



## Safety Data Sheet Molten Sulfur

SDS Number: 283 Revision: January 3, 2020

### Section 1: IDENTIFICATION

**1.1 Product Name:** Molten Sulfur

**1.2 Other Identification:**

Chemical Family: Sulfur  
Formula: S

**1.3 Recommended Use of Chemical:** Multiple industrial and agricultural uses

**1.4 Manufacturer:** Tessenderlo Kerley, Inc.  
2910 N. 44<sup>th</sup> Street, Suite 100  
Phoenix, Arizona 85018  
(602) 889-8300

Information:

**1.5 Emergency Contact:** Tessenderlo Kerley, Inc. (800) 877-1737  
CHEMTREC (800) 424-9300 (Domestic)  
(703) 527-3887 (International)

### Section 2: HAZARD(S) IDENTIFICATION

**2.1 Hazard Classification:**

Health	Skin Corrosion/Irritation	Category 2
	Eye Damage/Irritation	Category 1

Physical None

**2.2 Signal Word:** DANGER

**2.3 Hazard Statement(s):** Causes skin irritation  
Causes serious eye damage



**2.4 Symbol(s):**

- 2.5 Precautionary Statement(s):** **If on skin:** Wash with plenty of water. Take off contaminated clothing and wash it before use. If skin irritation occurs: Get medical advice/attention.  
**If in eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison control center/doctor/regional medical center. Wear heat-resistant gloves/chemical goggles/face shield/long sleeve shirt.  
Wash hands and face thoroughly after handling.
- 2.6 Unclassified Hazard(s):** Molten non-metal. Flammable solid when solidified.
- 2.7 Unknown Toxicity Ingredient:** None

### Section 3: COMPOSITION/INFORMATION on INGREDIENTS

#### 3.1 Chemical Ingredients: (See Section 8 for exposure guidelines)

Chemical	Synonym, Common Name	CAS No.	EINECS No.	% by Wt.
Sulfur	Molten sulfur	7704-34-9	231-722-6	>99
Hydrogen sulfide	Hydrogen sulfide	7783-06-4	231-977-3	<1
Sulfur dioxide	Sulfur dioxide	7446-09-5	231-195-2	0 – 10 ppm

### Section 4: FIRST AID MEASURES

#### 4.1 Symptoms/Effects:

- Acute:** Eye contact may cause eye damage and/or irritation. Skin contact will cause skin burns and/or irritation. Ingestion will irritate the gastrointestinal tract.
- Chronic:** No known chronic effects.

- 4.2 Eyes:** If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention. For contact with hot material, gently open eyelids and flush affected eye(s) with cold (not icy) water. Seek immediate medical attention. For cold material, wash with plenty of water with eyelids open. If redness or pain develops, seek medical attention.
- 4.3 Skin:** For contact with molten product, remove clothing if not sticking to skin. Attempts should not be made during first aid to remove molten sulfur stuck to the skin, as underlying tissue may easily be torn away. Flush immediately with large amounts of cool water. Keep injury cool to minimize swelling and tissue damage. Be alert for signs of shock from trauma, and hyperthermia from excessive cooling of the injury. Thermal burns require immediate medical attention.
- 4.4 Ingestion:** First aid is not normally required for solid material; however, if molten Sulfur is swallowed, seek immediate medical attention.
- 4.5 Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from the source of exposure and into fresh air in a position comfortable for breathing. If

symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin CPR. If breathing difficulties develop, Oxygen should be administered by qualified personnel. Seek immediate medical attention.

## Section 5: FIRE FIGHTING MEASURES

### 5.1 Flammable Properties: (See Section 9, for additional flammable properties)

NFPA:            Health - 2            Flammability - 1            Reactivity - 0

### 5.2 Extinguishing Media:

**5.2.1 Suitable Extinguishing Media:** Dry chemical, Carbon dioxide, foam or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F (100°C). Carbon dioxide (CO<sub>2</sub>) may displace Oxygen. Use caution when applying CO<sub>2</sub> in confined spaces.

