



Section 1: Product and Company Identification

Manufacturer Kern Oil & Refining Co. – 7724 East Panama Lane – Bakersfield – CA 93307-9210
(661) 845-0761 – sds@KernOil.com – www.KernOil.com

Chemical Name: Sulfur
Chemical Family: Non-Metallic Element
Trade Name Sulfur
Synonyms: Brimstone, Molten Sulphur
Recommended Uses: Industrial Chemical
CAS #: 7704-34-9
RTECS #: WS4250000
SDS Number: KOP040
SDS Date: September 14, 2020

CHEMTREC
(800) 424-9300 or
(703) 527-3887
POISON CONTROL
CENTER
(800) 346-5922

Section 2: Hazard Identification

Signal Word: **WARNING**

Pictograms: Exclamation Mark

Physical Hazards: Not Classified

Health Hazards: Skin Irritation (Category 2) Causes skin irritation.

Environmental Hazards: Not Classified



Precautionary Statements:

Prevention: Wash thoroughly after handling. Wear protective gloves or clothing.

Response: **If on skin:** Wash with plenty of water. See Section 4. If skin irritation occurs: Get medical advice or attention. Take off contaminated clothing and wash it before reuse.

Storage: None

Disposal None

HNOC:* May contain and liberate poisonous hydrogen sulfide gas which is highly toxic. Hydrogen sulfide can cause respiratory paralysis and death, depending on the concentration and duration of exposure. See Sections 8 and 11.

Supplemental Info: CERCLA Rating: (Scale 0-3) Health = 1, Fire = 2, Reactivity = 0, Persistence = 1
 NFPA Rating: (Scale 0-4) Health = 1, Fire = 1, Reactivity = 0
 HMIS Rating: Fire 1, Health 1**, Physical 0, **Chronic

* Hazard(s) not otherwise classified or not covered by GHS

Section 3: Composition / Information on Ingredients

Component	CAS No.	Percent
Sulfur	7704-34-9	100%
Hydrogen Sulfide (H2S)	7783-06-4	Trace

Section 4: First Aid Measures

Inhalation: If respiratory symptoms develop from exposure to fumes emitted by the material, move victim away from source of exposure and unto fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and flush affected area(s) with large amounts of water. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops. Seek medical attention.

Eye Contact: Move victim away from exposure and into fresh air. If irritation or redness develops, flush eyes with clean water for at least 15 minutes. Seek medical attention. For contact with the molten material, gently open eyelids and flush affected eye(s) with cold water. Seek immediate medical attention.

Ingestion: If molten material is swallowed, seek immediate medical attention.

Section 5: Fire Fighting Measures

Fire Fighting Procedures: Hazardous combustion/decomposition products may be released by this material when exposed to heat of fire. Use caution and wear protective clothing, including respiratory protection. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined, spaces, or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant.

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Extinguishing Media: Dry chemical, carbon dioxide, sand, foam, earth, and water are recommended. Use caution when applying carbon dioxide in confined spaces.

Further Information: Flammable/combustible material. May be ignited by static electricity, friction, heat, sparks or flames. Some may burn rapidly with flare burning effect. Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence. May re-ignite after fire is extinguished. Reference NFPA 655 "Prevention of Sulfur Fires and Explosions", 1993.

Hazardous Combustion Products: Can form explosive mixtures with oxidizers.

Section 6: Accidental Release Measures

Protection: In the event of a release, eliminate any source of ignition near the spill and the associated vapors. Stop all work in vicinity and remove personnel immediately. Monitor release area with a combustible gas detection device. Do not touch or walk through spilled material.

Spill: Remove or secure ignition sources near molten sulfur releases. Allow liquid to solidify. Do not touch liquid sulfur – thermal burn hazard. Carefully contain and stop the source of the spill, if safe to do so. Do not flush down sewer or drainage systems. Protect bodies of water, such as by diking. Water may be used to help solidify molten sulfur, but should be applied with care to avoid splattering.

