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## Molten Sulphur

### MATERIAL SAFETY DATA SHEET

#### SECTION 1 – STATEMENT OF HAZARDOUS NATURE CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

This product is classified as:

**Not Hazardous** according to criteria of the National Occupational Health and Safety Commission and as a **Dangerous Good** according to the Australian Dangerous Goods (ADG) Code.

Emergency Telephone Number: Poisons Information Centre (Australia): 13 1126

<b>Substance</b>	Liquid Sulphur
<b>Other Names</b>	Molten Sulphur
<b>Product Use</b>	Produced and stored on the Sulphur Recovery Unit
<b>Creation Date</b>	November 2000
<b>Revision Date</b>	June 2009

#### SECTION 2 – COMPOSITION / INFORMATION ON INGREDIENTS

Ingredients	CAS No.	Proportion (% By Weight)
Sulphur	7704-34-9	50 - 100
Hydrogen Sulphide	7783-06-4	0 - 0.1

#### SECTION 3 – HAZARDS IDENTIFICATION

<b>Approved Criteria Classification (Calculated)</b>	Not classified
<b>SUSDP Classification</b>	Not classified
<b>ADG Classification</b>	Class 4.1
<b>UN Number</b>	2448
<b>Emergency Overview</b>	
<b>Colour</b>	Clear to amber yellow
<b>Physical Description</b>	Liquid
<b>Odour</b>	Pungent
<b>Major Health Hazards</b>	Thermal burns. May form polysulphides including hydrogen sulphide, a highly toxic gas.

<b>Potential Health Effects</b>	
<b>Inhalation:</b>	
<b>Short Term Exposure</b>	Elevated temperatures or mechanical action may form vapours, mists or fumes, which may be irritating to the eyes, nose, throat and lungs. Highly toxic at high hydrogen sulphide concentrations. Thermal burns to the respiratory tract may result.
<b>Long Term Exposure</b>	No data given.
<b>Skin Contact:</b>	
<b>Short Term Exposure</b>	Will adhere to bare skin and solidify, releasing large amounts of heat and causing thermal burns.
<b>Long Term Exposure</b>	
<b>Eye Contact:</b>	
<b>Short Term Exposure</b>	Exposure to hot material may cause thermal burns with subsequent long-term injury.
<b>Long Term Exposure</b>	
<b>Ingestion:</b>	
<b>Short Term Exposure</b>	Hot liquid will cause thermal burns to the mouth, throat and stomach. Abdominal discomfort, nausea, vomiting and diarrhea may result if swallowed.
<b>Long Term Exposure</b>	
<b>Carcinogen Status</b>	
<b>NOHSC</b>	Not classified.
<b>NTP</b>	Not classified.
<b>IARC</b>	Not classified.

<b>SECTION 4 – FIRST AID MEASURES</b>	
<b>Scheduled Poisons</b>	Poison Information Centres in each State capital city can provide additional assistance for scheduled poisons. Phone: Australia 13 1126.
<b>Inhalation</b>	If respiratory symptoms develop, move casualty away from source of exposure and into fresh air. If respiratory irritation, dizziness, nausea or unconsciousness occurs, seek medical attention. If casualty is not breathing, begin artificial respiration immediately. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.
<b>Skin Contact</b>	Immediately flush the affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get immediate medical attention. Do not remove material from skin or contaminated clothing as the damaged flesh may be easily torn. Do not use solvents or thinners to dissolve sulphur stuck to the skin. Launder contaminated clothing before reuse.
<b>Eye Contact</b>	Flush with copious amounts of clean low-pressure water, ensuring eyelids are held open for at least 15 minutes. Obtain immediate medical attention. If medical attention is not immediately available, flush for an additional 15 minutes.
<b>Ingestion</b>	Not expected to occur in normal industrial use. Do not induce vomiting. Obtain immediate medical attention.

<b>SECTION 5 – FIRE FIGHTING MEASURES</b>	
<b>Fire and Explosion Hazards</b>	May give off flammable vapours, creating an explosion hazard. Hydrogen sulphide, an extremely flammable, very toxic gas, may be present. Molten sulphur may flash and/or burn when exposed to air at temperatures near the flash point. Can accumulate static charge.
<b>Extinguishing Media</b>	Water fog, foam, dry powder, carbon dioxide.
<b>Fire Fighting</b>	Water or foam may cause frothing. Use water to cool fire-exposed containers. Water spray may be used to flush spills away from exposures. Prevent runoff from fire control or dilution from entering waterways or sewers. If safe to do so, remove containers from path of fire. Fire fighting personnel should wear appropriate protective equipment including fire retardant clothing and breathing apparatus.
<b>Flash Point</b>	207 °C
<b>Flammable Limits (% Volume in Air)</b>	Lower 3.3 (hydrogen sulphide) Upper 46 (hydrogen sulphide)

<b>SECTION 6 – ACCIDENTAL RELEASE MEASURES</b>	
<b>Occupational Release</b>	Eliminate source of ignition. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewer, watercourses or low areas and contact with soil. Contain spilled liquid with sand or earth. Allow material to solidify and scrape up with a non-sparking shovel. Place material in suitable containers for recycling or disposal. Personnel involved in the cleanup should wear suitable protective equipment.

