



SECTION 1: Identification of the Substance / Mixture and of the Company / Undertaking

1.1. Product Identifier

Product Name : Tetrakis(hydroxymethyl)phosphonium Sulfate (THPS 75%)
CAS-No. : 55566-30-8
EPA Reg No : 33677-5-075713

1.2. Details of the Distributor of the Safety Data Sheet

Company Name : GreenSol Limited
Address : #39-41 Marryat Street, San Fernando, Trinidad, West Indies
Telephone : +1(868) 225-4858
Mobile : +1(868) 720-2517
Email : sdeokiesingh@greensolltd.com

1.3. Emergency Telephone Number

Emergency Number : +1(868) 720-2517 (GREENSOL)
: +1(800) 424-9300 (CHEMTREC)

SECTION 2: Hazard Identification

GHS Classification:

Acute toxicity, Oral : Category 4
Acute toxicity, Inhalation : Category 3
Serious eye damage : Category 1
Skin sensitization : Sub-category 1A
Reproductive toxicity : Category 1B (suspected)
Hazardous to the aquatic environment, Acute : Category 1
Hazardous to the aquatic environment, Chronic : Category 2
Hazard Pictograms :



GHS06



GSH05



GHS09

Signal Word : **DANGER**
Hazard Statements : H302: Harmful if swallowed.
H331: Toxic if inhaled.
H317: May cause an allergic skin reaction.
H318: Causes serious eye damage.
H360: May damage fertility or the unborn child (suspected).



Precautionary Statements

H400: Very toxic to aquatic life.
H411: Toxic to aquatic life with long lasting effects.

Prevention:
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing mist/vapors/spray.
P264: Wash hands and exposed skin thoroughly after handling.
P272: Contaminated work clothing should not be allowed out of the workplace.
P280: Wear protective gloves / protective clothing / eye protection / face protection.
P273: Avoid release to the environment.

Response:
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P311: Call a POISON CENTER / doctor.
P301+P312: IF SWALLOWED: Call a POISON CENTER / doctor if you feel unwell.
P330: Rinse mouth.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER / doctor.
P302+P352: IF ON SKIN: Wash with plenty of water.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
P362+P364: Take off contaminated clothing and wash it before reuse.

Storage / Disposal:
P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P501: Dispose of contents/container in accordance with local/regional/national regulations.

SECTION 3: Composition / Information on Ingredients

Name	CAS No.	%
Tetrakis (Hydroxymethyl) Phosphonium Sulfate	55566-30-8	74-77%

SECTION 4: First Aid Measures



Eye Contact	: Hold eyelids open and flush with a steady, gentle stream of water for a least 15 minutes. Seek immediate medical attention.
Skin Contact	: In case of contact, immediately wash with plenty of soap and water for at least 5 minutes. Seek medical attention if irritation develops or persists. Removed contaminated clothing and shoes. Clean contaminated clothing and shoes before re-use.
Inhalation	: If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues.
Ingestion	: Wash out mouth and keep at rest. Seek immediate medical attention. Medical conditions possibly aggravated by exposure: Skin contact may aggravate existing skin disease.
NOTES TO PHYSICIAN	: All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred. Treat symptomatically. No specific antidote available.

SECTION 5: Firefighting measures

Flash Point, oF, (Setaflash)	: N/A
Lower Flammability Limits	: N/D
Upper Flammability Limits	: N/D
Extinguishing Media	: Agents approved for Class B hazards, (i.e., Water fog, foam, dry chemical, carbon dioxide).
Special Firefighting Procedures	: Firefighters should wear NIOSH/MSH Approved self-contained breathing apparatus and full protective clothing. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind; keep out of low areas. Evacuate residents who are downwind of fire.
Unusual Fire and Explosion Hazards	: Containers may explode (due to build-up of pressure) when exposed to extreme heat.
Hazardous Decomposition Materials (Under Fire Conditions)	: Oxides of sulfur, Oxides of phosphorus, and/or Oxides of carbon.

