



Liquid Fertilizer

K-Row 23

Potassium and Sulfur Nutrition | Seed Safe In-furrow
0-0-23-8S

K-Row 23[®] - Potassium Sulfite Solution

Soluble Potash (K ₂ O)	23%
Total Sulfur (S) derived from Potassium Sulfite	8%
Density: pounds per gallon at 68°F	11.5
Volume: gallons per ton	174
Pounds of potash (K ₂ O) per gallon	2.6
Pounds of sulfur (S) per gallon	0.92



ADD POTASSIUM AND SULFUR

SAFELY IN THE ROW WITH K-Row 23

GENERAL INFORMATION

K-Row 23 is the in-furrow solution for delivering potassium and sulfur at planting. K-Row 23 is a clear liquid solution containing 23% K₂O and 8% plant available sulfur. Each gallon of K-Row 23 contains approximately 2.6 pounds of potassium (K₂O) and approximately 1.0 pounds of sulfur (S). K-Row 23 is a seed safe product developed by Tessenderlo Kerley Inc. for starter fertilizer applications, but is also a versatile fertilizer that can be used in most liquid applications (including sidedress and fertigation).

K-Row 23 Delivers Results

A sustainable nutrient management program begins with the “4 R’s” (applying the Right source of nutrient, in the Right place at the Right rate and the Right time). Applying fertilizers closer to plant roots often improves nutrient use efficiency by increasing nutrient availability and uptake. While K-Row 23 is specially designed to be used as a starter fertilizer, it can also be an effective tool to deliver nutrients at other crop growth stages. Here are some key benefits of choosing K-Row 23:

Use as an In-Furrow Starter

Starter fertilizer applications can be one key component to a successful growing season by giving growing seedlings access to available nutrients to further boost growth. The chemistry of K-Row 23 allows growers to apply available potassium and sulfur, safely, in numerous starter fertilizer blends on several crops, including corn and soybean. Sulfur starter applications can be especially vital to limit early-season sulfur deficiencies. Supplying a soluble sulfur source in-furrow or next to the furrow allows plants to access needed sulfur early in the season when it may not be as available in the soil.

K-Row 23 is compatible with many nitrogen and phosphorous fertilizers, to provide complete N-P-K-S blends, see section “Blending with K-Row 23” for more information.

Crop Safety

University research has demonstrated the superior safety of K-Row 23 compared to several common starter fertilizers on seed germination of many different crops. This makes K-Row 23 an excellent choice for in-furrow starter fertilizer blend placement. Additionally, the safety of the product also translates to other crops and types of fertilizer applications. K-Row 23 has been shown to be safe when applied at transplanting for vegetable crops, and for applications to young trees and vines. K-Row 23 allows for higher application rates compared to other liquid potassium and sulfur fertilizers. This is especially important in crops that demand high amounts of potassium, including crops like potatoes, tomatoes, and alfalfa, and permanent crops like grapes, tree nuts, and tree fruits.

Use on Low pH Soils

Soil pH has a direct effect on nutrient availability as well as soil microbial activity. A low soil pH can indicate the presence of high levels of toxic ions such as manganese, iron and/or aluminum while a high pH can indicate the presence of free lime in the soil. Most crops do best with a soil pH between 6.0 and 7.5 for optimum nutrient uptake. K-Row 23 generates very little acidity when applied to the soil, making it an excellent source of potassium and sulfur for soils with low pH, as it will not further acidify the soil. It is important to note that soil pH should be monitored, and if required, a liming program should be implemented to help manage low pH soils.

The purpose of this guide is to provide information about K-Row 23 and to make suggestions regarding its use. This guide does not make recommendations about the amount of potassium and sulfur needed for optimum crop production. The rate of each application of K-Row 23 should be made based on a soil test and/or plant tissue analysis for potassium and sulfur, and on the recommendations of a Certified Crop Advisor, Pest Control Advisor or authorized K-Row 23 distributor.

SOIL APPLICATION

Be sure to follow established recommendations for crop, soil type, and moisture conditions in your area. Excessive amounts of fertilizer can damage seed germination. Do not exceed established recommendations for N + P + K for local crops, soil types, and conditions.

