

# THE ORIGINAL

## AMMONIUM THIOSULFATE

12-0-0-26S

LIQUID FERTILIZER

### Thio-Sul® – Ammonium Thiosulfate Solution

Total Nitrogen (N) as Ammoniacal Nitrogen	12%
Total Sulfur (S) derived from Ammonium Thiosulfate	26%
Density: pounds per gallon at 68°F	11.1
Volume: gallons per ton	180

#### GENERAL INFORMATION

Thio-Sul is the original nitrogen-sulfur plant nutrient solution instrumental in unlocking the full potential of your fertility program. Thio-Sul is a clear liquid containing 12% N and 26% S and is the most popular S-containing product used in the fluid fertilizer industry. Thio-Sul is compatible with N solutions and complete (N-P-K) liquid blends that are neutral to slightly acidic. In addition to its wide adaptability for use in clear liquid blends, it is also well suited for use in suspensions.

Thio-Sul aids in increasing crop yields and stretching fertilizer dollars by improving the Nitrogen-Sulfur balance and helps in maintaining necessary sulfur levels in sulfur

deficient soils. Thio-Sul helps solubilize other nutrients in the soil like phosphorus and micronutrients such as zinc, manganese, iron, and copper for better plant utilization.

Thio-Sul contains nitrogen in the ammoniacal form and sulfur as thiosulfate. Thiosulfate sulfur is unique in that it exists in two oxidation states. This gives it enhanced pathways of availability more suitable to the sulfur uptake patterns of most plants. When applied to soils, Thio-Sul 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.



# THERE'S NO SUBSTITUTE FOR THE ORIGINAL

## GENERAL INFORMATION (CONTINUED)

Thio-Sul contains 1.3 pounds of nitrogen and 2.8 pounds of sulfur per gallon. Thio-Sul weighs 11.1 pounds per gallon.

Nitrogen and sulfur are important components of proteins. Sulfur deficiency may affect the plant's ability to utilize nitrogen for protein synthesis. For best management practices and utilization of nitrogen and sulfur, apply Thio-Sul with enough UAN solution or aqua ammonia to make an N: S ratio of 5:1. Plant tissue analysis is recommended to determine a crop's sulfur requirement.

Most crops need between 20 and 50 pounds of sulfur (7 to 18 gallons of Thio-Sul) per acre per crop depending upon local growing conditions, soil type, fertilizer placement, crop and yield potential. For best results, follow soil and plant tissue analysis guidelines on sulfur nutrition for crops in your area.

## THIOSULFATE AS A SULFUR SOURCE

The advantage of thiosulfate is that it is a highly soluble source of sulfur, great for liquid blends. After being applied to the soil, thiosulfates are oxidized to sulfate-sulfur over 1 to 3 weeks. When sulfur is applied totally in the sulfate form, some may be lost to leaching — the result of rainfall and/or irrigation water moving this form below the root zone.

Thio-Sul is often applied in combination with UAN solutions and aqua ammonia in supplying the sulfur needs of crops.

## THIO-SUL AS A NITROGEN STABILIZER

University research has shown Thio-Sul acts as a nitrification inhibitor when blended with UAN solution resulting in more nitrogen being available to the crop. Thio-Sul, when added to UAN solution at a 5 to 10% volume-to-volume ratio, delays nitrification, resulting in a decrease of potential losses from nitrate nitrogen leaching.

Thio-Sul, when added to UAN solution or aqua ammonia, allows the plant to better utilize the

applied nitrogen. Not only does Thio-Sul stabilize the nitrogen for plant use, but it is an excellent source of sulfur as well.

## Thio-Sul DELIVERS RESULTS

- Slows down nitrification, reducing risk of leaching nitrates
- Is an excellent source of sulfur
- Can be mixed with liquids in the same manner as UAN or 10-34-0 (11-37-0)
- Versatile – may be used as a 2" x 2" starter, broadcast, early top-dress and through irrigation water
- Increases fertilizer efficiency. Keeps nitrogen in the  $\text{NH}_4^+$  form (enhances phosphorus uptake)
- Inhibits nitrogen losses when applied as surface banding to pasture or wheat ground
- Helps reduce ammonia volatilization losses when applied with UAN or other liquid ammonium or urea fertilizer products

## APPLICATION & USE RECOMMENDATIONS

See Application Precautions on  
Page 5 Before Applying

## SOIL APPLICATION

**Row and Vegetable Crops (starter fertilizer):** Apply Thio-Sul as a band application 2 inches to the side and 2 inches below the seed row at 1 to 3 gallons per acre by itself or in combination with other liquid fertilizers.

