SDS(Safety Data Sheet)

Product	Molten Sulfur		
MSDS Number	List No.	Issuing date	Last revised date
-	PD1062	2008-07-25	2024-01-17

1. IDENTIFICATION

1) Product name

Molten Sulfur

2) Recommended use of the chemical and restriction on use

- Recommended use: Others
  기타
- Restrictions on use: Do not use for any other purpose.

3) Details of the supplier of the safety data sheet

○ **Manufacturer**

- Company name: GS Caltex Corporation
- Address: GS Tower, 508, Nonhyeon-ro, Gangnam-gu, Seoul, Korea
- Emergency telephone number: 1544-5151

2. HAZARDS IDENTIFICATION

1) Classification of the product

SKIN CORROSION/IRRITATION : Category 2

2) Label elements

○ **Hazard pictograms**

○ **Signal word**

Warning

○ **Hazard statements**

- H315 Causes skin irritation.

○ **Precautionary statements**

1) Prevention

- P264 Wash ... thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

2) Response

- P302 + P352 IF ON SKIN: Wash with plenty of water/cleansing agent.
- P321 Specific treatment (see section 5).
- P332 + P313 If skin irritation occurs: Get medical advice/attention.
- P362 + P364 Take off contaminated clothing and wash it before reuse.

3) Storage

- Not applicable

4) Disposal

- Not applicable

3) Other hazards

○ **Product NFPA Level**

(※ 0-Lack, 1-Low, 2-Moderate, 3-High, 4-Very High)

Product name	Health	Flammable	Reaction
Molten Sulfur	1	1	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Sulfur, precipitated, sublimed or colloidal	Brimstone;Colloidal sulfur	7704-34-9	231-722-6	100

4. FIRST AID MEASURES

1) Eye contact

- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes.
- If eye irritation persists: Get medical advice/attention.

2) Skin contact

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
- If skin irritation occurs: Get medical advice/attention.
- Take off immediately all contaminated clothing and wash it before reuse.

3) Inhalation

- Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

4) Ingestion

- Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

5) Indication of any immediate medical attention and special treatment needed

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.
- Direct water (Unsuitable extinguishing media)

2) Special hazards arising from the substance or mixture

- Fire may produce irritating, corrosive and/or toxic gases.
- Heating may cause a fire or explosion.

3) Special protective equipment and precautions for firefighters

- Rescuers should put on appropriate protective gear.
- In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
- Eliminate all ignition sources if safe to do so.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment

- Clean up spills immediately, observing precautions in Protective Equipment section.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Please note that materials and conditions to be avoided.

2) Environmental precautions

- Large spill: Prevent entry into waterways, sewers, basements or confined areas.

3) Methods and material for containment and cleaning up

- Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.

7. HANDLING AND STORAGE

1) Precautions for safe handling

- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Avoid prolonged or repeated contact with skin.
- Please note that materials and conditions to be avoided.
- Handling refer to engineering control/personal protection section.
- Wash thoroughly after handling.

2) Conditions for safe storage (including any incompatibilities)

- Please note that materials and conditions to be avoided.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Store in a well-ventilated place. Keep container tightly closed.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Sulfur, precipitated, sublimed or colloidal	Not available	Not available	Not available	Not available

2) Appropriate engineering controls

- Install local exhaust ventilation system.
- Check legal suitability of exposure level.

3) Personal protection equipment

○ **Respiratory protection**

- If exposure consentration of the material is lower than 100 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; such
- If exposure consentration of the paticle material is lower than 250 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material
- If exposure consentration of the particle material is lower than 500 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate materia
- If exposure consentration of the particle material is lower than 10000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate mater
- If exposure consentration of the material is lower than 100000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; su
- If exposure consentration of the material exceeds the permitted exposure standards, Wear European Standard EN 149 approved full or half face piece (with goggles) respireatory protective equipment.

○ **Eye protection**

- An eye wash unit and safety shower station should be available nearby work place.
- Wear breathable safety goggles to protect from vapour state organic material causing eye irritation or other disorder.