SECTION 6: Accidental Release Measures

Evacuation Procedures and Safety	: Ventilate closed spaces before entering. Personnel handling this material should be thoroughly trained to handle spills and releases.
----------------------------------	---



- Wear appropriate protective gear for the situation. See Personal Protection Information in Section VIII. Evacuate and isolate spill area.
- Containment of Spill : Stop leak if it can be done without risk. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike area to prevent run-off. Collect and contain contaminated absorbent and dike material for disposal.
- Cleanup and Disposal of Spill : Recover material, if possible. **DO NOT RETURN MATERIALS TO ITS ORIGINAL CONTAINER.** Absorb with an inert absorbent. Shovel up into an appropriate closed container (see Section VII: Handling and Storage). Decontaminate tools and equipment following cleanup.
- Environmental and Regulatory Reporting : Do not flush to drain. Runoff from fire control or dilution water may cause pollution. Prevent material from entering public sewer system or any waterways. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

SECTION 7: Handling & Storage

- Handling : Personnel handling this product should be thoroughly trained as to its hazards. Do not get on skin or in eyes. Avoid direct or prolonged contact with skin and eyes. Avoid breathing vapors and mists. Use only as directed.
- Hazardous Warning : This product belongs to a chemical family that **HAS BEEN TESTED** in combination with Trimethylolpropane, Trimethylolpropane derived products or their corresponding Trimethylolpropane homologs for toxicity of the thermal decomposition products in the absence of flame. Products in this chemical family **PRODUCED NO SIGNIFICANT ADVERSE HEALTH EFFECTS** in laboratory animals. However, there is a possibility that this thermal decomposition may produce bicyclic phosphates and/or phosphites in combination with certain other phosphorus compounds. Bicyclic phosphates and phosphites have acute neurotoxic properties and may cause convulsive seizures in laboratory test animals. Follow all precautionary measures outlined in this Material Safety Data Sheet.
- Storage : Store in an area that is clean, cool, dry, well ventilated. Store away from bases, oxidizers, reducing agents. Store in tightly closed containers. Container material to avoid: Ordinary steel. Recommended container material: high density, high molecular weight polyethylene containers.



SECTION 8: Exposure Controls / Personal Protection

- Introductory Remarks : These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section XIII: Disposal Considerations. Assistance with this selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.
- Exposure Guidelines : No exposure limits were found for this product.
- Engineering Controls : Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures.
- Respiratory Protection : When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standard and/or industrial recommendations.
- Eye/Face Protection : Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. Eye contact should be prevented through use of chemical safety glasses with side shields or splash proof goggles. An emergency eyewash must be readily accessible to the work area. Face contact should be prevented through use of a face shield.
- Skin Protection : Skin contact should be prevented through use of suitable protective clothing, gloves and footwear, selected with regard for use conditions and exposure potential. Consideration must be given both to durability as well as permeation resistance.
- Work Practice Controls : Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:
- (1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
 - (2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
 - (3) Wash exposed skin promptly to remove accidental splashes or contact with this material.



SECTION 9: Physical and Chemical Properties

Appearance/odor	: Clear to pale yellow liquid
State	: Liquid
pH	: 3.24 at 100 wt/wt%
Specific Gravity	: 1.414 at 200C (680F)
Solubility in Water	: Miscible
Melting Point	: N/D
Vapor Pressure	: N/D
Vapor Density	: N/D
Boiling Point	: N/D
Evaporation Rate	: N/D
Viscosity (centistokes)	: 21cs at 250C (770F)
Vapor Density	: N/D

SECTION 10: Stability and Reactivity

Chemical Stability	: This product is stable under normal handling and storage conditions described in Section 7. Under unusual conditions, such as very high temperatures and/or in the presence of strong reducing agents, the product may break down to form hazardous decomposition products noted below. The customer is advised to seek further advice from Water Management Chemicals Technical Service personnel when considering such applications.
Conditions to Avoid	: Heat, Temperatures above 1600C. See HAZARD WARNING and HANDLING: in Section 7.
Incompatible Materials	: Strong bases and/or Strong oxidizing agents.
Decomposition Products	: Thermal Decomposition: Oxides of Sulfur, Oxides of Phosphorus, Oxides of Carbon, and/or Phosphine Gas.
Hazardous Polymerization	: Will not occur

SECTION 11: Toxicological Information

ACUTE EYE IRRITATION	: The following data are for similar or related products.
Toxicological Information and Interpretation	: eye- eye irritation, rabbit. Severely irritating. This material is expected to cause significant irritation to the eyes.
ACUTE SKIN IRRITATION	: The following data are for similar or related products.
Toxicological Information and Interpretation:	: Skin - skin irritation, rabbit. Minimally irritating. This material is not expected to cause significant irritation to the skin. Skin - sensitization, guinea pig. Sensitizing. May cause significant allergic skin reaction.
ACUTE DERMAL TOXICITY	: The following data are for similar or related products.



