



Liquid Fertilizer

KTS

Potassium and Sulfur Nutrition | Nitrification Inhibitor
0-0-25-17S

KTS[®] - Potassium Thiosulfate Solution

Soluble Potash (K ₂ O)	25%
Total Sulfur (S) derived from Potassium Thiosulfate	17%
Density: pounds per gallon at 60°F	12.2
Volume: gallons per ton	164
Pounds of potash (K ₂ O) per gallon at 60°F	3.0
Pounds of sulfur per gallon at 60°F	2.1



ENHANCE CROP QUALITY

HIGHLY SOLUBLE POTASSIUM AND SULFUR

GENERAL INFORMATION

KTS is the original liquid potassium and sulfur plant nutrient solution, key in delivering essential soluble potassium to your fertility program. KTS is a neutral to basic, clear liquid solution, containing 25% potash (K_2O) and 17% sulfur (S). Each gallon of KTS contains 3 pounds of K_2O and 2.1 pounds of S. KTS can be applied by drip, sprinkler or flood irrigation, as well as applied as a starter (2" x 2") or sidedress application. It can also be applied as a foliar treatment on select crops. The versatility of KTS allows it to be blended with other fertilizers to create complete (N-P-K) liquid blends.

KTS Delivers Results

- Is an excellent source of highly soluble potassium and sulfur.
- Blends easily with other liquid fertilizers, including Urea Solutions, UAN-32, 10-34-0 or 11-37-0 (See section: **"Blending with KTS"** for tips and precautions when blending).
- Versatile – can be used in starter blends, sidedress and foliar applications, and fertigation.
- Timing – As a liquid fertilizer, the solubilized nutrients in KTS can be delivered to a developing crop at crucial growth stages. Potassium requirements for most crops increase dramatically during periods of rapid growth and fruit development.

Thiosulfate sulfur has been shown to help improve solubility of nutrients like phosphorous, zinc, manganese, and iron. Thiosulfate is also a proven nitrification inhibitor.

The Thiosulfate Advantage

KTS contains 17% sulfur in the form of thiosulfate ($S_2O_3^{-2}$). Thiosulfate provides unique benefits when applied to cropping systems, including the following:

Thiosulfate is a highly soluble source of sulfur, great for liquid blends. When applied to soils, thiosulfate immediately begins to oxidize to sulfate-sulfur. Within 1 to 3 weeks, depending on soil temperature, soil type and rate of application, most of the thiosulfate sulfur converts to sulfate-sulfur, and in the process can increase the solubility

of phosphorous and some micronutrients, including iron, zinc and manganese.

Thiosulfate acts as a nitrification inhibitor when blended with liquid urea and ammonium-based nitrogen fertilizers (including UAN solution). This slows the conversion of ammonium-nitrogen to leachable nitrate-nitrogen. Since ammonium does not leach as readily, the applied nitrogen remains available to the crop in the upper profile of the soil for a longer time. This can help the plant better utilize the applied nitrogen. The amount of nitrification inhibition increases as the concentration of applied thiosulfate increases. The ideal concentrations can easily be achieved in banded applications when greater than 5 lbs/A of thiosulfate-sulfur is applied.

Thiosulfate is an acidifier. As a dual nutrient source-acidifier the use of thiosulfate products, including KTS, is a highly effective and economical practice for lowering soil pH. KTS can be used to manage high pH soil, especially in crops that demand high amounts of potassium. KTS can be used to lower the soil pH for the following purposes: 1) For crops that prefer acidic soil conditions (e.g., blueberries), 2) For combating the effects of citrus greening disease (for more information on this use, contact a Crop Vitality representative), and 3) To release unavailable calcium from calcareous soils (soils high in calcium carbonate). When applying KTS for purposes of acidification, it is important to take periodic soil tests, and consult with local recommendations and a crop advisor. Over acidification of soils in some cases can be detrimental to crop growth. When applying KTS through drip irrigation, the concentration of product in the smaller wetted zone, should be considered.

