Safety Data Sheet

Version 1.5
Revision Date 10/18/2024

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	**Sulfur, Enriched Sulfur**
Chemical Formula	S
Molecular Weight	32.06
CAS No.	7704-34-9
RTECS No.	WS4250000
Synonyms	Brimstone; Bensulfoid; Flowers of Sulfur; Precipitated Sulfur; Sublimed Sulfur
Application	Laboratory chemical for research purposes only
Supplier Address*	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053 *May include subsidiaries or affiliate companies/divisions
Email	iusa@isoflex.com
Website	www.isoflex.com
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

2. HAZARDOUS IDENTIFICATION

Emergency Overview: Dust may form flammable or explosive mixture with air. Keep away from heat, sparks, flame. During use, avoid contact with eyes, skin, clothing. Wash thoroughly after handling. When not in use, keep in tightly closed container.

Precautionary Label Statements: Warning

OSHA Hazards: Flammable solid, irritant

GHS Classification: Acute toxicity, Oral (Category 5); Acute toxicity, Inhalation (Category 5); Acute toxicity, Dermal (Category 5); Skin irritation (Category 2)

NFPA Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 **Flammability = 1** **Reactivity = 2**

HMIS Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 **Flammability = 2** **Physical Hazard = 2**

HEALTH HAZARD	2
FLAMMABILITY	2
PHYSICAL HAZARD	2

Potential Health Effects

Inhalation — Nuisance dust. May cause coughing, sneezing or labored breathing if large amounts are inhaled.

Ingestion — Considered essentially non-toxic by ingestion. Ingestion of very large amounts may cause sore throat, nausea, headache, and possibly unconsciousness in severe cases. May be converted into hydrogen sulfide in the intestine. May cause irritation. Irritant to human eyes at 6-8 ppm. Redness and pain may be observed.

Chronic Exposure — Prolonged overexposure to sulfur 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. Sensitive individuals can experience skin irritation from repeated exposure to sulfur dust. Allergenic responses can occur.

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3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name:	Sulfur
CAS No.:	7704-34-9
Chemical Formula:	S
Molecular Weight:	32.06

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4. FIRST AID MEASURES

Inhalation Exposure — Remove to fresh air. Get medical attention for any breathing difficulty.

Oral Exposure — Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

Dermal Exposure — Wash exposed area with soap and water. Get medical advice if irritation develops.

Eye Exposure — Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. FIREFIGHTING MEASURES

Flash Point — 207 °C (405 °F)

Autoignition Temperature — 232 °C (450 °F)

Flammable — Slight fire hazard when exposed to heat or flame.

Explosion — Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Explosive limits, dust in air, gm/cu meter: Lower - 35, Upper - 1400. Hazardous in contact with oxidizing materials; forms explosive mixtures.

Suitable Extinguishing Media	Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Solid streams of water should not be used because of possibility of dispersing dust clouds of sulfur in air.

Firefighting

Protective Equipment	In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas.
Environmental Precautions	Do not let product enter drains.
Methods for Cleaning Up	Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

7. HANDLING AND STORAGE

Handling	Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity. Empty only into inert or non-flammable atmosphere. Emptying contents into a non-inert atmosphere where flammable vapors may be present could cause a flash fire or explosion due to electrostatic discharge. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.
Storage	Keep in a tightly closed container. Store in a cool, dry, corrosion-proof, ventilated area away from moisture, sources of heat or ignition, combustibles and oxidizers. Protect against physical damage. Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits	None established
Ventilation System	Use adequate general or local exhaust ventilation to keep fume or dust levels as low as possible. In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.

Personal Protective Equipment

Personal Respirators (NIOSH Approved)	None required where adequate ventilation conditions exist. If airborne concentration is high, use an appropriate respirator or dust mask. For conditions of use where exposure to the dust or mist is apparent, a half-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection	Wear protective gloves and clean body-covering clothing.
Eye Protection	Use chemical safety goggles. Safety glasses with side shields, proper gloves are both recommended. Maintain eye-wash fountain and quick-drench facilities in work area.
Other Control Measures	Remove any worker from exposure to sulfur who shows allergic reactions; such individual should not be assigned further work where exposed to sulfur without a physician's approval.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Powder, crystals or solids
Color	Yellow
Odor	Faint odor

