

# SAFETY DATA SHEET

# Blended Sulphur

Revision Date 24-Aug-2016

Revision Number 1

## 1. Identification

<b>Product Name</b>	Bio-Sul Premium Plus 70% S
<b>Synonyms</b>	Sulphur; Brimstone
<b>Product Use</b>	Fertilizer Production, Soil Amendment
<b>Manufacturer/Supplier</b>	Bio-Cycle Solutions Ltd. PO Box 1052 Okotoks, AB, T1S 1B1 Tel: 403-803-2549
<b>Emergency Phone</b>	403-803-2549

## 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**

Store in a dry place

Store in a cool, 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<sub>2</sub>S 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<sub>2</sub>S 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<sub>2</sub> solution I.V over 2 to 4 minutes).

## 5. Fire-fighting measures

<b>Extinguishing Media</b>	Dry chemical, foam and carbon dioxide. Water may not be an effective medium to extinguish fire.
<b>Fire and Explosion Hazards</b>	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.
<b>Hazardous Combustion Products</b>	Oxides of Sulphur and Hydrogen Sulphide
<b>Protective equipment and precautions for fire-fighters</b>	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

<b>Personal Precautions</b>	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.
<b>Environmental Precautions</b>	Prevent spilled material from entering sewers, storm drains and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements.
<b>Methods for Clean-up</b>	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

<b>Handling</b>	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.
<b>Storage</b>	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<sup>3</sup> (TWA); inhalable. 3 mg/m<sup>3</sup> (Respirable fraction) (TWA); For Particles Not Otherwise Specified  
OSHA: 15 mg/m<sup>3</sup> (Total dust) (TWA), 5 mg/m<sup>3</sup> (Respirable fraction) (TWA); For Particulates Not Otherwise Regulated (PNOR)

#### Hydrogen sulphide (H<sub>2</sub>S):

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

<b>Physical State</b>	Solid
<b>Appearance</b>	Yellow
<b>Odour</b>	Slight Rotten egg
<b>Odour Threshold</b>	No information available
<b>pH (10% solution in water)</b>	1.7
<b>Melting point</b>	119°C
<b>Boiling point</b>	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).
<b>Flash point</b>	207°C (Cleveland Open Cup)
<b>Evaporation rate</b>	Not applicable
<b>Lower Flammability Limit (Vol. % in air)</b>	35 g/m <sup>3</sup>
<b>Upper Flammability Limit (Vol. % in air)</b>	1400 g/m <sup>3</sup>
<b>Vapor Pressure</b>	13 mm Hg, torr (25 °C)
<b>Vapor Density (air=1)</b>	>38.9
<b>Solubility</b>	Insoluble in water
<b>Partition coefficient – n-octanol/water</b>	0.025 (P <sub>oct/wat</sub> )
<b>Auto-ignition Temperature</b>	232 °C
<b>Specific gravity</b>	1995 kg/m <sup>3</sup>
<b>Percent Volatile (wt. %)</b>	14
<b>Hydrogen Sulphide in Headspace</b>	<0.1 ppm (equilibration time 15 hrs. at 24 °C)

## 10. Stability and reactivity

<b>Stability and Reactivity</b>	Stable under normal ambient storage conditions. Hazardous polymerization is not known to occur.
<b>Conditions to avoid</b>	Avoid contact with incompatible materials and sources of ignition.
<b>Incompatible materials</b>	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.
<b>Hazardous decomposition products</b>	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 <sub>50</sub> Oral	LD <sub>50</sub> Dermal	LC <sub>50</sub>
Sulphur	>8437 mg/kg	Not available	Not available
Hydrogen Sulphide	Not available	Not available	444 ppm (rat)

<b>Eye</b>	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 <sub>2</sub> S)
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gas. Hydrogen Sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations. Above 50 ppm H<sub>2</sub>S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around light sources.

<b>Skin</b>	May be irritating to skin. Signs/symptoms may include localized redness, swelling and itching.
<b>Ingestion</b>	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.
<b>Inhalation</b>	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 <sub>2</sub> S) 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.
<b>Skin Sensitization</b>	Not hazardous by OSHA/WHMIS criteria. Allergic skin responses have been reported but not common.
<b>Respiratory Sensitization</b>	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****Canadian TDG**

<b>UN-No.</b>	1350
<b>Shipping Name</b>	Sulphur
<b>Hazard Class</b>	4.1
<b>Packing Group</b>	III
<b>Transport in Bulk</b>	Labels required 4.1

**Note:** 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. TDG Regulations Schedule 2, Special Provision 33.

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

<b>Shipping Description</b>	UN1350, Sulfur, 4.1, III
<b>Non-Bulk Package Marking</b>	None
<b>Non-Bulk Package Labeling</b>	None
<b>Bulk Package/Placard Marking</b>	Flammable solid / 1350
<b>Packaging - References</b>	None; None; 49 CFR 173.240
(Exceptions; Non-bulk; Bulk)	

**Note:** Solid sulfur is not regulated if transported in non-bulk packaging or if formed to a specific shape, such as prills, granules, pellets, pastilles, or flakes. [49CFR 172.102, Special Provision 30]

If shipment is domestic only, may be shipped as:

<b>Shipping Name</b>	NA1350, Sulfur, 9, III
<b>Placard / Marking</b>	None / 1350 or Class 9 / 1350

**International Maritime Dangerous Goods (IMDG)**

<b>Shipping Description</b>	UN1350, Sulphur, 4.1, III
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<b>Non-Bulk Package Marking</b>	Sulphur, UN1350
<b>Labels</b>	Flammable solids
<b>Placards/Marking (Bulk)</b>	Flammable solid / 1350
<b>Packaging - Non-Bulk</b>	P002, LP02
<b>EMS</b>	F-A, S-G

**Note:** Solid sulphur is not subject to the IMDG Code when formed to a specific shape such as prills, granules, pellets, pastilles or flakes. [IMDG 3.3.1 242]

#### International Civil Aviation Org. /International Civil Aviation Association (ICAO/IATA)

<b>UN/ID #</b>	UN1350
<b>Proper Shipping Name</b>	Sulphur
<b>Hazard Class/Division</b>	4.1
<b>Packing Group</b>	III
<b>Non-Bulk Package Marking</b>	Sulphur, UN1350
<b>Labels</b>	Flammable solid
<b>ERG Code</b>	3L

**Note:** Solid sulphur is not regulated when it has been formed to a specific shape, e.g. prills, granules, pellets, pastilles or flakes. [IATA DGR 4.4 A105]

	LTD. Qty.	Passenger Aircraft	Cargo Aircraft Only
Packing Instruction #	Y443	446	449
Max. Net Qty. Per Package	10 kg	25 kg	100 kg

## 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

<b>Version 01 Revision Date</b>	24-Aug-2016
<b>Revised By</b>	KaizenLAB, Calgary, Canada, Phone 403-297-0411 for Bio-Cycle Solutions Ltd. Sub-contracted Laboratory – LCS Laboratory Inc., London, Ontario, Phone 519-488-1353

#### Disclaimer:

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End of SDS