SAFETY DATA SHEET

Sulphur Fertilizer

Revision Date 17-Sep-2020

Revision Number 4

1. Identification

Product Name	Bio-Sul Premium Plus
Fertilizer Registration #	2019059F (Fertilizer Act)
Synonyms	Sulphur; Brimstone
Product Use	Fertilizer
Manufacturer/Supplier	GFL Environmental Inc. 5566 54th Ave SE Calgary, AB T2C 3A5 Tel: 1-888-755-0044
Emergency Phone	CANUTEC 1-613-996-6666

2. Hazard identification

Classification

Health		Physical	
Eye irritation	Category 2	Flammable Solids	Category 2
Skin irritation	Category 2	Combustible Dust	Category 1

Label Elements

Signal Word
Warning

Hazard Statements
Flammable Solid
May irritate eyes and skin
May cause respiratory tract irritation
May form combustible dust concentrations in air

Precautionary Statements
Prevention
Avoid all sources of ignition and minimize dust generation
Avoid contact with skin and eyes
Wear eye protection/protective gloves/protective clothing
Wash hands thoroughly after handling
Do not eat, drink or smoke when using this product
Response
If INHALED: Remove victim to fresh air in a position comfortable for breathing. Get medical attention
If SWALLOWED: DO NOT induce vomiting. Get medical attention
If ON SKIN: Wash with soap and water. Get medical attention
If IN EYES: Flush eyes with water for at least 15 minutes. Get medical attention
Storage
Outdoor storage is acceptable. Place in well-ventilated area away from incompatible materials, heat and sources of ignition.

Disposal

Dispose of contents/container in accordance with local/provincial/federal regulations.

3. Composition/Information on Ingredients

Substance/Mixture: Granule Mixture (Sulphur and Compost)

Hazardous Components

Chemical name	CAS No.	Concentration %
Sulphur	7704-34-9	70

4. First-aid measures

Eye Contact Flush eyes with plenty of water for at least 15 minutes. Seek medical attention.

Skin Contact Remove contaminated shoes and clothing, wash skin with soap and water for at least 15 minutes. Seek medical attention.

Inhalation Remove person to fresh air in a position comfortable for breathing. If breathing has stopped apply artificial respiration. Seek medical attention.

Ingestion DO NOT induce vomiting unless directed to do so by a physician or a poison control center. Never give anything by mouth to an unconscious person. Seek medical attention.

Most important symptoms/effects Causes irritation by all routes.

Notes to physician At high concentrations, H_2S may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. If the diagnosis of H_2S poisoning is confirmed and the patient does not

respond rapidly to supportive care, the use of nitrites may be an effective antidote (for adults 10 mL of 3% $NaNO_2$ solution I.V over 2 to 4 minutes).

5. Fire-fighting measures

Extinguishing Media

Use water spray, foam, dry chemical or carbon dioxide. If used correctly, water is an effective medium to extinguish fires. Do not use direct water stream as it may further spread the fire.

Fire and Explosion Hazards

Sulphur burns easily in air when ignited by flame or excess heat. Dust may form an explosive mixture with air and oxidizers. The dust is sensitive to static discharge and may form explosive mixtures with air. Hazardous combustion/decomposition products including hydrogen sulphide may be released by this product when exposed to heat or fire.

Hazardous Combustion Products

Oxides of Sulphur and Hydrogen Sulphide

Precautions for Fire-fighters and Protective Equipment

Fire fighters must be fully trained and wear full protective clothing including an approved, self-containing breathing apparatus which supplies a positive air pressure within a full face-piece mask. Hydrogen Sulphide is heavier than air and may collect in low lying areas and confined spaces.

6. Accidental release measures

Personal Precautions

Wear protective clothing, gloves, and full-face self-contained breathing apparatus. Avoid creating dust and keep all sources of ignition away from spill/release. If a dangerous amount of hydrogen sulphide around the spilled product is suspected, additional actions may be warranted.

Environmental Precautions

Prevent spilled material from entering sewers, storm drains and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements.

Methods for Clean-up

Contain spill, isolate area, and deny entry to unauthorized personnel. Eliminate all ignition sources. Avoid producing dust during clean-up. Use non-sparkling tools and equipment, prevent scattering of dust by moistening with water.