○ **Hand protection**

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

○ **Body protection**

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value

Apperance	Liquid
Color	No Data
Smell	무취 (일부 황화수소가 섞여있을 경우, 계란 썩는 냄새)
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	113~119 ℃
Boilling Point	No Data
Flash Point	160 ℃
Evaporating Rate	No Data
Flammability(Solid, Gas)	No Data
Explosibility Range	No Data
Steam Pressure	3.95e-006 mmHg (at 25℃)
Solubility	No Data
Vapor Density	No Data
Specific Gravity	2.07 g/㎤ @20℃
Distribution Coefficient	0.23 (추정치)
SelfIgnition Temperature	232 ℃
Pyrolysis Temperature	No Data
Viscosity	No Data
Molecular Weight	32.07

10. STABILITY AND REACTIVITY

1) Chemical Stability and hazardous reactivity - Can form explosive mixtures at temperatures at or above the flashpoint.
- Fire may produce irritating, corrosive and/or toxic gases.

2) Conditions to avoid - Ignition source(heat, spark, flame, friction, shock, contamination)

3) Incompatible materials - Combustibles

4) Hazardous decomposition products - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

11. TOXICOLOGICAL INFORMATION

1) Information on the likely routes of exposures

○ **Inhalation**

- No inhalation effects through respiratory system.

○ **Skin contact**

- Causes skin irritation.
- Absorbable through the skin

○ **Eye contact**

- Causes serious eye irritation.
- Possible exposure through the eye

○ **Ingestion**

- No ingestion effect through mouth.

2) Health hazard information

○ **Acute toxicity**

*** Oral - Not classified (ATEmix > 2000 mg/kg)**

- Sulfur, precipitated, sublimed or colloidal : rat(male/female); LD50 > 2000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)

*** Dermal - Not classified (ATEmix > 2000 mg/kg)**

- Sulfur, precipitated, sublimed or colloidal : rat(male/female); LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)

*** Inhalation(Gas) - Not applicable**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

*** Inhalation(Vapour) - Not classified (ATEmix > 20 mg/L)**

- Sulfur, precipitated, sublimed or colloidal : Not available

*** Inhalation(Dust, mist) - Not classified (ATEmix > 5 mg/L)**

- Sulfur, precipitated, sublimed or colloidal : rat(male/female); LC50 > 5.43 mg/L air/4h (OECD TG 403, GLP) (ECHA)

○ **Skin corrosion/Irritation : Category 2 (SKIN IRRITATION Cat.2)**

- Sulfur, precipitated, sublimed or colloidal : rabbit; irritating (OECD TG 404, GLP) (ECHA)

○ **Serious eye damage/irritation : Not classified**

- Sulfur, precipitated, sublimed or colloidal : rabbit; not irritating (OECD TG 405, GLP) (ECHA)

○ **Respiratory sensitization : Not classified**

- Sulfur, precipitated, sublimed or colloidal : Not available

○ **Skin sensitization : Not classified**

- Sulfur, precipitated, sublimed or colloidal : guinea pig; not sensitising (OECD TG 406, GLP) (ECHA)

○ **Carcinogenicity : Not classified**

- Sulfur, precipitated, sublimed or colloidal : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed

○ **Germ cell mutagenicity : Not classified**

- Sulfur, precipitated, sublimed or colloidal : in vitro mammalian chromosome aberration test : negative (OECD TG 473, GLP) (ECHA), in vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471, GLP) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test : negative (OECD TG 474, GLP) (ECHA)

○ **Reproductive toxicity : Not classified**

- Sulfur, precipitated, sublimed or colloidal : Not available

○ **Specific target organ toxicity (single exposure) : Not classified**

- Sulfur, precipitated, sublimed or colloidal : oral; rat(male/female); Findings were considered to reflect the normal spectrum of spontaneous lesions present in rats of this strain and age. LD50 > 2000 mg/kg bw, no deaths (OECD TG 401, GLP) (ECHA)
  dermal; rat(male/female); Findings were considered to reflect the normal spectrum of spontaneous lesions present in rats of this strain and age. LD50 > 2000 mg/kg bw, no deaths (OECD TG 402, GLP) (ECHA)
  inhalation; rat(male/female); Within one week after exposure all surviving rats recovered and no clinical signs were observed anymore. LC50 > 5.43 mg/L air/4h (OECD TG 403, GLP) (ECHA)