Starter Fertilizer In-Furrow

Corn: For pop-up or in-furrow placement, K-Row 23 can be applied, by itself, 1 to 5 gallons per acre of K-Row 23 with the seed. In sandy or dry soil, reduce the rate by half.

K-Row 23 can be blended with ammonium polyphosphate (APP) in any ratio. In-furrow application of blends of K-Row 23 with 10-34-0 or 11-37-0 should not exceed:

- 80 pounds per acre (7.0 gallons per acre) of mixed product in-furrow for heavy clay soils with no more than 5 gallons per acre of APP.
- 40 pounds per acre (3.5 gallons per acre) of mixed product in-furrow for sandy soils or in dry soil conditions.

If other fertilizers are added to the suggested rates above, then a test trial should be done before making large applications.

Wheat: Apply 1 to 3 gallons per acre by itself or in combination with APP. Follow established rates for N + K₂O with the seed for the region and/or soil type.

Soybeans (Irrigated): Based on 30" rows, apply 2 to 4 gallons per acre of K-Row 23 in-furrow, by itself. Irrigate after application to ensure good moisture for germination.

Soybeans (Dry land): Apply 1 to 2 gallons per acre in-furrow with good moisture.

Sorghum: Apply 1 to 3 gallons per acre in-furrow with good moisture.

Cotton: Apply 1 to 2 gallons per acre in-furrow with good moisture.

Other Crops: Apply 1 to 2 gallons per acre. In sandy or dry soil conditions, reduce the rate by half.

Starter Fertilizer (2"X 2" Or 2"X 0")

Corn: Apply 1 to 8 gallons per acre of K-Row 23 with or without APP in a 2" x 2" (2 inches to the side of the seed row and 2 inches below) or 2" x 0" (2 inches to the side of the seed row on the soil surface) placement. For sandy or

dry soil conditions reduce rate by 50% when moisture is limiting.

Soybeans: Apply 1 to 6 gallons per acre of K-Row 23 in a 2" x 2" or 2" x 0" placement. In sandy or dry soil conditions, reduce the rate by half.

Sorghum: Apply 1 to 6 gallons per acre in a 2" x 2" or 2" x 0" placement. In sandy or dry soil conditions, reduce the rate by half.

Cotton: Apply 1 to 5 gallons per acre of K-Row 23 in a 2" x 2" or 2" x 0" placement. In sandy or dry soil conditions, reduce the rate by half.

Other Crops: Apply 1 to 5 gallons per acre of K-Row 23 in a 2" x 2" or 2" x 0" placement. In sandy or dry soil conditions, reduce the rate by half.

Sidedress Application

K-Row 23 can be soil injected or deep banded by itself or with nitrogen and phosphorus to supply crops with N, P, K, and S requirements for the season. K-Row 23 can also be broadcast sprayed on the soil surface or surface banded between rows.

Rates will vary depending on region and crop requirement. Follow soil and tissue analysis recommendations to apply the proper amount of potassium and sulfur. Do not apply K-Row 23 with knife injectors or other types of fertilizer injecting equipment that may cause root pruning. For surface applications, avoid windy conditions where concentrated solutions can contact the plant leaves.

Row Crops (Corn, Cotton, Soybeans): 3 to 15 gallons per acre for soil injection on medium to fine textured soils and 3 to 10 gallons per acre on sandy soils; avoid pruning roots. For surface banding or dribble application, 3 to 10 gallons per acre on medium to fine textured soils and 3 to 5 gallons per acre on sandy soils.

Vegetable Crops: 3 to 12 gallons per acre for soil injection on medium to fine textured soils and 3 to 8 gallons per acre on sandy soils; avoid pruning roots. For surface banding or dribble application, 3 to 12 gallons per acre on medium to fine textured soils and 3 to 8 gallons per acre on sandy soils.

Permanent Crops (Trees and Vines): 5 to 12 gallons per acre for soil injection on medium to fine textured soils and 5 to 10 gallons per acre on sandy soils; avoid pruning roots. For surface banding or dribble application, 5 to 12 gallons per acre on medium to fine textured soils and 5 to 10 gallons per acre on sandy soils.

FERTIGATION

Fertigation is the practice of injecting soluble fertilizers through irrigation systems using water as a nutrient delivery system to the crop.

