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

1.1. Product Identifier

Trade name	:	Glutaraldehyde, 50% Aqueous Solutions; Glutaric Dialdehyde 50% Solution
Chemical name	:	Glutaraldehyde 50% solution
CAS-No.	:	111-30-8
Formula	:	OCH(CH2)3CHO in H2O
Molecular Weight	:	100.12

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

Hazard Pictogram :

GHS08 GHS05 GHS06 GSH09

Signal Word	:	**DANGER**
Hazard Statement	:	Toxic by inhalation and if swallowed. Causes burns. May cause sensitization by inhalation and skin contact. Very toxic to aquatic organisms.

Hazard

Acute toxicity Oral	:	H301: Toxic if swallowed
Acute toxicity (Inhalation)	:	H331: Toxic if inhaled.
Skin Corrosion	:	H314: Causes severe skin burns and eye damage.
Respiratory Sensitization	:	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Sensitization	:	H317: May cause an allergic skin reaction
Inhalation	:	H335: May cause respiratory irritation.
Acute aquatic toxicity	:	H400: Very toxic to aquatic life.
Caution Tips	:	**Prevention:** P260: Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
P285: In case of inadequate ventilation wear respiratory protection.
P273: Avoid release to the environment.
Response:
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
Disposal:
Dispose of contents/container through a waste management company authorized by the local government

Other Hazards : No information available

SECTION 3: Composition / Information on Ingredients

Ingredient Name	Concentration	Cas Number
Glutaraldehyde	50%	111-30-8
Water	50%	7732-18-5

SECTION 4: First Aid Measures

Inhalation : Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth-to-mouth use rescuer protection (Pocket mask etc.). Call a poison control center or doctor for treatment advice. If breathing is difficult, oxygen should be administered by qualified personnel.

Skin contact : Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly. Suitable emergency safety shower facility should be immediately available.

Eye contact	:	Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available
Ingestion	:	If the person is fully alert and cooperative, have the person rinse mouth with plenty of water. In cases of ingestion have the person drink 4 to 10 ounces (120-300 mL) of water. Do not induce vomiting. Do not attempt mouth rinse if the person has respiratory distress, altered mental status, or nausea and vomiting. Call a physician and/or transport to emergency facility immediately. See "Indication of immediate medical attention and special treatment needed". Seek medical attention immediately.
Protection of first-aiders	:	A rescuer should wear personal protective equipment, such as rubber gloves and airtight goggles.

SECTION 5: Firefighting measures

Fire Extinguishing Media	:	To extinguish combustible residues of this product use water for, carbon dioxide, dry chemical or foam.

5.1. Special hazards arising from the substance or mixture

Hazardous Combustion Products	:	Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.
Unusual Fire and Explosion Hazards	:	This material will burn until the water has evaporated.
Hazards	:	Residue can burn.

5.2. Advice for firefighters Fire Fighting Procedures

Keep people away. Isolate fire and deny unnecessary entry. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

5.3. Special Protective Equipment for Firefighters:

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during firefighting operations. If contact is likely, change to full chemical resistant firefighting clothing with elf-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-

contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Evacuate area. Keep upwind of spill. Ventilate area of leak or spill. Only trained and properly protected personnel must be involved in clean-up operations. Refer to Section 7, Handling, for additional precautionary measures.

Environmental precautions	:	Spills or discharge to natural waterways is likely to kill aquatic organisms. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information
Methods for Cleaning Up	:	Avoid making contact with spilled material, glutaraldehyde will be absorbed by most shoes. Always wear the correct protective equipment, consisting of splashproof monogoggles, or both safety glasses with side shields and a wraparound full-face shield, appropriate gloves and protective clothing. A self-contained breathing apparatus or respirator and absorbents may be necessary, depending on the size of the spill and the adequacy of ventilation. Small spills: Wear the correct protective equipment and cover the liquid with absorbent material. Collect and seal the material and the dirt that has absorbed the spilled material in polyethylene bags and place in a drum for transit to an approved disposal site. Rinse away the remaining spilled material with water to reduce odor, and discharge the reinstate into a municipal or industrial sewer. Large spills: In case of nasal and respiratory irritation, vacate the room immediately. Personnel cleaning up should be trained and equipped with a self-contained breathing apparatus, or an officially approved or certified full-face respirator equipped with an organic vapor cartridge, gloves, and clothing impervious to glutaraldehyde, including rubber boots or shoe protection. Deactivate with sodium bisulfite (2-3 parts (by weight) per part of active substance glutaraldehyde), collect the neutralized liquid and place in a drum for transit to an approved disposal site.