**5.2.2 Unsuitable Extinguishing Media:** Simultaneous use of foam and water on the same surface is to be avoided.

### 5.3 Protection of Firefighters:

#### 5.3.1 Specific Hazards Arising from the Chemical:

**Physical Hazards:** When overheated, Hydrogen sulfide and/or Sulfur dioxide vapors may evolve. Hydrogen sulfide can form explosive mixtures with air. Sulfur dioxide is a severe respiratory irritant. Keep containers /storage tanks in fire area cooled with water spray. If the vapors venting from a storage vessel are burning, they should be permitted to continue to burn until the source of ignition has been extinguished. Water spray is effective in washing venting vapors from the air.

Molten Sulfur burns with a pale blue flame that may be difficult to see in the daytime. Combustion of Sulfur produces Sulfur dioxide vapors.

**Chemical Hazards:** None

#### 5.3.2: Protective Equipment and Precautions for Firefighters:

Firefighters should wear self-contained breathing apparatus (SCBA) and full fire-fighting turnout gear. Keep containers/storage vessels in fire area cooled with water spray. Firefighters should be advised that solid material on the ground

may only be a crust formed over molten material underneath and they should move over the solid material with extreme caution.

## **Section 6: ACCIDENTAL RELEASE MEASURES**

- 6.1 Personal Precautions:** Keep all sources of ignition away from spill/release. Material may contain or release poisonous Hydrogen sulfide gas. If the presence of dangerous amounts of H<sub>2</sub>S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Use personal protective equipment specified in Section 8. Isolate the release area and deny entry to unnecessary, unprotected and untrained personnel.
- 6.2 Environmental Precautions:** Keep out of "waters of the United States" because of potential aquatic toxicity.
- 6.3 Methods of Containment:**
- Small Release:** Confine release with dirt, sand or absorbent or use small amount of water to cause molten material to solidify.
- Large Release:** Shut off release if safe to do so. Dike spill area with earth, sand, other inert absorbents or use water sparingly to solidify material and prevent runoff into sewers, storm drains or surface waterways.
- 6.4 Method for Cleanup:**
- Small Release:** For small areas break up hardened material and shovel into suitable drums for recycle or disposal as chemical waste. Use non-sparking tools.
- Large Release:** Recover as much of the spilled product for recycle by breaking up material and shoveling into suitable contains. Any unusable material should be disposed of as a chemical waste. Use non-sparking tools.

## **Section 7: HANDLING and STORAGE**

- 7.1 Handling:** Material is handled at high temperatures (260 to 280°F); protective clothing is required. Handle in enclosed containers to avoid breathing product. Avoid any sources of ignition. Avoid contact with skin and eyes. Use in a well-ventilated area. Use non-sparking tools. Liquid Sulfur should not be placed in any vessel which contains trace quantities of water (potential steam explosion) or hydrocarbons (evolution of Hydrogen sulfide gas). Wash thoroughly after handling.
- 7.2 Storage:** Store in cool, dry, well-ventilated areas in enclosed containers. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame. Keep

moisture away from the bottom of tanks. Electrostatically ground storage and transfer vessels.

## Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Exposure Guidelines:

Chemical	OSHA PELs		ACGIH TLVs	
	TWA	STEL	TWA	STEL
Sulfur dioxide	5 ppm	None	None	0.25 ppm
Hydrogen sulfide	None	20 ppm (Ceiling)	1 ppm	5 ppm
Sulfur	None	None	None	None

### 8.2 Engineering Controls:

Use adequate exhaust ventilation to prevent inhalation of product vapors. Keep eye wash/safety showers in areas where product is used.

### 8.3 Personal Protective Equipment (PPE):

**8.3.1 Eye/Face Protection:** Chemical goggles and a full face shield.

**8.3.2 Skin Protection:** Heat resistant gloves and apron or Nomex clothing may be worn to prevent contact with molten sulfur. Long-sleeve shirts are advisable. Wash contaminated clothing prior to reuse.

