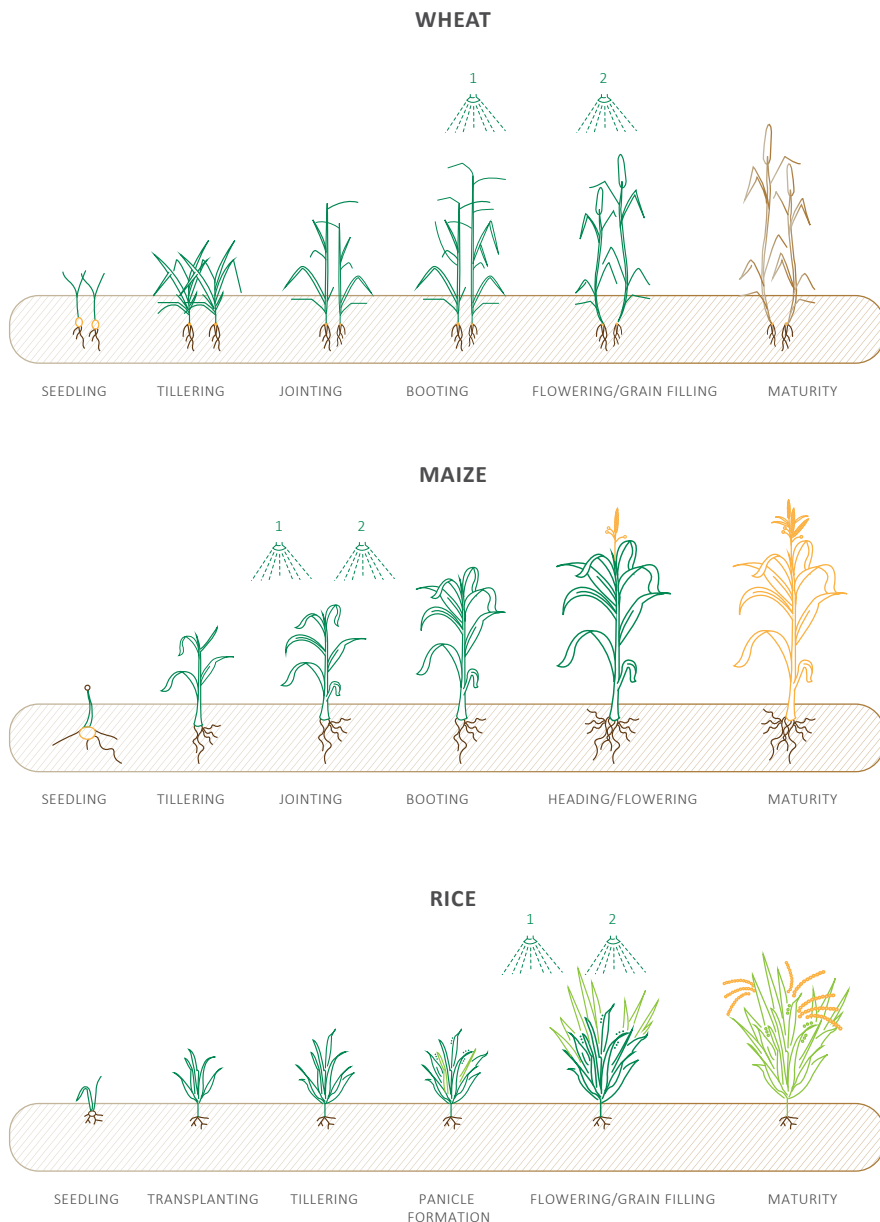
Foliar application of K-Leaf in broad-acre crops brings a number of advantages. The crops are more resistant, root uptake of potassium is improved, and potassium deficiency is easily corrected. Moreover, trials on both wheat and maize have shown an increase in yield.