SECTION 7: Handling & Storage

General Handling	:	Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Keep container closed. Use with adequate ventilation. Wear goggles, protective clothing and butyl or nitrile gloves. Wash thoroughly with soap and water after handling.

		Remove contaminated clothing and wash before reuse.
Other precautions	:	Do not spray or aerosolize the undiluted form of the product. Full personal protective equipment (including skin covering and full-face SCBA respirator) is required for dilutions or mixtures of the product used in a spray application.
Storage Conditions	:	Do not store in: Aluminum. Carbon steel. Copper. Mild steel. Iron
Shelf Life	:	Use within 12 Months

SECTION 8: Exposure Controls / Personal Protection

Appropriate engineering controls	:	Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath
Personal protective equipment	:	Vapor respirator. Follow local and national regulations.
Respiratory protection		
Hand protection	:	Protective Gloves
Eye protection	:	Safety glasses. A face-shield, if the situation requires.
Skin and body protection	:	Protective clothing, Protective boots, if the situation requires.

SECTION 9: Physical and Chemical Properties

Physical State	:	Liquid
Colour	:	Colourless to yellow
Odour	:	Fruity
pH	:	3.1 - 4.5 ASTM E70
Melting Point	:	No data available
Freezing Point	:	-18 °C OECD 102
Boiling Point (760 mmHg)	:	100.5 °C OECD 103 (ca. 212F)
Melting Point	:	-21C (ca. -6F) Freezing Point
Solubility	:	Soluble in water
Closed Cup	:	ASTM D56 (none)
Evaporation Rate (Butyl Acetate=1)	:	1.0 Literature
Flammability (solid, gas)	:	No
Flammable Limits In Air Lower	:	No test data available
Upper	:	No test data available
Vapor Pressure	:	0.20 @ 20C (68F) (based on glutaraldehyde)
Vapor Density (air = 1)	:	1.1 Literature
Specific Gravity (H2O = 1)	:	1.129 @ 20C OECD 109
Solubility in water (by weight)	:	100 % @ 20 °C Calculated
Autoignition Temperature	:	No test data available
Decomposition Temperature	:	No test data available
Dynamic Viscosity	:	15.4 mPa.s Literature
Kinematic Viscosity	:	20.2 mm2/s @ 20 °C Literature
Explosive properties	:	no data available

Oxidizing properties	:	No

SECTION 10: Stability and Reactivity

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical Stability	:	Thermally stable at typical use temperatures.
Possibility of Hazardous Reactions	:	Polymerization will not occur.
Conditions to Avoid	:	Active ingredient decomposes at elevated temperatures
Incompatible Materials	:	Avoid contact with: Amines. Ammonia. Strong acids. Strong bases. Strong oxidizers. Avoid contact with metals such as: Aluminum. Carbon steel. Copper. Iron. Mild steel.
Hazardous Decomposition Products	:	Decomposition products depend upon temperature, air supply and the presence of other materials.

SECTION 11: Toxicological Information

Acute Toxicity (Oral):

Type of Value	:	LD50 Species: rat (male/female)
Value	:	approx. 158 mg/kg (OECD Guideline 401)

Inhalation:

Type of Value	:	LC50 Species: rat (male/female)
Value	:	0.48 mg/l (OECD Guideline 403)
Exposure time	:	4 h An aerosol was tested

Dermal:

Type of Value	:	LD50 Species: rat (male/female)
Value	:	> 2,000 mg/kg (OECD Guideline 402) The data refer to a diluted watery solution of the substance.

Corrosion/irritation

Skin:

Species	:	rabbit Result: Corrosive.
Method	:	OECD Guideline 404 The data refer to a diluted watery solution of the substance

Eye:

Species	:	rabbit Result: Risk of serious damage to eyes.
Method	:	Draize test The data refer to a diluted watery solution of the substance

Sensitization:

Open epicutaneous test (OET)

Species	:	guinea pig

Result	:	sensitizing The data refer to a diluted watery solution of the substance.