Toxicological Information and Interpretation	: LD50 - lethal dose 50% of test species, >4000 mg/kg, rat.
ACUTE RESPIRATORY IRRITATION	: The following data are for similar or related products.
Toxicological Information and Interpretation	: Lung - lung irritation (qualitative), **. This material is not expected to cause significant irritation to the respiratory tract.
ACUTE INHALATION TOXICITY	: The following data are for similar or related products.
Toxicological Information and Interpretation	: LC50 - lethal concentration 50% of test species, 2.28 mg/l/1 hr, rat.
Acute Oral Toxicity	: The following data are for similar or related products.
Toxicological Information and Interpretation	: LD50 - lethal dose 50% of test species, 967 mg/kg, rat.
Chronic Toxicity	: Suspected reproductive toxin (animal studies – fertility, developmental effects) The following data is for similar or related products. Toxicological Information and Interpretation - REPRODUCTIVETOXICITY, rat. Material is not a reproductive toxin. - CARCINOGENICITY, **. There was no evidence of carcinogenicity in F344/N rats and B6C3F1 mice (both sexes) dosed by gavage at 5 or 10 mg THPS/kg/day for 2 years. Aref. NTP study report TR296, 1987 . - CHRONIC EXPOSURE, **. Medical surveillance for over 30 years of employees in our manufacturing facility has shown no evidence of developmental toxicity from long-term exposure following an acute incident, for example, a major or minor spillage. -MUTAGENICITY, **. Ames test: Negative. - MUTAGENICITY, **. Chinese hamster ovary cells (chromosomal aberrations): Positive. TERATOGENICITY, **. Studies in both rats and rabbits showed no indications of developmental toxicity in the absence of marked material (parental) toxicity. No observed effect level for development 15mg/kg/bodyweight. No observed effect level for development 18 mg/kg body weight. - MUTAGENICITY, **. Mouse micronucleus (in vivo): Negative. - MUTAGENICITY, **. Unscheduled DNA synthesis assay: Negative.

SECTION 12: Ecological Information

Ecotoxicological Information	: Not expected to cause significant adverse environmental impact if product reaches waterways. The following data is based on the technical grade active ingredient(s) (TGAI).
Ecotoxicological Information and Interpretation	: LG50 - Lethal concentration 50% of test species, 19.4 mg/l/48 hr, Daphnia magna.



LG50 - Lethal concentration 50%of test species, 93 mg/l/96 hr, bluegill sunfish (Lepomis macrochirus).
 LG50 - Lethal concentration 50%of test species, 119 mg/l/96 hr, rainbowtrout (Oncorhynchus mykiss).
 LG50 - Lethal concentration 50%of test species, 86 mg/l/96 hr., Juvenile Plaice.
 LG50 - Lethal concentration 50%of test species, 340 mg/l/96 hr. Brown Shrimp.
 LC50 – ecotox Method for association with dry sediment weight., 2174 mg/l/10 days, Corophium Volutator. (Dry sediment weight).
 LD50 - lethal dose 50% of test species, 311 mg/kg, Mallard duck (anas platyrhynchos).

Chemical Fate Information

: Product is not expected to bioaccumulate. The following data is for similar or related product. This product is readily biodegradable under aerobic and anaerobic conditions in a sediment-water system. 28 days (aerobic) and 30 days (anaerobic). THPS has been shown to degrade rapidly once diluted to sub-ppm concentrations and forms trishydroxymethyl phosphine oxide which is classified as nontoxic.

SECTION 13: Disposal Considerations

Waste Classification

: Chemical additions, processing or otherwise altering this material any make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.

EPA Hazardous Waste

: No

SECTION 14: Transportation Information

DEPARTMENT OF TRANSPORTATION:

DOT Proper Shipping Name : Toxic Liquid, Organic, n.o.s., (Contains Phosphonium, tetrakis (Hydroxymethyl)-, Sulfate), 8(6.1), UN2922, PGIII
 DOT Hazard Class : 8(6.1)
 DOT Identification Number : UN2922
 DOT Identification Name: : Phosphonium, Tetrakis (Hydroxynethyl)-, Sulfate
 DOT Packaging Group : III
 2000 ERG Guide Number : 153



SECTION 15: Regulatory Information

- TSCA : This product is excluded from TSCA because it is solely for FIFRA regulated use.
- CERCLA : If reportable quantity of this product is accidentally spilled the incident is subject to the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act and must be reported to the National Response Center by calling (800) 424-8802.
- CERCLA Component CAS # Wt. % : None
- RQ, lbs Product RQ Value
- SARA TITLE III : This product contains the following Extremely Hazardous Substance under EPCRA section 302/304 lists.
- EHS Component CAS# Wt. % RQ, lbs :
TPQ, lbs

Under the provisions of Title III, Sections 311/312 of the Superfund Amendments and Reauthorization Act, this product is classified into the following hazard categories:

Acute Health X Chronic Health Fire Pressure Reactive

This product contains the following Section 313 Reportable Ingredients:

313 Component CAS # Wt. %

None

SECTION 16: Other Information

Hazardous Material Identification System Category Rating:

Health: 2

Flammability: 0

Reactivity: 1

Personal Protection: C

This rating scheme rates health, fire, and reactivity on a scale of 0 to 4.