Before injecting K-Row 23 into an irrigation system, make sure that the irrigation system is in good condition and provides uniform distribution to the field. When applying K-Row 23 through sprinkler and micro-irrigation systems, injection should occur in the middle third or second half of the irrigation set. The injection of K-Row 23 should be done slowly and should last at least as long as it takes irrigation water to travel from the point of injection to the last emitter or sprinkler in the field.

The injection of K-Row 23 should be done with a fertilizer injection pump and should be done over a 1 to 4 hour time period. Rapid injection of K-Row 23 may lead to uneven distribution and may cause crop damage. For additional information about injection of nutrients into an irrigation system, consult with your local agronomist and review University of California publication 21620 "Fertigation with Micro-irrigation," or University of Florida Bulletin #250 "Injection of Chemicals Into Irrigation Systems: Rates, Volumes, and Injection Periods."

Rates will vary depending on region and crop requirement. Follow soil and tissue analysis recommendations to apply the proper amount of potassium and sulfur. When applying K-Row 23 through irrigation systems, use the following precautions:

- Use caution when applying K-Row 23 to crops that are experiencing heat or moisture stress. As temperatures increase, K-Row 23 applications should be split among several irrigations at lower rates per application.
- Avoid applications to new plantings until crop is well established.
- Do not apply K-Row 23 while chlorinating irrigation system. K-Row 23 will neutralize chlorine.
- When applying K-Row 23 into systems where acids are also injected, ensure that the irrigation water pH is above 6.0 and the acid is well mixed into the water before injecting K-Row 23.

All rates listed are for established crops on medium to fine textured soils. For sandy soils, suggested rates should be reduced by 50%.

Flood and Furrow Irrigation

Vegetable and Row Crops: 5 to 15 gallons per acre per application; apply once every 2 to 3 weeks as needed.

Trees and Vines: 5 to 20 gallons per acre per application; apply once every 2 to 3 weeks starting at full leaf.

Alfalfa: Apply 5 to 10 gallons per acre of K-Row 23 to seedling alfalfa with irrigation water. Apply 5 to 20 gallons per acre with irrigation water to an established crop.

Sprinkler and Center Pivot Irrigation

Application of K-Row 23 by solid-set sprinklers should be followed by additional irrigation time to reduce the possibility of fertilizer injury to the crop. Always apply K-Row 23 in a full irrigation set and if possible, avoid application during the midday when temperatures are high. When applying K-Row 23 at recommended rates through a center pivot, the product is diluted with enough water that foliar burn is not normally a problem.

Vegetable and Row Crops: Beginning at the 3rd - 4th leaf stage, apply 1 to 9 gallons per acre every 2 to 3 weeks based on crop requirements.

Trees (Under): 5 to 12 gallons per acre per application every 2 to 3 weeks based on crop requirements.

Trees (Overhead): 3 to 6 gallons per acre every 2 to 3 weeks based on crop requirements.

Vines: 3 to 6 gallons per acre every 10 to 14 days based on crop requirements.

Drip Irrigation

Vegetable and Row Crops: 3 to 9 gallons per acre, every 2 to 3 weeks.

Young Trees: 3 to 9 gallons per acre during the season, starting at full leaf; apply once every 3 to 4 weeks.

Mature Trees: 5 to 16 gallons per acre, starting at full leaf; apply once every 2 to 3 weeks as needed.

Grapes: To mature vines, apply 5 to 16 gallons per acre as needed according to tissue analysis, every 2 to 3 weeks. To young vines, apply 3 to 9 gallons per acre no more than once every 3 to 4 weeks. Application of K-Row 23 can be made any time throughout the season and post-harvest.

Strawberries, Blueberries and Caneberries: 3 to 9 gallons per acre once every 2 to 3 weeks after plants are well established.

Micro-Sprinkler (Fan Jet)

Young Trees: 3 to 9 gallons per acre, once every 3 to 4 weeks.

Mature Trees: 5 to 18 gallons per acre, once every 2 to 3 weeks.

Young Vines: 3 to 9 gallons per acre, once every 3 to 4 weeks, starting at full leaf.

Mature Vines: 5 to 18 gallons per acre as required according to tissue analysis, once every 2 to 3 weeks, starting at full leaf.