Other Information Toxicological data applies only to the water free substance.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Fish	:	Fish
Acute	:	Fish test acute static. Cyprinodon variegatus/LC50 (96 h): 39 mg/l The details of the toxic effect relate to the nominal concentration. Fish test acute static Lepomis macrochirus/LC50 (96 h): 9.4 mg/l The details of the toxic effect relate to the nominal concentration.
Aquatic invertebrates		
Acute	:	Daphnia test acute static Daphnia magna/EC50 (48 h): 5.75: 5.75 mg/l The details of the toxic effect relate to the nominal concentration. other Flow through.: 0.75 mg/l mussel/EC50 (96 h): 0.75 mg/l The statement of the toxic effect relates to the analytically determined concentration.: 5.5 mg/l OPP 72-3 (EPA-Guideline) Flow through. Mysid shrimp/LC50 (96 h): 5.5 mg/l The statement of the toxic effect relates to the analytically determined concentration. Chronic: OECD Guideline 202, part 2 semi static Daphnia magna (NOEC) 21 d 2.5 mg/l The statement of the toxic effect relates to the analytically determined concentration.
Aquatic plants	:	Toxicity to aquatic plants: OECD Guideline 201 static green algae/EC50 (72 h): 0.6 mg/l The statement of the toxic effect relates to the analytically determined concentration. ISO/DIS 10253 Skeletonema costatum/EC50 (72 h): 0.92 mg/l The details of the toxic effect relate to the nominal concentration.
Microorganisms	:	Toxicity to microorganisms: OECD Guideline 209 aerobic activated sludge, domestic/EC20 (30 min): approx. 15 mg/l The details of the toxic effect relate to the nominal concentration.
Non-Mammals	:	Other terrestrial non-mammals: LD50: 0.73 ml/kg (50%aq.) Moderately toxic.

		Bioaccumulation Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected. Environmental mobility: Transport between environmental compartments
Plant	:	Toxicity to terrestrial plants: OECD Guideline 208 vetch/EC20 (19 d): > 450 mg/kg
Degradability/Per Sistence Biological/Abio gical Degradation	:	Test method: OECD 301 A (new version) (aerobic), activated sludge, domestic Method of analysis: DOC reduction Degree of elimination: 90-100 % (28 d) Evaluation: Readily biodegradable (according to OECD criteria). Readily biodegradable (according to OECD criteria).
Hydrolysis	:	Test method: Directive 92/69/EEC, C.7 (abiotic) pH7 Half-life: > 1 a (50 °C) In contact with water the substance will hydrolyse slowly. Bioaccumulation Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.
Environmental Mobility Transport between environmental compartments	:	other adsorption/water - soil log KOC: 0.76

SECTION 13: Disposal Considerations

Waste Treatment Methods	:	Incinerate in suitable incineration plant, observing local authority regulations. Do not discharge substance/product into sewer system. Incinerate or dispose of in a RCRA-licensed facility.
Container Disposal	:	Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

SECTION 14: Transportation Information

Land transport
USDOT
Hazard class: 8
Packing group: II
ID number: UN 2922
Hazard label: 8, 6.1, EHSM
Proper shipping name: CORROSIVE LIQUID, TOXIC, N.O.S. (contains GLUTARALDEHYDE)
Sea Transport
IMDG
Hazard class: 8

Packing group: II
ID number: UN 2922
Hazard label: 8, 6.1, EHSM
Marine pollutant: YES
Proper shipping name: CORROSIVE LIQUID, TOXIC, N.O.S. (contains GLUTARALDEHYDE)

Air Transport

IATA/ICAO
Hazard class: 8
Packing group: II
ID number: UN 2922
Hazard label: 8, 6.1
Proper shipping name:
CORROSIVE LIQUID, TOXIC, N.O.S. (contains GLUTARALDEHYDE)

SECTION 15: Regulatory Information

Safe Management Ordinance of Dangerous Chemical Product (State Council Announce on January 26,2002):

Safe use and production, the storage of a dangerous chemical, transport, loading and unloading were prescribed.

SECTION 16: Other Information

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
1	02-02-2023	Initial issue of SDS	Laboratory Coordinator