Reporting: Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems and natural waterways. This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations. Notify fire authorities and appropriate federal, state and local agencies.

Section 7: Handling and Storage

Handling: The material storage and loading/unloading temperature range is 260°F - 300°F. Material will solidify below 260°F. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid creating and inhaling dust. Sulfur is not compatible with metals and metal powders (Ex. Zinc and Tin) and is not compatible with alkali metals (Ex. Sodium and Potassium). At 320°F flammable and toxic gases are formed (H₂S, SO₂ and SO₃).

Storage: The hazards of hydrogen sulfide should be considered when storing or transporting molten sulfur. H₂S can accumulate in confined spaces such as sulfur pits and headspaces of truck trailers and railcars. Exposure to H₂S is possible during product transfer into/out of truck trailers and railcars.

Unusual Hazards: Avoid excessive dust generation, sparks or open flames. Avoid breathing fumes of molten sulfur, use normal good industrial hygiene. Tanks should be filled from the bottom or through discharge pipes that extend to the bottom of the tank, since the dielectric constant of sulfur promotes the build-up of static electricity. The H₂S level in the vapor space in a storage vessel should be checked periodically for explosivity.

Section 8: Exposure Control and Personal Protection**Component Exposure Limits:**

Sulfur: NIOSH: REL 10 ppm (Not to be exceeded during any 10-minute work period.)
ACGIH: TLV 1 ppm (8-Hr) STEL 5 ppm TWA 10 mg/m³ 3 mg/m³ as nuisance dust
OSHA: TWA 15 mg/m³ Total TWA 5 mg/m³ Resp. (Nuisance Dust)

H₂S: ACGIH: STEL 5 ppm TWA 1 ppm
OSHA: Ceiling 20 ppm

Engineering Measures: Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment

Respiratory: A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Hands: Gloves constructed of nitrile, neoprene, or PVC are recommended.

Eyes: Safety glasses or goggles are recommended.

Skin and Body: Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure.

Section 9: Physical and Chemical Properties

Appearance:	Yellow
Odor:	Odorless (Pure Sulfur) Rotten Egg (Trace of H ₂ S)
Physical State:	Liquid (Molten) or Dry
pH:	Not Determined
Vapor Pressure:	0.5 mm Hg @70°F (20°C)
Vapor Density:	Heavier than air
Volatility (Vol. %):	100%
Viscosity (SSU@ 100°F):	NA
Pour Point:	NA
Boiling Point/Range:	370-520°F
Melting Point:	NA
Solubility (H₂O):	Negligible
Specific Gravity:	0.8353
API Gravity:	37.9
Evaporation Rate:	Slower than BuAc
Flash Point:	405°F
Flammability Limits:	LFL: 4.3% UFL: 46% (Data for H ₂ S)
Auto Ignition:	450°F

Section 10: Stability and Reactivity

Chemical Stability: Stable under normal conditions.

Conditions to Avoid: Temperatures above the high flash point of this combustible material in combination with sparks, open flames, or other sources of ignition.

Incompatible Materials: Sulfur is not compatible with metals and metal powders (Ex. Zinc and Tin) and is not compatible with alkali metals (Ex. Sodium and Potassium). At 320°F flammable and toxic gases are formed (H₂S, SO₂ and SO₃).

Hazardous Decomposition Products: Sulfur containing gases.

Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation, ingestion, eye or skin contact.

Component Toxicity: Sulfur: Inhalation LC50 Rat >9.23 mg/L 4 h; Oral LD50 Rat >3000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg Hydrogen sulfide: (7783-06-4) Inhalation LC50 Rat 0.701 mg/L 4 h; Inhalation LC50 Rat 0.99 mg/L 1 hr.

Acute Effects: Dermatitis, Respiratory Irritation, Metabolic Acidosis, Allergies, and Eye disorders.