**8.3.3 Respiratory Protection:** Where there is potential for airborne exposure to Hydrogen sulfide (H<sub>2</sub>S) and/or Sulfur dioxide (SO<sub>2</sub>), above exposure limits, a NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent, operated in a pressure demand or other positive pressure mode, should be used.

**8.3.4 Hygiene Considerations:** Common good industrial hygiene practices should be followed, such as washing thoroughly after handling and before eating or drinking.

## Section 9: PHYSICAL and CHEMICAL PROPERTIES

<b>9.1 Appearance:</b>	Yellow brown to bright yellow molten liquid.
<b>9.2 Odor:</b>	Rotten egg or sulfurous odor.
<b>9.3 Odor Threshold:</b>	0.3 to 5 ppm (sulfur dioxide). 4.7 ppb (hydrogen sulfide).
<b>9.4 pH:</b>	Not applicable
<b>9.5 Melting Point/Freezing Point:</b>	247°F (119°C)
<b>9.6 Boiling Point:</b>	833°F (445°C)
<b>9.7 Flash Point:</b>	405°F (207°C) (closed Cup)
<b>9.8 Evaporation Rate:</b>	Not determined
<b>9.9 Flammability:</b>	Not applicable
<b>9.10 Upper/Lower Flammability Limits:</b>	Not applicable
<b>9.11 Vapor Pressure:</b>	1 mm Hg @ 363°F (184°C)
<b>9.12 Vapor Density:</b>	> 38.9

9.13 Relative Density:	1.8 @ 68°F (20°C), 15 lbs/gal.
9.14 Solubility:	Insoluble in water; soluble in carbon disulfide
9.15 Partition Coefficient:	No data available.
9.16 Auto-ignition Temperature:	450°F (232°C)
9.17 Decomposition Temperature:	Not applicable
9.18 Viscosity:	6.5 cP @ 363°F (184°C)

#### Section 10: STABILITY and REACTIVITY

10.1 Reactivity:	See Section 10.5, below.
10.2 Chemical Stability:	Stable under normal (ambient) pressure and temperature.
10.3 Possibility of Hazardous Reactions:	See Section 10.5, below. Polymerization is not known to occur.
10.4 Conditions to Avoid:	Avoid all possible sources of ignition. Avoid overheating (>290°F).
10.5 Incompatible Materials:	<b>Sulfur can react with metals such as Sodium, Calcium, Tin, Nickel or Zinc under certain conditions.</b> Avoid contact with strong oxidizing agents such as acids, chlorine, dichromates or permanganates.
10.6 Hazardous Decomposition Products:	Heat (flames) can release toxic vapors or gases. Combustion can yield Sulfur Oxides. Molten sulfur reacts with hydrocarbons to form Carbon disulfide and Hydrogen sulfide. May contain or liberate toxic Hydrogen sulfide gas.

#### Section 11: TOXICOLOGICAL INFORMATION

11.1 Oral:	Oral Rat LD <sub>50</sub> : 8,437 mg/kg (literature value)
11.2 Dermal:	No data available.
11.3 Inhalation:	May contain or release highly toxic H <sub>2</sub> S gas.
11.4 Eyes:	Vapors from molten sulfur may cause watering of the eyes/eye irritation. Contact with the molten material will cause thermal burns.
11.5 Chronic/Carcinogenicity:	Not listed in NTP, IARC or by OSHA.
11.6 Teratology:	No data available.
11.7 Reproduction:	No data available.
11.8 Mutagenicity:	No data available.

#### Section 12: ECOLOGICAL INFORMATION

12.1 Ecotoxicity:	Sulfur is not classified as an environmental hazard.
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<b>12.2 Persistence &amp; Degradability:</b>	Sulfur is a component of the environment and there is a natural cycle of oxidation and reduction reactions which transform 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.
<b>12.3 Bioaccumulative Potential:</b>	This product is not bioaccumulative.
<b>12.4 Mobility in Soil:</b>	Sulfur is not expected to be mobile in the soil. Sulfur is slowly converted to sulfate in soil by the action of autotrophic bacteria.
<b>12.5 Other Adverse Effects:</b>	None

### Section 13: DISPOSAL CONSIDERATIONS

Consult federal, state and local regulations for disposal requirements.