BLENDING WITH K-Row 23

K-Row 23 blends easily with many liquid fertilizers giving the flexibility to create complete N-P-K-S blends. K-Row 23 is compatible with liquid urea and ammonium polyphosphate (APP) solutions in any ratio. It is also compatible with many secondary and micronutrient fertilizers, as well as pesticides. Use the following precautions when blending fertilizers with K-Row 23:

- Always do a jar test before blending large quantities.
- Do not blend K-Row 23 with any calcium or magnesium fertilizers.
- Do not mix K-Row 23 with acid or acidic fertilizers below a pH of 6.0.
- When mixing pesticides with K-Row 23, always ensure compatibility first with a jar test. The blend sequence should be as follows: water, then pesticide, followed by K-Row 23 and/or other fertilizers. To avoid separation of products, always keep agitators running during filling and spraying operations.
- Micro-nutrient blends should be jar tested first before mixing with K-Row 23. In most situations, micro-nutrients must be chelated to a neutral pH. Strongly acidic and/or weak chelates do not blend well with K-Row 23.

Blending KTS with UAN Solutions

When blending K-Row 23 and UAN solutions, add water on a weight basis equal to the weight of K-Row 23 or UAN, whichever is in the smallest quantity. Blending order should be: K-Row 23, then water, followed by UAN. Blends with UAN solution should be tested first before making large quantities. In cold weather, the potassium in K-Row

23 reacts with the nitrate in UAN to form potassium nitrate crystals. Adding water or heat will bring the crystals back into solution.

For more information about the compatibility and blending of K-Row 23 visit cropvitality.com/compatibility or contact a Crop Vitality representative.

APPLYING K-Row 23 IN HARD WATER

Use caution when applying K-Row 23 in irrigation water that is high in calcium and/or magnesium. Calcium sulfite can form and can potentially plug injection equipment and emitters. Caution should be used if the combined calcium and magnesium in the water is over 100 ppm. When the irrigation water has calcium/magnesium over 100 ppm, injections should take place very slowly, as to not allow any sulfites formed to build up in the injection points and emitters.

APPLICATION PRECAUTIONS

The directions on this guide are believed to be reliable and should be followed carefully. Crop injury may result from unusual weather conditions, failure to follow application guide recommendations, or improper application practices, all of which are out of control of the manufacturer or seller. Plant and leaf injury may occur on some crops when certain weather and growing conditions are present. The user assumes all risks of use and handling.

The recommendations in this guide are for K-Row 23 only; the addition of other fertilizers at or near the same time could increase the chance of phytotoxicity to the crop. When working with an unfamiliar blend formulation or application method, always do a small test plot before treating the whole field.

The application of K-Row 23 for purposes other than those listed on this application guide is not recommended. For information on safety and handling, consult a Safety Data Sheet (SDS) or visit our website at cropvitality.com/KRow23.



TECHNICAL DATA

K-Row 23

Plant Nutrient Content Weight %

Soluble Potash (as K ₂ O)	23
Total Sulfur (S)	8

Typical Properties

Specific Gravity	1.38
pH	8.0 - 9.0
Appearance	Clear, Colorless to Slightly Yellow
Salt-Out Temperature	-4°F
Actual Salt Index	46



See SDS for additional information on safety and handling at: cropvitality.com/krow23
Keep out of reach of children. Use caution when handling.



Warranty and Limitation of Damages

Tessenlo Kerley, Inc. (TKI) warrants only that this product conforms to the product description in the Application Guide. Except as warranted by this description, TKI makes no representation or warranty or guarantee, whether expressed or implied, of fitness for a particular purpose of merchantability, or of product performance. TKI does not authorize any agent or representative to make any such representation, warranty or guarantee. To the extent consistent with applicable law, TKI's maximum liability for breach of its warranty or for use of this product, regardless of the form of action, shall be limited to the purchase price of this product. To the extent consistent with applicable law, buyer and user acknowledge and assume all risks and disposal liability resulting from handling, storage, use and disposal of this product. If buyer does not agree with or accept these warranty and liability limitations, buyer may return the unopened container to the place of purchase for full refund. Buyer's use of this product shall constitute conclusive evidence of buyer's acknowledgment and acceptance of the forgoing limitations. Some jurisdictions do not allow the exclusion of implied warranties or the limitation of certain damages, so the above may not apply. The purchase, delivery, acceptance and use of this product by the buyer are subject to the terms and conditions of seller's sales invoice for this product.

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