<b>SECTION 7 – HANDLING AND STORAGE</b>	
<b>Handling</b>	Avoid all personal contact. Harmful amounts of hydrogen sulphide may be present. Keep face clear of tank openings. Avoid, as far as reasonably practicable, the inhalation of vapours or mists. May generate static electricity. Handle with electrically grounded equipment.
<b>Storage</b>	Store in a cool place out of direct sunlight. Store away from sources of heat and ignition. Store in a well ventilated area away from oxidising agents including chlorates, nitrates, perchlorates and permanganates. Keep containers closed at all times. Containers must be labelled in accordance with local regulations. Storage containers must be ventilated to prevent the build-up of hydrogen sulphide, and enclosed areas must be tested for hydrogen sulphide concentration before entry.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION			
Exposure Limits (NOHSC)	Ingredient	TWA	STEL
	Hydrogen Sulphide	10 ppm 14 mg/m <sup>3</sup>	15 ppm 21 mg/m <sup>3</sup>
<b>Ventilation</b>	Ensure adequate ventilation.		
<b>Eye Protection</b>	Chemical goggles or safety glasses with side shields to protect against eye splashes.		
<b>Skin Protection</b>	Thermally protective gloves must be worn when handling liquid. Use chemical-resistant apron and/or clothing to protect against hot liquid and to avoid skin contact.		
<b>Respirator</b>	Positive pressure air supplied respirators should be used during unloading of molten sulphur, or other instances when H <sub>2</sub> S is likely to exceed exposure standards.		

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES	
<b>Physical State</b>	Liquid
<b>Colour</b>	Clear to yellow amber
<b>Boiling Point</b>	444 °C
<b>Vapour Pressure (@184 °C)</b>	0.13 kPa
<b>Relative Vapour Density</b>	1.1 or higher (Air = 1)
<b>Volatile Component</b>	Negligible
<b>Evaporation</b>	Negligible
<b>Specific Gravity</b>	1.819g/cm <sup>3</sup>
<b>Solubility in Water</b>	Below 0.1 % mass
<b>Molecular Weight</b>	32

SECTION 10 – STABILITY AND REACTIVITY	
<b>Reactivity</b>	Stable
<b>Conditions to Avoid</b>	High temperatures, exposure to air.
<b>Materials to Avoid</b>	Strong oxidising agents such as chlorates, nitrates, perchlorates or permanganates; and alkalis.
<b>Hazardous Decomposition</b>	Hydrogen sulphide and sulphur oxides.
<b>Hazardous Polymerisation</b>	Will not occur.

<b>SECTION 11 – TOXICOLOGICAL INFORMATION</b>	
<b>Classification of Hazardous Ingredients</b>	
<b>Ingredients</b>	<b>R Phrases</b>
Hydrogen Sulphide	R12, R26, R50
<b>Individual Ingredient Information</b>	
<b>Sulphur</b>	
<b>Irritation Data</b>	8 ppm eye human
<b>Toxicity Data</b>	LD rat oral: 8 437 mg/kg LDLo rabbit oral: 175 mg/kg LC50 mammal – spp. unspecified inhalation: 1 660 mg/m <sup>3</sup>
<b>Hydrogen Sulphide</b>	
<b>Toxicity Data</b>	LC50 mouse inhalation: 634 ppm/1 hr LC50 rat inhalation: 444 ppm
<b>Target Organs</b>	Eyes, respiratory system, central nervous system.
<b>Reproductive Data</b>	TCLo rat inhalation: 20 ppm (6 – 22 D preg/21 D after birth)
<b>Target Organs</b>	Eyes, skin, respiratory system and central nervous system.

<b>SECTION 12 – ECOLOGICAL INFORMATION</b>	
	No data available.

<b>SECTION 13 – DISPOSAL CONSIDERATIONS</b>	
	Suitable for processing by an approved recycling facility or can be disposed of at any licensed waste disposal site subject to compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

<b>SECTION 14 – TRANSPORT INFORMATION</b>	
<b>ADG Code</b>	Class 4.1
<b>HAZCHEM Code</b>	2X
<b>Subsidiary Risk</b>	NIL
<b>Packaging Group</b>	III
<b>Packaging Method</b>	As approved by Competent Authority.
<b>UN Proper Shipping Name</b>	SULFUR, MOLTEN
<b>UN Number</b>	2448

<b>SECTION 15 – REGULATORY INFORMATION</b>	
<b>AICS</b>	All ingredients present on AICS.

**SECTION 16 – OTHER INFORMATION**

<b>Acronyms</b>	
	<b>SUSDP</b> Standard for the Uniform Scheduling of Drugs and Poisons
	<b>ADG Code</b> Australian Code for the Transport of Dangerous Goods by Road and Rail
	<b>CAS Number</b> Chemical Abstracts Service Registry Number
	<b>UN Number</b> United Nations Number
	<b>R-Phrases</b> Risk Phrases
	<b>HAZCHEM</b> An emergency action code of numbers and letters which gives information to emergency services
	<b>NOHSC</b> National Occupational Health and Safety Commission
	<b>NTP</b> National Toxicology Program (USA)
	<b>IARC</b> International Agency for Research on Cancer
	<b>AICS</b> Australian Inventory of Chemical Substances
	<b>TWA</b> Time Weighted Average
	<b>STEL</b> Short Term Exposure Limit