Chronic Effects: Mutagenicity: No evidence of a mutagenic effect. Teratogenicity: No evidence of a teratogenic effect (birth defect). Sensitization: No evidence of a sensitization effect. Reproductive: No evidence of negative reproductive effects. Target Organ Effects: Acute: No data available Chronic: No data available.

Delayed Effects: No data available.

Carcinogenicity: No evidence for carcinogenicity according to NTP, IARC, NIOSH, OSHA, or ACGIH.

Section 12: Ecological Information

Ecotoxicity: Sulfur is not classified as an environmental hazard. In six studies on ecological effects (involving bobwhite quail, two fish species, daphnia, mysid shrimp and honey bees), sulfur has been shown to be practically non-toxic to the species tested. While there is potential for non-target organisms to be exposed to sulfur, little hazard to these species is expected to result. Test Results: Sulfur Powder: 96 HR LC50 BRACHYDANIO RERIO 866 MG/L [STATIC] 96 HR LC50 LEPOMIS MACROCHIRUS < 14 MG/L [STATIC] 96 HR LC50 ONCORHYNCHUS MYKISS > 180 MG/L [STATIC].

Persistence and Degradability: Sulfur is a component of the environment, and there is a natural cycle of oxidation and reduction reactions which transforms sulfur into both organic and inorganic products. Sulfur is amenable to microbial utilization. Therefore, this material can be degraded by microorganisms and is regarded as inherently biodegradable.

Bioaccumulative Potential: Sulfur is not expected to have bioaccumulation or food chain contamination potential. Mobility in Soil: Sulfuric acid is miscible with water. It will not adsorb to particulate matter or surfaces and is expected to have high mobility in soil and sediments.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

Waste Disposal Instructions: See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations. Recycle unused material. This product may meet the definition of a hazardous waste under RCRA (40 CFR 261) or definitions of a hazardous waste by State or local regulation. Analysis of the waste generated must be tested to correctly categorize the material for disposal. If this product meets the definition of a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Disposal of Contaminated Containers or Packaging: Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 14: Transportation Information

	DOMESTIC	INTERNATIONAL
DOT SHIPPING NAME:	Sulfur	Sulfur
DOT HAZARD CLASS:	4.1	4.1
DOT IDENTIFICATION NUMBER:	NA1350	UN1350
DOT PACKING GROUP:	III	III
DOT SHIPPING NAME:	Sulfur, Molten	Sulfur, Molten
DOT HAZARD CLASS:	9	4.1
DOT IDENTIFICATION NUMBER:	NA2448	UN2448
DOT PACKING GROUP:	III	III

Section 15: Regulatory Information

OSHA – This material is classified as hazardous under OSHA Regulations.

SARA/CERCLA 302/304 – Hydrogen sulfide (RQ – 100 lbs.) is listed on EPA's Extremely Hazardous Substance (EHS) list and is a CERCLA hazardous substance which in case of spill may be subject to release reporting requirements.

SARA 311/312 – Hazard Classes

- | | |
|--------------------------------------|-----|
| 1. Immediate (acute) health effects: | Yes |
| 2. Delayed (chronic) health effects: | Yes |
| 3. Fire Hazard: | Yes |
| 4. Sudden Release of Pressure: | No |
| 5. Reactivity Hazard: | No |

TSCA – This product and/or its components are listed on the TSCA Chemical Inventory under Section 8(b).

State Regulations:

Molten sulfur is on the New Jersey and Pennsylvania Right to Know lists.

California Proposition 65: Not Listed

Canada: WHMIS: Classifications of Substances: Canada - WHMIS: Ingredient Disclosure: Sulfur, Molten B4 Hydrogen Sulfide A, B1, D1A, D2B 1 %.

Section 16: Other Information

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, Kern Oil & Refining Co. (Kern) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage may be required. Kern assumes no responsibility for results obtained or for incidental or consequential, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.