**Row and Vegetable Crops (sidedress):** Inject 6 to 12 gallons of Thio-Sul per acre to meet the crop's sulfur requirement. If injection applications are made close to the row (less than 12 inches), reduce application rate by half (3 to 6 gallons per acre). Avoid root pruning. For preplant soil injection application, DO NOT apply Thio-Sul where it will be in direct seed contact.

**Trees and Vines (soil injection and surface banding):** Apply 5 to 10 gallons of Thio-Sul per acre early in the growing season for sulfur nutrition. Avoid pruning roots during injection application.

**Trees and Vines (broadcast):** Apply 10 to 12 gallons of Thio-Sul per acre in a broadcast spray by itself or mixed with water and/or other liquid fertilizers. For young trees and vines apply 5 to 8 gallons per acre. Prevent spray and drift from contacting drop foliage and tree bark.

## FERTIGATION

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

Before injecting Thio-Sul into an irrigation system, make sure that the irrigation system is in good condition and provides uniform distribution to the field. Application of nutrients like Thio-Sul should be made in the middle third or second half of an irrigation set.

*The injection of Thio-Sul 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 Thio-Sul should be done with fertilizer injection pump and should be done over a 1 to 4 hour time period. Rapid injections of Thio-Sul may lead to uneven distribution of fertilizer 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 Microirrigation," or University of Florida Bulletin #250 "Injection of Chemicals Into Irrigation Systems: Rates, Volumes, and Injection Periods."*

## SPRINKLER IRRIGATION

**Row and Vegetable Crops:** Apply 1 to 5 gallons of Thio-Sul per acre with irrigation water. Apply at planting or wait until the crop is at the 3rd or 4th leaf stage. Repeat as needed every 7 to 14 days. Thio-Sul may be mixed with nitrogen solutions (UAN) and applied as needed during the season.

**Trees (under):** Apply 5 to 8 gallons of Thio-Sul per acre with irrigation water every 10 to 14 days as needed beginning at full leaf stage.

**Trees (over):** Apply 3 to 4 gallons of Thio-Sul per acre with irrigation water every 10 to 14 days as needed beginning at full leaf stage.

**Vines:** Apply 2 to 4 gallons of Thio-Sul per acre with irrigation water every 10 to 14 days as needed.

**Alfalfa:** Apply 5 to 10 gallons per acre of Thio-Sul with irrigation water after cutting.

## FLOOD AND FURROW IRRIGATION

Thio-Sul may be applied with irrigation water. For best management practices, applications should be made when the crop may best utilize the nitrogen and sulfur. Apply 5 to 10 gallons per acre of Thio-Sul on lighter soils and 8 to 12 gallons per acre on heavier soils. Apply throughout majority of the crop's irrigation period.

**Row and Vegetable Crops:** Apply 5 to 10 gallons of Thio-Sul per acre per application with irrigation water.

**Trees and Vines:** Apply 5 to 10 gallons of Thio-Sul per acre per application with irrigation water.

**Alfalfa:** Apply 4 to 8 gallons per acre of Thio-Sul to seedling alfalfa with irrigation water. Apply 5 to 10 gallons per acre with irrigation water to an established crop.

## DRIP IRRIGATION

**Row and Vegetable Crops (drip tape and subsurface drip):** Apply 1 to 2 gallons of Thio-Sul per acre per treatment with full irrigation. Repeat application, as needed, every 7 to 10 days to provide adequate sulfur nutrition.

**Trees and Vines (subsurface drip):** Apply 2 to 4 gallons of Thio-Sul per acre per treatment with full irrigation. Repeat application after 14 to 21 days, or as needed, to provide adequate sulfur nutrition.