Safety Data

Boiling Point:	445 °C (833 °F)
Vapor Pressure (MM HG):	N/A
Melting Point:	116 °C (241 °F)
Vapor Density (Air=1):	8.8
Specific Gravity:	2.01
Evaporation Rate:	N/A
Volatiles by Volume:	0
Solubility (H_2O):	Negligible (< 0.1 %)

10. STABILITY AND REACTIVITY

Stability	Stable under ordinary conditions of use and storage. Transition temperature is about 95 ºC (203 ºF) (slow conversion) between alpha and beta crystalline forms.
Conditions to Avoid	Heat, flame, other sources of ignition
Incompatible Materials	Strong oxidizing agents, most common metals, hydrogen, chlorine, fluorine, organic materials at elevated temperatures
Decomposition Products	Oxides of sulfur
Hazardous Polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Oral LD50	LDLO Oral - Rabbit - 175 mg/kg LD50 Oral - Rat - > 2,000 mg/kg
Inhalation LC50	LC50 Inhalation - Rat - 4 h - > 9.23 mg/l
Dermal LD50	LD50 Dermal - Rabbit - > 2,000 mg/kg
Other Information on Acute Toxicity	LDLO Intravenous - Rat - 8 mg/kg LDLO Intravenous - Rabbit - 5 mg/kg LDLO Intraperitoneal - Guinea pig - 55 mg/kg LDLO Intravenous - Dog - 10 mg/kg
Skin Corrosion/Irritation	Skin - Rabbit - No skin irritation
Serious Eye Damage/Eye Irritation	Eyes - Rabbit - No eye irritation

Respiratory or Skin Sensitization	No data available
Germ Cell Mutagenicity	No data available

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible or confirmed human carcinogen by IARC.
ACGIH	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive Toxicity	No data available
Teratogenicity	No data available
Specific Target Organ Toxicity / Single Exposure (Globally Harmonized System)	No data available
Specific Target Organ Toxicity / Repeated Exposure (Globally Harmonized System)	No data available
Aspiration Hazard	No data available
Signs and Symptoms Exposure	Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting, dermatitis.
Synergistic Effects	No data available
Additional Information	RTECS: WS4250000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to Fish	LC50 - *Oncorhynchus mykiss* (rainbow trout) - > 180 mg/l - 96 h LC50 - other fish - 866 mg/l - 96 h
Toxicity to Daphnia and other Aquatic Invertebrates	EC50 - *Daphnia magna* (Water flea) - > 5,000 mg/l - 48 h
Persistence and Degradability	No data available
Bioaccumulative Potential	No data available
Mobility in Soil	No data available
PBT and vPvB Assessment	No data available
Other Adverse Effects	No data available

13. DISPOSAL CONSIDERATIONS

Product	Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal

	disposal regulations. Dispose of unused contents in accordance with federal, state and local requirements.
Contaminated Packaging	Dispose of container in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

Proper Shipping Name	SULPHUR
Hazard Class	4.1
UN/NA	UN1350
Packing Group	III
Information Reported for Product/Size	100LB

15. REGULATORY INFORMATION

OSHA Hazards	Flammable solid, irritant
SARA 302 Components	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
SARA 311/312 Hazards	Fire Hazard, Acute Health Hazard
Massachusetts Right to Know Components	Sulfur / CAS No. 7704-34-9 / Revision Date 1993-04-24
Pennsylvania Right to Know Components	Sulfur / CAS No. 7704-34-9 / Revision Date 1993-04-24
New Jersey Right to Know Components	Sulfur / CAS No. 7704-34-9 / Revision Date 1993-04-24
California Prop. 65 Components	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Prepared By	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Issuing Date	December 1, 2014
Revision Date	October 18, 2024
Revision Number	5
Revision Note	Update supplier address

ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AICS	Australian Inventory of Chemical Substances
ALARA	As Low As Is Reasonably Achievable

AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
BOD5	Biochemical Oxygen Demand
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
COD	Chemical Oxygen Demand
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
ECL	Korean Existing Chemicals List
EINECS	European Inventory of Existing Commercial Chemical Substances
EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
IMDG	International Maritime Code for Dangerous Goods
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration
MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PICCS	Philippines Inventory of Chemicals and Chemical Substances
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)

SNUR	Significant New Use Rule (TSCA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährdungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

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