MATERIAL SAFETY DATA SHEET
MOLTEN SULPHUR

Section 1 – Identification of Supplier

Product identifier:
Product Name: Molten Sulphur
Shipping Name: Molten Sulfur

Suppliers Details: Chemical Initiatives (Pty) Ltd
Address: AECI Place, Building 24, The Woodlands, Woodlands Drive, Woodmead, 2196, South Africa

Telephone number	**Emergency number**
+27 11 8068700	+27 11 608 3300

Section 2 – Hazard identification

Component	**Label elements**	**Precautions statement:**	**Other Hazards:**
Molten Sulphur	 **Warning:** Hydrogen Sulfide causes eye irritation.	Wear gloves, face protection and protective clothing.	Hydrogen Sulphide (H_2S) may be present in trace quantities (by weight) in molten sulphur but may accumulate to toxic for flammable concentrations in enclosed spaces such as sulphur storage pits tanks or tankers.

Health Statements:

Skin or eye contact with Molten Sulphur can cause severe thermal burns. Solidified sulphur, especially crushed or powdered Sulphur, can be ignited by friction, static electricity, heat, sparks or flames. Airborne sulphur dust can form explosive dust mixture with air. Excessive exposure to dust may cause skin, eye or respiratory tract irritation.

Toxic hydrogen sulfide (H_2S) and Sulphur dioxide (SO_2) gases may be released by Molten Sulphur. Concentrations of H_2S and SO_2 may accumulate in or near containers of Molten Sulphur. Over-exposure to these gases can cause respiratory collapse, coma and death. Burning Sulphur releases toxic oxides of Sulphur such as SO_2.

Precautionary statements: Prevention:

Keep away from flames and hot surfaces. No smoking.
Avoid accumulations of sulphur dust.
Wear protective clothing to prevent skin contact.
Wear eye protection to prevent contact with molten sulphur
Do not breathe dust. Use only outdoors or in a well-ventilated area.

Response
In case of fire: Use dry chemical, CO2, water spray or fire fighting foam to Extinguish.
If Molten Sulphur on skin or clothing: Cool Molten Sulphur with water. Removal of encrusted Sulphur from eyes, skin or clothing to be done only by medical personnel.
If Sulphur dust on skin (or hair): Rinse skin with water or shower. Remove and wash contaminated clothing. Seek medical attention if irritation persists.
If in eye: Rinse cautiously with water to cool Sulphur. Seek medical attention.
For dust inhalation: Remove person to fresh air and keep comfortable for breathing. Get medical attention if irritation persists.

Storage Avoid releasing H_2S and SO_2 into areas where respiratory exposure might occur.
Avoid generating heavy concentrations of airborne, finely-ground Sulphur dust.
Avoid accumulations of Sulphur dust on surfaces of equipment or buildings.

Disposal Dispose of contents/containers to approved disposal site in accordance with local, regional, or national regulations.

Section 3 – Composition / information on ingredients

Components: Sulphur and Hydrogen sulfide

Molten sulphur causes severe burns and may generate hydrogen sulphide, which is very toxic by inhalation.

Section 4 – First aid measures

Inhalation: If inhaled, remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Medical oxygen may be administered, if available, where breathing is difficult. Keep patient warm and at rest. Seek medical attention immediately.

Skin contact: Solidified Sulphur: Take off all contaminated clothing immediately. Wash off with soap and water. Seek medical attention immediately. Molten Sulphur: Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Eye contact: Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical advice.

Ingestion: Molten sulphur would cause severe burns. No effects expected from solidified Sulphur at ambient temperature. Consult a physician if necessary.

Section 5 – Fire Fighting Measures

Suitable extinguishing media: Sand, Dry chemical, Foam, Carbon dioxide (CO_2), Water spray. Steam may be used for small fires in confined spaces

Specific hazards during fire fighting:
Toxic fumes of Sulphur dioxide will result from combustion. Do not spray water directly into containers of Molten Sulphur due to the danger of boil over. Also avoid spraying direct streams of water that may scatter burning Sulphur and spread the fire or create Sulphur dust clouds and cause an explosion.

For large fires, consider evacuation of an area downwind of fire if necessary. Fire will rekindle until mass has been cooled to below approximately 150°C. Cool surrounding area and containers until well after the fire is out to prevent re-ignition. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Special protective equipment for fire-fighters:
Fire fighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require an approved pressure demand self-contained breathing apparatus with full face-piece and full protective clothing.

Further information: Standard procedure for chemical fires. In the event of fire, cool tanks with water spray.

Section 6 – Accidental Release Measures

Personal precautions: Protective clothing and gloves, and an acid gas/particulate respirator are recommended for persons exposed to potentially hazardous levels of Sulphur dust or fume. Tightly fitting safety goggles.

Environmental precautions: This product can pose a threat to the environment. Contamination of soil and water should be prevented. Prevent spillage from entering streams or sewers.

Methods for cleaning up: Stop the source of the release, if safe to do so. Isolate area until gas has dispersed.

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or

flames in immediate area). Ventilate and gas test area before entering. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods which will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers for recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements. If Molten Sulphur is accidentally released into a confined or enclosed space, monitor for hydrogen sulfide and Sulphur dioxide build-up in the vapor space above the spill.

Section 7 – Handling and Storage

Precautions for Safe Handling: Wash thoroughly after handling. Promptly remove contaminated clothing and launder before reuse. Avoid contact with skin and eyes. Keep containers closed and clearly labelled. Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Do not use in areas without adequate ventilation. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Toxic concentrations of hydrogen sulfide may accumulate in tanks and bulk transport compartments storing Sulphur. Bond and ground containers during
product transfer to reduce the possibility of static-initiated fire or explosion.
Dust explosion class: Severe if Molten Sulphur solidifies and dust is generated.