7. Handling and storage

Handling

Avoid all sources of ignition and minimize dust generation. Do not breathe dust or swallow. Avoid contact with skin and eyes. All equipment used when handling the product must be grounded. Handle an open container with care. Do not eat, drink

or smoke when handling the product. Where practical, dust producing process should be confined and isolated.

Storage

Outdoor storage is acceptable. Place in well-ventilated area away from incompatible materials, heat and sources of ignition.

If stored in containers, all storage containers and pumping equipment should be grounded. Structural materials and lighting and ventilation systems should be corrosion resistant. Head spaces in storage containers may contain toxic hydrogen sulphide gas. Ventilate thoroughly before permitting entry.

8. Exposure controls/Personal protection

Exposure Guidelines

Sulphur:

ACGIH: 10 mg/m^3 (TWA); inhalable. 3 mg/m^3 (Respirable fraction) (TWA); For Particles Not Otherwise Specified
OSHA: 15 mg/m^3 (Total dust) (TWA), 5 mg/m^3 (Respirable fraction) (TWA); For Particulates Not Otherwise Regulated (PNOR)

Hydrogen Sulphide (H_2S):

ACGIH: 1 ppm (TWA); 5 ppm (STEL); (2009)
OSHA: 20 ppm (C); 50 ppm (Peak) (Maximum duration: 10 mins. once only if no other meas. exp. occurs.)
10 ppm (TWA); 15 ppm (STEL) [Vacated]

PEL: Permissible Exposure Limit
TWA: Time-Weighted Average
STEL: Short-Term Exposure Limit
C: Ceiling
ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: Occupational Safety & Health Administration

Engineering Controls

Dust control equipment such as local exhaust ventilation and material transport systems involved in handling the product should contain explosion relief vents, explosion suppression system or an oxygen deficient environment. Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, gas, etc.) below recommended exposure limits.

Personal Protective Equipment

Eye/Face Protection

Wear appropriate safety glasses. Indirect vented, dust-tight goggles are recommended if dust is generated when handling this product.

Skin/Hand Protection

Wear impervious gloves. Depending on exposure and use conditions, additional protection such as chemical resistant boots, aprons, arm covers, hoods, coveralls or encapsulated suits may be necessary.

Respiratory Protection

If engineering controls and ventilation are not sufficient to control dust or hydrogen sulphide exposure to below the allowable limits, then an appropriate NIOSH approved air-purifying

	respirator or self-contained breathing apparatus (SCBA) should be used.
General Hygiene Considerations	Handle according to established industrial hygiene and safety practices. Clean shoes thoroughly and wash contaminated clothing before reuse.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odour	Slight Rotten egg
Odour Threshold	No information available
pH (10% solution in water)	1.7
Melting point	119°C
Boiling point	Not available, decomposes at 170-175 °C (melted sample decomposes in 3 stages: At 170-175°C color changes from green brown to dark brown, produces gas at 189 °C. At 230 °C produces gas with foam and color changes to a dark brown liquid with black particles).
Flash point	207°C (Cleveland Open Cup)
Evaporation rate	Not applicable
Lower Flammability Limit (Vol. % in air)	35 g/m^3
Upper Flammability Limit (Vol. % in air)	1400 g/m^3
Vapor Pressure	13 mm Hg, torr (25 °C)
Vapor Density (air=1)	>38.9
Solubility	Insoluble in water
Partition coefficient – n-octanol/water	0.025 ($P_{oct/wat}$)
Auto-ignition Temperature	232 °C
Specific gravity	1995 kg/m^3
Percent Volatile (wt. %)	14
Hydrogen Sulphide in Headspace	<0.1 ppm (equilibration time 15 hrs. at 24 °C)

10. Stability and reactivity

Stability and Reactivity	Stable under normal ambient storage conditions. Hazardous polymerization is not known to occur.
Conditions to avoid	Avoid contact with incompatible materials and sources of ignition.
Incompatible materials	Avoid contact with oxidizing agents such as acids, chlorine, dichromate and permanganates. Elemental sulphur reacts with metals such as sodium, calcium, tin, nickel and zinc under certain conditions.
Hazardous decomposition products	Hydrogen sulphide, hazardous sulphur dioxide, and related oxides of sulphur may be generated upon combustion. Combined with moisture, sulphur may form acidic/corrosive solutions. In the presence of moisture, iron and oxygen, sulphur has the capacity to form spontaneously combustible pyrophoric iron.