For rice, which is a fast growing crop, potassium uptake by the roots can be a limiting factor when uptake of this nutrient is critical. Only applying potassium to the soil will limit rice yield. Experiments have demonstrated that when yield is low, **foliar application of K-Leaf can improve yield by 30%.**

Recommended application (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Wheat, barley	From heading (BBCH 51) to grain filling (BBCH 75)	1 - 2	5 - 10
Maize	3 - 6 leaves (BBCH 13-16)	1 - 2	10 - 12
Rice	Flowering/grain filling (BBCH 61-75)	1 - 2	5 - 10

Crop growth stages



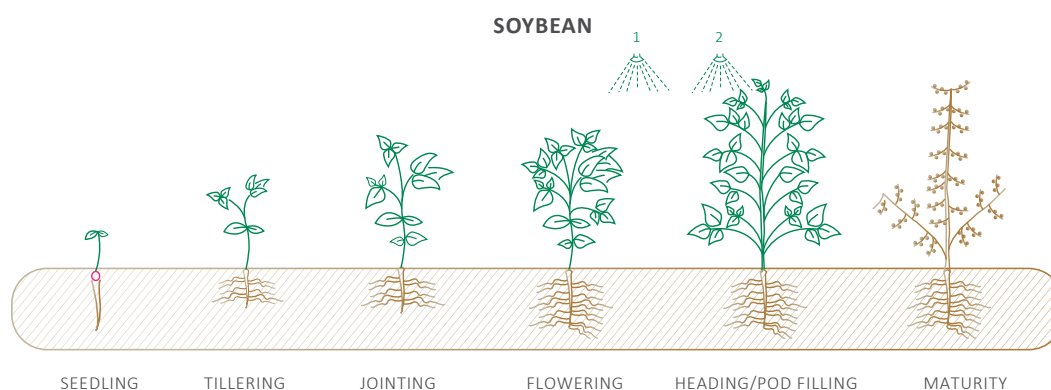
Oil Crops

For soybeans, in some cases there is an almost linear relationship between the amount of foliar applied K-Leaf and the yield increase. For sunflowers, foliar application of K-Leaf enhances growth by increasing the rate of photosynthesis, improving the dry weight and yield of the crop.

Recommended application (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Soybean	From beginning of flowering to beginning of seed filling (R1-R5.2 or BBCH 61-73)	1 - 2	6 - 10
Sunflower	From eight leaves (BBCH 18) to flowering (BBCH 61-69)	1 - 2	6 - 10
Oilseed rape	From stem elongation to beginning of seed development (BBCH 37-71)	1 - 2	6 - 12
Olive trees	Flowering (BBCH 60) Fruit development (BBCH 71) Fruit ripening (BBCH 85)	3	10 - 15
Peanut	Seed formation (BBCH 71-79)	1 - 3	8 - 12

Crop growth stages



Fiber crops

Potassium uptake requirements during growth can be difficult to maintain in cotton. Foliar application of potassium enables the correction of a deficiency more quickly and efficiently than soil application. **Therefore, foliar application of K-Leaf prevents yield loss in cotton.**

Recommended application (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Cotton	Flowering (BBCH 60-70)	1 - 2	10 - 15
Flax	10 - 15 cm stage (BBCH 31-32)	1	8 - 12

Tobacco

For good curing and optimal combustibility, the potassium content of the tobacco leaves should be higher than 2%. K-Leaf provides an excellent means of **increasing the potassium content in the leaf during the growth stage** with the highest potassium requirement (i.e. during the second month after transplantation).

Recommended application (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Tobacco	At 20 unfolded leaves (30 days after transplanting), bud formation (40 days after transplanting) and bud emergence (50 days after transplanting) (BBCH 40-60)	3	6 - 12

Fruit and vegetables

Besides increasing yield in vegetables, the application of K-Leaf also improves quality. It increases the size of the products as well as their dry matter content, while reducing the presence of components that are detrimental to quality, such as nitrate.

For fruit trees, **foliar spraying is recommended after fruit setting in order to enhance the quality of the harvest.** Citrus crops deserve a special mention due to their sensitivity to chloride. Since sulfate of potash has the lowest salt index of all potash fertilizers, its use is highly recommended for citrus fruit. Furthermore, foliar application of K-Leaf can greatly improve fertilizer use efficiency in citrus crops.

In vineyards, K-Leaf is used as a foliar spray in order to avoid mineral deficiency or an imbalance between potassium, magnesium, and calcium. Its application stimulates early maturity of the fruit, reducing the risk of damage, and increases the sugar content of the grapes, improving wine quality.