### Section 14: TRANSPORT INFORMATION

#### 14.1 Basic Shipping Description:

<b>14.1.1 Proper Shipping Name:</b>	Sulfur, molten
<b>14.1.2 Hazard Classes:</b>	9 (domestic only) 4.1 (international)
<b>14.1.3 Identification Number:</b>	NA2448 (domestic only) UN2448 (international)
<b>14.1.4 Packing Group:</b>	III
<b>14.1.5 Hazardous Substance:</b>	No
<b>14.1.6 Marine Pollutant:</b>	No

#### 14.2 Additional Information:

##### 14.2.1 Other DOT Requirements:

<b>14.2.1.1 Reportable Quantity:</b>	Not applicable
<b>14.2.1.2 Placard(s):</b>	Class 9 (domestic only) Flammable solid (international)
<b>14.2.1.3 Label(s):</b>	Class 9 (domestic only) Flammable solid (international)

<b>14.2.2 USCG Classification:</b>	Compatibility Group 0 (unassigned). Chris Code: SXX
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##### 14.2.3 International Transportation:

<b>14.2.3.1 IMO:</b>	Not normally shipped by this mode.
<b>14.2.3.2 IATA:</b>	Forbidden
<b>14.2.3.3 TDG (Canada):</b>	Sulphur, molten (UN2448)
<b>14.2.3.4 ADR (Europe):</b>	Sulphur, molten (UN2448)

<b>14.2.3.5 ADG (Australia):</b>	Sulphur, molten (UN2448)
<b>14.2.4 Emergency Response Guide:</b>	133
<b>14.2.5 ERAP - Canada:</b>	Not applicable
<b>14.2.6 Special Precautions:</b>	Not applicable

<b>Section 15: REGULATORY INFORMATION</b>
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**15.1 U.S. Federal Regulations:**

<b>15.1.1 OSHA:</b>	This product is considered hazardous under the criteria of the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200).	
<b>15.1.2 TSCA:</b>	Product is contained in USEPA Toxic Substance Control Act Inventory.	
<b>15.1.3 CERCLA:</b>	Reportable Quantity – No	
<b>15.1.4 SARA Title III:</b>		
<b>15.1.4.1 Extremely Hazardous Substance (EHS):</b>		No
<b>15.1.4.2 Section 312 (Tier II) Ratings:</b>	Immediate (acute)	Yes
	Fire	Yes
	Sudden Release	No
	Reactivity	No
	Delayed (chronic)	No
<b>15.1.4.3 Section 313 (FORM R):</b>	Not applicable	
<b>15.1.5 RCRA:</b>	Not Applicable	
<b>15.1.6 CAA (Hazardous Air Pollutant/HAP):</b>	Not Applicable	

**15.2 International Regulations:**

<b>15.2.1 Canada:</b>	
<b>15.2.1.1 WHMIS:</b>	B4, D2B
<b>15.2.1.2 DSL/NDL:</b>	Yes, DSL No. 8339

**15.3 State Regulations:**

<b>15.3.1 CA Proposition 65:</b>	 <b>WARNING:</b> This product can expose you to chemicals including sulfur dioxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to <a href="http://www.P65.Warnings.ca.gov">www.P65.Warnings.ca.gov</a> .
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**Section 16: OTHER INFORMATION**

**REVISIONS:** This SDS was reformatted to comply with the new Hazard Communication Standard dated March 26, 2012, by the Regulatory Affairs Department of Tessengerlo Kerley, Inc. 9/26/2014.  
Revised sections 2, 8, 10 and 15. 6/10/2016.  
Revised section 15. 12/22/2018.  
Revised section 1. 1/3/2020.

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