The purpose of this guide is to provide information about KTS 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 KTS should be made based on a soil test, soil release rate test and/or plant tissue analysis for potassium and sulfur, and on the recommendations of a Certified Crop Advisor, Pest Control Advisor or authorized KTS 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

Many crops are sensitive to salts during germination. When soil moisture is low, delayed crop emergence and/or phytotoxicity may occur when fertilizer is placed too close to the seed. These starter recommendations are for a 2" x 2" (2 inches to the side and 2 inches below the seed) or a 2" x 0" (2 inches to the side of the seed on the soil surface).

Corn: 1 to 4 gallons of KTS per acre by itself or with other starter fertilizers.

Wheat: 1 to 4 gallons per acre by itself or with other starter fertilizers.

Other Crops: 1 to 3 gallons per acre by itself or with other starter fertilizers.

In-Furrow Fertilizer

Do not apply KTS directly on the seed of legumes or other small-seeded crops. Use caution applying KTS in pop-up fertilizer applications when soil moisture is limited, soil salinity is above an electrical conductivity of 1.0 or when irrigation is delayed such that germination may be affected.

Corn: 2 to 4 quarts of KTS per acre by itself or with other liquid pop-up fertilizers, based on 30" rows.

Wheat: 2 to 4 quarts of KTS per acre by itself or with other liquid fertilizers, based on 15" rows.

Sidedress Application

KTS 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. KTS can also be broadcast sprayed on 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 KTS 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 plants.

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.

FOLIAR FERTILIZER APPLICATION

Suggested foliar application rates for certain crops are listed. For crops not listed, contact a Crop Vitality Representative or your local KTS dealer. KTS may be applied by ground or air. Rate recommendations listed below are for KTS only. The addition of other products to the spray mix is the responsibility of the applicator and should be tested on the crop in a small area before applying to the entire field.

If used improperly, KTS can cause foliar burn. Use the following precautions when foliar applying KTS:

- Do not apply KTS to the foliage of any crop when temperatures are, or will be, above 90°F. If possible, apply early in the morning or late in the evening.
- Use caution when applying fertilizer to crops experiencing heat or moisture stress. Crops should be well-watered before applying any fertilizer.
- Do not apply KTS foliarly with crop oil sprays and silicon adjuvants. Allow at least 14 days before or after an application of crop oil before applying KTS as a foliar.
- Do not use high-pressure sprays (greater than 60 psi) when applying KTS over the top of a crop.

Cotton: 4 to 5 quarts per acre beginning from the 1st through to the 4th week of bloom along with 2 quarts/acre of N-Sure.

Potatoes: 2 to 4 quarts per acre beginning at tuber initiation; apply second treatment at golf ball size tubers and third treatment at tuber bulking.

Wheat and other Small Grains: 2 to 8 quarts per acre at tillering to early boot stage.

Canola: 2 to 8 quarts per acre at bolting.

Alfalfa: 4 to 8 quarts per acre at crown green up or on regrowth just after cutting.

Rice: 4 to 6 quarts per acre at initiation.

Peas and Lentils: 2 to 4 quarts per acre during late bud to 10% bloom.

Tomatoes: Begin at fruit set; apply 2 to 4 quarts per acre every 7 to 14 days.

Trees: KTS at 2 to 6 quarts per acre in a minimum spray volume of 100 gallons per acre. Begin application at first full leaf and apply as needed during the growing season. For concentrated sprays of less than 100 gallons per acre, reduce the rate of KTS to stay within the recommended solution ratio (i.e., 50 gallons of water per acre equals 1 to 3 quarts of KTS per acre).

Soybeans: 4 to 6 quarts per acre at R1 to R2 stage.

Sugar Beets: 1 to 2 gallons per acre at bloom.

Vines: Begin 2 weeks after bloom: 2 to 4 quarts per acre in a minimum of 50 gallons of water. Repeat treatment in 7 to 10 days. *Do not apply foliar to Concord grapes.*

FERTIGATION

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

Before injecting KTS into an irrigation system, make sure that the irrigation system is in good condition and provides uniform distribution to the field. When applying KTS through sprinkler and micro-irrigation systems, injection should occur in the middle third or second half of the irrigation set.