**Trees and Vines (drippers and mini sprinklers):** Apply 6 to 8 gallons of Thio-Sul per acre with a full irrigation. For young trees and vines apply 2 to 4 gallons of Thio-Sul per acre with a full irrigation. Repeat application in 14 to 21 days.

# EXPERIENCE

## THE FULL POTENTIAL OF YOUR CROPS

### TOPDRESSING

**Pastures and Small Grains Only:** Apply Thio-Sul along with nitrogen solutions (UAN) to provide adequate sulfur nutrition. For every 5 to 7 pounds of nitrogen, apply 1 pound of sulfur. Application on small grains should be done before jointing (Feekes Growth Stage 5). See Application Precautions. Tissue testing is recommended.

**Alfalfa:** Apply 5 to 10 gallons of Thio-Sul with a ground sprayer immediately after a cutting or during dormancy before regrowth has occurred.

### STRAW DECOMPOSITION

Thio-Sul may be used as an aid to straw decomposition. The effectiveness depends on the time of application, soil moisture and spray coverage on the straw.

While temperatures are still warm, lightly disc or chisel the ground after harvest. Spray a mixture of Thio-Sul and water over the stubble. Wait at least 6 weeks before another field cultivation. Apply 3 to 4 gallons of Thio-Sul for every ton of straw to be treated. Thio-Sul should be mixed in enough water or UAN/water solution to supply a minimum of 20 gallons of spray solution per acre. To be effective, thorough spray coverage of the straw is essential.

### 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 high pH can indicate the presence of free lime in the soil. Most crops do best with 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 Thio-Sul if the pH of the soil is below.



See SDS for additional information on safety and handling at:  
**[cropvitality.com/thiosul](http://cropvitality.com/thiosul)**

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

## APPLICATION PRECAUTIONS

DO NOT apply Thio-Sul directly on or below germinating seeds such as in a “pop up” fertilizer program. Reduced germination may result from dry soil conditions and when used in starter fertilizer blends.

Crop injury may result from unusual weather conditions, failure to follow label directions, or improper application practices, all of which are out of control of the manufacturer or seller. The directions on this label are believed to be reliable and should be followed carefully.

The application of Thio-Sul for purposes other than listed herein is not recommended.

## SPRINKLER IRRIGATION

Application of Thio-Sul by sprinklers should be followed by 1 to 2 hours of additional irrigation to reduce the possibility of fertilizer injury. Always apply Thio-Sul with a full irrigation and avoid application during mid-day when temperatures are high.

Center pivot application of Thio-Sul at recommended rates is diluted with enough water that foliar burning is not normally a problem.

Thio-Sul should not be mixed with acids or other acidic material below a pH of 6.0

DO NOT apply  
as a foliar spray on trees  
or vegetable crops

A jar test is recommended when mixing with pesticides to check for physical compatibility. When mixing Thio-Sul or any liquid fertilizer with pesticides, always keep agitators running during filling and spraying operations. Failure to maintain agitation may cause separation of products, resulting in uneven spray application, which may result in phytotoxicity occurring to targeted crop.

## SOIL INJECTION

Avoid pruning roots with injection equipment when applying Thio-Sul.

## TOPDRESSING

DO NOT top-dress (by airplane or ground rig) with Thio-Sul when temperatures are above 70°F and relative humidity is below 30%. Some foliar burn may occur even under the best of conditions. When working with a new formulation or application method, always do a small test plot before treating the whole field.



# TECHNICAL DATA

## Thio-Sul 12-0-0-26S

### PLANT NUTRIENT CONTENT WEIGHT %

Total Nitrogen (N) as Ammoniacal Nitrogen	12
Total Sulfur (S)	26

### TYPICAL PROPERTIES

Specific Gravity	1.33
pH	6.5 - 8.5
Appearance	Clear, Colorless to Yellow
Salt-Out Temperature	45°F

### FORMULATION AND APPLICATION FACTORS, 68°F

Density: pounds per gallon	11.1
Volume: gallons per ton	180
Pounds of Nitrogen per gallon	1.3
Pounds of Sulfur per gallon	2.8



### 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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