Recommended application: leguminous crops and vegetables (spray volume base: 300 l/ha)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Chick pea	After flowering (> BBCH 69)	1	15 - 20
Faba bean	After flowering (> BBCH 69)	1 - 3	8 - 12
Tomato	After flowering (> BBCH 69)	2 - 4	6 - 10

Recommended application: fruit (spray volume base: 300 l/ha for field crops, 600 to 800 l/ha for fruit trees)

CROP	SPRAY TIMING	NO. APPLICATIONS	APPLICATION RATE (kg/ha/application)
Avocado	Every month after flowering (> BBCH 69)	3 - 4	15 - 18
Banana	From beginning of flowering (BBCH 61)	2 - 5	5 - 10
Citrus	After flowering (> BBCH 69)	2 - 4	5 - 15
Grape	1 week before flowering (BBCH 60)	3 - 5	6 - 12
Pineapple	From beginning of vegetative growth to end of flowering (BBCH 40-69)	6 - 8	4 - 6
Mango	After flowering (> BBCH 69)	2 - 3	10 - 15
Pome fruit, stone fruit	After flowering (> BBCH 69)	2 - 3	7 - 14
Strawberry	After flowering (> BBCH 67)	3	5 - 10



DIRECTION FOR USE OF K-LEAF

At 20°C (68°F) K-Leaf normally **only takes a few minutes to dissolve** at a concentration of 100 g/l, which is much higher than the recommended practical dose. Continuous agitation or stirring will speed up dissolution.

However, the time required to dissolve K-Leaf will also **depend on the quality of the spraying water**.

Poor quality water may affect solubility. Concentrations of 2 to 4 kg K-Leaf/100 liters of water are generally sufficient for a positive and cost-effective result.

PRECAUTIONS

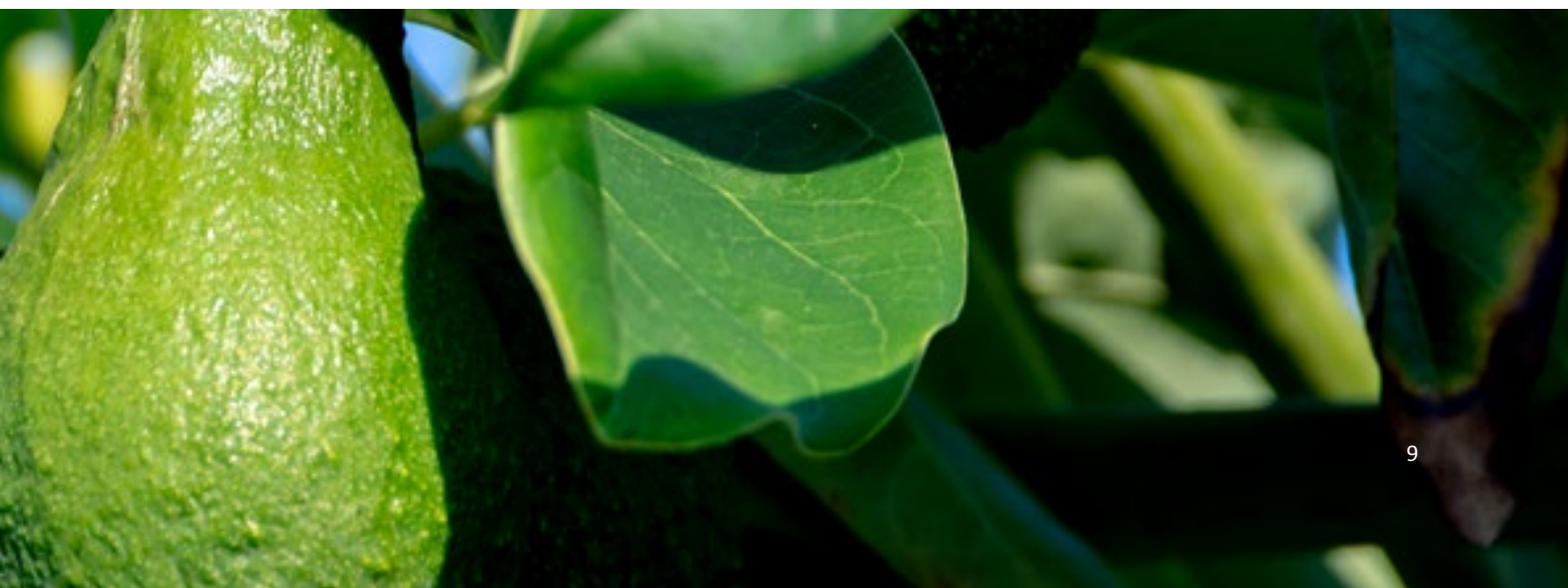
In addition to the directions for use of K-Leaf, the following precautions should be carefully observed:

- Foliar sprays of K-Leaf should be applied when crops are turgid (i.e. either in the evening or early in the morning, but never during the heat of the day).
- K-Leaf is compatible with most pesticides, fungicides and other agrochemicals at normal concentrations, except those containing calcium, which will cause the precipitation of calcium sulfate (gypsum).
- It is highly recommended to conduct a small-scale trial to check the compatibility of the mixture before operating on a larger scale and spraying.
- Recommendations in the user manual for agrochemicals should be strictly observed.
- Store K-Leaf in dry conditions, avoiding extreme heat or cold.
- For field, root and leguminous crops it is not recommended to exceed a concentration of 6% of K-Leaf (w/w) in the spray solution.
- For vegetables crops it is not recommended to exceed a concentration of 4% of K-Leaf (w/w) in the spray solution.
- For fruit crops it is not recommended to exceed a concentration of 3% of K-Leaf (w/w) in the spray solution.
- In cases where low spray volumes could be an issue with respect to concentration, please consult with your Tessenderlo Kerley International Expert or any other qualified agronomist.

GUIDELINES

In order to get the best results from K-Leaf the following guidelines should be followed:

- Fill the tank with water to at least two-thirds of its capacity.
- Add K-Leaf, taking care not to exceed the maximum recommended concentration.
- Maintain stirring or agitation throughout the entire operation.
- Complete the filling of the tank with water.
- Check that the K-Leaf has dissolved completely before injecting the solution into the spraying system.
- The use of filters is recommended, as is generally advised for most solid fertilizers when used for foliar spraying.





SULFATE OF POTASH FROM TESSENDERLO KERLEY INTERNATIONAL



	K-LEAF	SOLUPOTASSE®	GRANUPOTASSE®	K50 POTASSE
TYPICAL TECHNICAL CHARACTERISTICS				
Average K ₂ O (K)	52.0% (43%)	51.5% (42.8%)	50.2% (41.7%)	50.4% (41.8%)
Average SO ₃ (S)	47.0% (18.7%)	47.0% (18.7%)	45.0% (18%)	44.3% (17.7%)
Average Cl	0.2%	0.6%	2.3%	2.1%
Sieve analysis	99% < 0.125 mm	80% < 0.30 mm	97% between 1.60 and 5 mm	97% < 1.65 mm (Tyler 10)
Bulk density	1.53 (struck) 1.25 (loose)	1.46 (struck) 1.21 (loose)	1.40 (struck) 1.27 (loose)	1.54 (struck) 1.09 (loose)
TO PRODUCE				
High value compounds				√
High value blends			√	
High value soluble mixes	√	√		
FOR APPLICATION				
Basal dressing			√	√
On the line or per plant			√	√
Greenhouse, hydroponic system		√		
Open field fertigation (drip, sprinkler, central pivot)		√		
Foliar feeding	√			





SUSTAINABLE CROP NUTRITION FOR AGRICULTURE

For over 100 years Tessenenderlo Kerley International has demonstrated its commitment to nurturing crop life through innovation, research and the development of novel fertilizers for a more sustainable agriculture. Our diverse product portfolio addresses the challenges of modern agriculture by delivering essential nutrients in forms that protect soil health and optimize nutrient use efficiency.

We provide an extensive range of both liquid and solid/soluble fertilizers



HIGH-PERFORMANCE LIQUIDS

HIGH QUALITY SOLID/SOLUBLES



**Our experts are familiar with your region and crops.
Their support includes:**

- Agronomic advice
- Providing technical information
- Carrying out field studies that are specific to your issues
- Providing application and storage tips

For more contact information, please get in touch with:

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