11. Toxicological Information

Effects of Acute Exposure

Component Toxicity

Component	LD_{50} Oral	LD_{50} Dermal	LC_{50}

Sulphur	>8437 mg/kg	Not available	Not available
Hydrogen Sulphide	Not available	Not available	444 ppm (rat)

Eye May be irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. This product (particularly when fresh) may release Hydrogen Sulphide (H_2S) gas. Hydrogen Sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations. Above 50 ppm H_2S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around light sources.

Skin May be irritating to skin. Signs/symptoms may include localized redness, swelling and itching.

Ingestion May cause irritation of the digestive tract. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea. Sulphur may be converted into hydrogen sulphide in the intestine.

Inhalation May cause respiratory tract irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. This product (particularly when fresh) may release Hydrogen sulphide (H_2S) gas. Hydrogen sulphide may cause symptoms such as digestive upset and loss of appetite, loss of sense of smell and pulmonary edema. At 500-1000 ppm Hydrogen sulphide may cause respiratory paralysis, collapse and death.

Skin Sensitization Not hazardous by OSHA/WHMIS criteria. Allergic skin responses have been reported but not common.

Respiratory Sensitization Not hazardous by OSHA/WHMIS criteria.

Effects of Chronic Exposure

Target Organs

Skin, eyes, gastrointestinal tract, respiratory system, lungs, blood, cardiovascular system, nervous system.

Specific Target Organ Toxicity (single exposure)

Not expected to cause organ effects from single exposure

Specific Target Organ Toxicity (repeated exposure)

Not expected to cause organ effects from repeated exposure

Chronic Effects

Prolonged or repeated contact may cause dry skin and irritation. Prolonged overexposure to sulphur dust can produce possible skin sensitization and permanent eye damage (clouding of the lens and chronic irritation). Prolonged inhalation can cause irritation of mucous membranes. Hydrogen sulphide may reduce lung function; cause neurological effects such as headaches, nausea, depression and personality changes; eye and mucous membrane irritation and damage to cardiovascular system.

Carcinogenicity

Not hazardous by OSHA/WHMIS criteria. This product does not contain any carcinogens or potential carcinogens as listed by ACGIH, IARC, OSHA, or NTP.

Germ Cell Mutagenicity

Not hazardous by OSHA/WHMIS criteria. None of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Effects
Not hazardous by OSHA/WHMIS criteria. None of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Teratogenicity
Not hazardous by OSHA/WHMIS criteria.

Embryotoxicity
Not hazardous by OSHA/WHMIS criteria.

12. Ecological Information

Ecotoxicity - Sulphur

Toxicity to fish	96 Hr. LC50 *Brachydanio rerio:* 866 mg/L (static) 96 Hr. LC50 *Lepomis macrochirus*: <14 mg/L (static)
Toxicity to trout	96 Hr. LC50 *Oncorhynchus mykiss*: >180 mg/L (static)
Persistence and degradability	Sulphur can be degraded by microorganisms.
Bioaccumulation	Sulphur is not expected to have bio accumulation or food chain contamination potential.
Mobility in environment	Oxides of sulphur can form sulphuric acid in soil which has high mobility in soil and sediments.
Other adverse effects	None anticipated.

13. Disposal considerations

Dispose of product/container in accordance with all federal, provincial and local Regulations. Product should not be allowed to enter sewers, storm drains and natural waterways. Comply with federal, provincial, and local requirements for spill and/or release notification.

14. Transport Information

Transportation of Dangerous Goods (TDG) Canada

Not regulated as the product is marketed in a granular form.

(According to the regulation (TDG Regulations Schedule 2, Special Provision 33), solid sulphur is not regulated if transported in quantities less than 400 kg per means of containment or if formed to a specific shape, such as prills, granules, pellets, pastilles or flakes)

Transportation in US (US Department of Transportation (DOT))

Not regulated as the product is marketed in a granular form.

International Maritime Dangerous Goods (IMDG)

Not regulated as the product is marketed in a granular form.

15. Regulatory Information

Prevention of Ecological Impact: Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under provincial and Federal regulations.
Sulphur is listed on Domestic Substances List, Canada

16. Other Information

Version 03 Revision Date	11-Jun-2018
Revised By	KaizenLAB, Calgary, Canada, Phone 403-297-0411 for GFL Environmental Inc. Sub-contracted Laboratory – LCS Laboratory Inc., London, Ontario, Phone 519-488-1353

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End of SDS