Standard for Prevention of Sulphur Fires and Explosions.
Conditions for safe storage, including incompatibilities:
Keep containers tightly closed in a dry, cool and well-ventilated place. Avoid dispersal of sulphur dust into the air such as cleaning dusty surfaces with compressed air. Dust control equipment such as local exhaust ventilation or material transport systems handling Sulphur should contain explosion relief vents or explosion suppression systems.

Section 8 - Exposure Controls and Personal Protection

Components:
Hydrogen Sulfide:
10ppm ACGIH TWA
15ppm ACGIH STEL

Sulphur Dioxide
TWA: 2 ppm 8 hours
STEL: 5 ppm
5minute(s).

Engineering measures: Use adequate ventilation to keep gas and dust concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors outdoors if possible and provide dust collectors with explosion vents. Supply sufficient replacement air to make up for air removed by the exhaust system. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Eye protection: Where there is a possibility of liquid contact, wear splash-proof safety goggles and face-shield.

Hand protection: Workers should wear insulated gloves and heat- and chemical-resistant clothing when handling hot Sulphur. Safety type boots are recommended. Skin and body protection: Gloves and coveralls of rubber or neoprene construction if liquid contact could occur. Workers should wear insulated gloves and heat- and chemical-resistant clothing when handling hot Sulphur. Safety type boots are recommended.

Respiratory protection: Where dust or Sulphur dioxide is generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment filter and an acid gas cartridge. Where hydrogen sulfide is present or possibly present in confined spaces at hazardous levels an approved supplied air respirator or self-contained breathing apparatus (SCBA) is necessary.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

Section 9 – Physical and Chemical Properties	
Appearance:	Amber to yellow liquid
Odour:	Pungent rotten-egg like.
Odour threshold:	Reported as low as 10 ppb or less
Ignition temperature:	248^0C -266^0C
Melting point:	110^oC -119^oC
Initial boiling point and boiling range:	444.6 ^{o}C
Flash point:	Liquid, pure : 188°C Liquid, impure : as low as 168°C

Vapour pressure:	10Pa =135^{0}C 100Pa=176^{0}C 1000Pa=235^{0}C
Relative Density:	1.9g/cm^3
Solubility:	Insoluble in cold water
Flammability (solid / gas)	Solid

Section 10 – Stability and Reactivity

Reactivity: Sulphur is incompatible with a number of chemical materials including, but not limited to, chlorates, nitrates, other oxidizers, carbides, halogens, potassium, phosphorus, and heavy metals. This incompatibility may result in fire, excessive heat generation, uncontrolled reaction, release of toxic products and/or explosion. Molten Sulphur may attack or degrade rubber and some plastics.

Chemical stability: Stable under normal conditions

Possibility of hazardous reactions:
Corrosive in contact with metals such as mild steel. Avoid moisture. At higher temperatures Molten sulphur may react with hydrocarbons in the absence of air to form hydrogen sulfide (H_2S). H_2S is a flammable gas and may present an explosion hazard in a confined space. Under certain conditions, H_2S can react to form pyrophoric iron compounds in enclosed spaces such as sulphur pits. Molten sulphur forms sulphides with most metals including iron and reacts vigorously with sodium and magnesium.

Conditions to avoid: High temperatures, incompatible materials, ignition sources, dust generation, excess heat. Fire can cause containers to burst/explode.

Hazardous decomposition products:
Sulphur burns to Sulphur dioxide. Sulphur reactions with hydrocarbons and other organic materials may produce hydrogen sulfide and carbon disulphide. Other possibly toxic reaction or decomposition products are highly dependent on the incompatible material.

Section 11 – Toxicology

Skin contact Molten: Skin contact with molten material will cause thermal burns. Dry Sulphur dust may cause slight skin irritation.

Eye contact Molten: Molten Sulphur in the eye will cause burns and permanent

damage. Exposure to Sulphur vapours may be irritating to the eyes. Dry Sulphur dust can be irritating.
Ingestion: Ingestion causes irritation of upper respiratory system and gastrointestinal disturbance.

Inhalation: Inhalation of dust may cause slight throat and lung irritation.

Further Information:
Inhalation of low levels of vapours containing hydrogen sulfide or Sulphur dioxide can produce respiratory tract irritation characterized by sneezing, coughing, sore throat and chest pain. At increasing concentrations, exposure to hydrogen sulfide and Sulphur dioxide can result in pulmonary oedema, dizziness, nausea, respiratory paralysis, unconsciousness and death. Asthmatics may be more susceptible to Sulphur dioxide exposures.

Section 12 – Ecological Information

Additional ecological Information:
Sulphur is insoluble in water at 20°C. There is minimal immediate risk from spills. However, over long-term exposure, Sulphur can oxidize under certain conditions to yield acidic runoff or acidic conditions in soils. Keep out of sewers, drainage and waterways. Report spills and releases, as applicable, under Local, Provincial and National legislation.

Section 13 – Disposal Considerations

Disposal: If material cannot be returned to process or salvage, dispose of in accordance with applicable Local, Provincial and National waste management regulations.

Section 14 - Transport

	Land	**Air**	**Sea**
UN:	2448	2448	2448
Proper Shipping name:	Sulphur Molten	Sulphur Molten	Sulphur Molten
Transport Hazard:	4.1	4.1	4.1
Packing Group:	III	III	III

Subsidiary Risk:	None	None	None
ERG:	133	133	133
Marine Pollutant:	No	No	No
Hazchem Label	Flammable Liquid  Elevated temperature warning triangle in terms of SANS 10232/1 as follows 		

Section 15 – Regulatory Information

Users should ensure that they comply with relevant local, state or national legislation

Section 16 – Other Information

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