The injection of KTS 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 KTS should be done with a fertilizer injection pump and should be done over a 1 to 4 hour time period. Rapid injection of KTS may lead to uneven distribution of the KTS 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 KTS through irrigation systems, use the following precautions:

- Use caution when applying KTS to crops that are experiencing heat or moisture stress. As temperatures increase, KTS 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 KTS while chlorinating irrigation system. Thiosulfates will neutralize chlorine.
- When applying KTS 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 KTS.

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 10 gallons per acre per application; apply once every 2 to 3 weeks.

Trees and Vines: 5 to 12 gallons per acre per application; apply once every 2 to 3 weeks starting at full leaf.

Alfalfa: Apply 4 to 8 gallons per acre of KTS to seedling alfalfa with irrigation water. Apply 5 to 12 gallons per acre with irrigation water to an established crop.

Sprinkler and Center Pivot Irrigation

Application of KTS by solid-set sprinklers should be followed by additional irrigation time to reduce the possibility of fertilizer injury to the crop. Always apply KTS in a full irrigation set and if possible, avoid application during the midday when temperatures are high.

When applying KTS 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 6 gallons per acre every 7 to 10 days based on crop requirements.

Trees (Under): 5 to 8 gallons per acre per application every 10 to 14 days based on crop requirements.

Trees (Overhead): 3 to 5 gallons per acre every 10 to 14 days based on crop requirements.

Vines: 3 to 5 gallons per acre every 10 to 14 days based on crop requirements.

Drip Irrigation

Vegetable and Row Crops: 3 to 5 gallons per acre, once every 10 days, no more than 3 times per month.

Young Trees: 3 to 5 gallons per acre during the season, starting at full leaf; apply once every 3 to 4 weeks.

Mature Trees: 5 to 10 gallons per acre, starting at full leaf; apply once every 3 to 4 weeks.

Grapes: To mature vines, apply 5 to 10 gallons per acre as required according to tissue analysis, no more than once every 2 weeks. To young vines, apply 3 to 5 gallons per acre, no more than once every 3 to 4 weeks.

Strawberries, Blueberries and Caneberries: 3 to 5 gallons per acre once every 10 days after plants are well established, no more than 3 times per month.

Micro-Sprinkler (Fan Jet)

Trees: To mature trees, apply 6 to 12 gallons per acre, once every 3 to 4 weeks. To young trees, apply 3 to 5 gallons per acre, once every 3 to 4 weeks

Grapes: To mature vines, apply 5 to 12 gallons per acre, once every 3 to 4 weeks. To young vines, apply 3 to 5 gallons per acre, once every 3 to 4 weeks.

BLENDING WITH KTS

KTS blends easily with many liquid fertilizers giving the flexibility to create complete N-P-K blends. KTS 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 KTS:

- Always do a jar test before blending large quantities.
- Do not mix KTS with acid or acidic fertilizers below a pH of 6.0.
- When mixing pesticides with KTS, always ensure compatibility first with a jar test. The blend sequence should be as follows: water, then pesticide, followed by KTS 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 KTS. In most situations, micro-nutrients must be chelated to a neutral pH. Strongly acidic and/or weak chelates do not blend well with KTS.

Blending KTS with UAN Solutions

When blending KTS and UAN solutions, add water on a weight basis equal to the weight of KTS or UAN, whichever is in the smallest quantity. Blending order should be: KTS, then water, followed by UAN. Blends with UAN solution should be tested first before making large quantities. In cold weather, the potassium in KTS 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 KTS visit cropvitality.com/compatibility or contact a Crop Vitality representative.

PH AND CROP PRODUCTIVITY

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. Periodic testing of soils is the only way to determine soil pH and the appropriate course of action to maintain soils at their full productive potential. Minimize or avoid applications of KTS if the pH of the soil is below 6.0 and there is no liming program in place.

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 KTS 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 KTS 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/KTS.

TECHNICAL DATA

KTS

Plant Nutrient Content Weight %

Soluble Potash (K ₂ O)	25
Total Sulfur (S)	17

Typical Properties

Specific Gravity	1.46
pH	7 to 8.2
Appearance	Clear, Colorless
Salt-Out Temperature	°F <15



See SDS for additional information on safety and handling at: cropvitality.com/kts

Keep out of reach of children. Use caution when handling.



Warranty and Limitation of Damages

Tessenderlo 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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