0 = No significant hazard 1 = Slight Hazard 2 = Moderate Hazard 3 = High Hazard 4 = Extreme Hazard

Personal Protective Equipment Guide:

A = Safety Glasses G = Safety Glasses, Gloves, Vapor Respirator

B = Safety Glasses, Gloves H = Safety Goggles, Gloves, Apron, Vapor Respirator

C = Safety Glasses/Goggles, Gloves, Apron I = Safety Glasses, Gloves, Apron, Dust & Vapor Respirator

D = Gloves, Apron, Face shield J = Splash Goggles, Gloves, Apron, Dust & Vapor Respirator

E = Safety Glasses, Gloves, Dust Respirator K = Air Line Hood/Mask, Gloves, Full Suit, Boots F = Safety

Glasses, Gloves, Apron, Dust Respirator X = Ask supervisor for special handling instructions.

Component data taken from Sax's Dangerous properties of Industrial Materials, 10th Edition, John Wiley & Sons; Vendor's MSDS



Sheets, NIOSH "Pocket Guide to CHEMICAL HAZARDS", U.S. Department of Health and Human Resources, 1997; The Merck

Index, 9th Edition, Merck&Co., Inc.; "ACGIH2002 TLVs and BEIs", American Conference of Governmental Industrial Hygienists;

"Quick Selection Guide to CHEMICALPROTECTIVE CLOTHING", 3RDEdition, John Wiley& Sons, Inc. ,1997.

Definitions

ACGIH: American Conference of Governmental & Industrial Hygienists ANSI: American National Standard Institute

BEI: Biological Exposure Indices - individual tests via urine or exhaled air CERCLA: Comprehensive Emergency Response, Compensation, and Liability Act DOT: U.S. Department of Transportation

EPA: U.S. Environmental Protection Agency HMIS: Hazardous Materials Identification System

IARC: International Agency for Research on Cancer

LC50: Lethal Concentration 50: A calculated concentration of the substance which is expected to cause death in 50%of

an entire defined experimental animal population.

LCLo: Lethal Concentration Low: The lowest concentration of a material in air (other than LC50) that has been reported to

have caused death in humans or animals.

LD50: Lethal Dose 50: A calculated concentration of the substance which is expected to cause death in 50% of an entire

defined experimental animal population.

LDLo: Lethal Dose Low: the lowest dose (other than LD50) of a material introduced by any route, other than inhalation, over

any given period of time in one or more divided portions and reported to have caused death in humans or animals.

MSHA: Mine Safety and Health Administration N/A: Not Applicable

N/D: Not Determined NE: Not Established

NFPA: National Fire Protective Association

NIOSH: National Institute for Occupational Safety & Health NSF: National Sanitation Foundation

NTP: National Toxicology Program

OSHA: U.S. Occupational Safety and Health Administration PEL: Permissible Exposure Limit

PPE: Personal Protective Equipment

RCRA: Resource Conservation and Recovery Act REL: Recommended Exposure Limit (NIOSH) RQ: Reportable Quantity

SARA: Superfund Amendments and Reauthorization Act of 1986 Title III SCBA: Self Contained Breathing Apparatus

STEL: Short Term Exposure Limit

TCLo: Toxic Concentration Low: The lowest concentration of a material in air to which humans or animals have been

exposed for any given period of time that has produced any toxic effect in humans or produced a carcinogenic,

neoplastigenic, or teratogenic effect in animals or humans.



TLV: Threshold Limit Value: A recommended upper limit or TWA concentration of a substance to which most workers

can be exposed without adverse effects.

TSCA: Toxic Substances Control Act TWA: Time Weighted Average

Wt: Weight

<: Less Than

>: Greater Than

Notice to Reader:

This SDS provides the information contained in this document in good faith but makes no representation as to its accuracy. This document is intended solely to guide the safe handling of the material by a properly trained individual. The final determination of the suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be handled with caution. Although some hazards are described, it cannot be guaranteed that these are the only hazards that exist.

Version	Date of Change	Change Description	Responsible Person
2	01-01-2025	Updated to supplier SDS Rev. 2	Laboratory Coordinator