○ **Specific target organ toxicity (repeated exposure) : Not classified**

- Sulfur, precipitated, sublimed or colloidal : oral; rat(male/female); 100, 400, 1000 mg/kg bw/day; 90 days; Based on the lack of treatment-related effects, the subchronic toxicity NOAEL was determined to be 1000 mg/kg bw/day. (OECD TG 408, GLP) (ECHA)
  dermal; rat(male/female); 100, 400, 1000 mg/kg bw/day; 21-23 days; Based on the lack of systemic toxicity effects observed in this study, the NOAEL for systemic effects was determined to be 1000 mg/kg bw/day. The NOAEL for local dermal effects was 400 mg/kg bw/day. (OECD TG 410, GLP) (ECHA)

○ **Aspiration hazard : Not classified**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

- Acute toxicity : Not classfied (ATEmix>1mg/L)
- Chronic toxicity : Not classfied

○ **Acute (short-term) aquatic hazard:**

Fish

- Sulfur, precipitated, sublimed or colloidal : Not available

Invertebrates

- Sulfur, precipitated, sublimed or colloidal : No toxic effects occur within the range of water solubility. (ECHA)

Aquatic algae

- Sulfur, precipitated, sublimed or colloidal : No toxic effects occur within the range of water solubility. (ECHA)

○ **Chronic (Long-term) aquatic hazard:**

Fish

- Sulfur, precipitated, sublimed or colloidal : Not available

Invertebrates

- Sulfur, precipitated, sublimed or colloidal : No toxic effects occur within the range of water solubility.

(ECHA)

Aquatic algae

- Sulfur, precipitated, sublimed or colloidal : Not available

2) Persistence and degradability

○ **Persistence**

- Sulfur, precipitated, sublimed or colloidal : log Kow = -1.38 (experimental) (EPISUITE)

○ **Degradability**

- Sulfur, precipitated, sublimed or colloidal : Sulfur pure test material showed a half life of 4.25 hours when illuminated with 80000 lux at 25°C. (ECHA)

3) Bioaccumulative potential

○ **Bioaccumulation**

- Sulfur, precipitated, sublimed or colloidal : BCF = 3.162 (estimated) (EPISUITE)

○ **Biodegradation**

- Sulfur, precipitated, sublimed or colloidal : Not available

4) Mobility in soil

- Sulfur, precipitated, sublimed or colloidal : Koc = 0.06337 (EPISUITE)

5) Hazard to the ozone layer

- Sulfur, precipitated, sublimed or colloidal : Not applicable

6) Other adverse effects

- Sulfur, precipitated, sublimed or colloidal : Not classified

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Waste must be disposed of in accordance with federal, state and local environmental control regulation.

2) Special precaution for disposal

- Consider the required attentions in accordance with waste treatment management regulation.

14. TRANSPORT INFORMATION

1) UN No.

- 2448

2) Proper shipping name

- SULPHUR, MOLTEN

3) Transport hazard class(es)

- 4.1

4) Packing group

- III

5) Marine pollutant

-

6) Special safety response for transportation or transportation measure

- Types of Emergency Measures in Case of Fire : F-A

- Types of Emergency Measures in Leakage : S-H

15. REGULATORY INFORMATION

EINECS(or ELINCS)

- Sulfur, precipitated, sublimed or colloidal : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Sulfur, precipitated, sublimed or colloidal : Not applicable

Substances restricted under REACH

- Sulfur, precipitated, sublimed or colloidal : Not applicable

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **K-REACH**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **Chemical Control Act in Korea**

- Sulfur, precipitated, sublimed or colloidal : List of substance subjected to the PRTR

○ **Safety Control of Dangerous Substances Act**

- Sulfur, precipitated, sublimed or colloidal : Dangerous substance

U.S.A

○ **US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **CERCLA Designation of hazardous substances (40 CFR 302.4)**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **CERCLA Section 302 regulation**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **CERCLA Section 304 regulation**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **CERCLA Section 313 regulation**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **Stockholm Convention list**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **Montreal Protocol list**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

National Inventory

○ **Korea**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

○ **U.S.A**

- Sulfur, precipitated, sublimed or colloidal : US TSCA phase-in substance

○ **China**

- Sulfur, precipitated, sublimed or colloidal : China phase-in substance

○ **Japan**

- Sulfur, precipitated, sublimed or colloidal : Not applicable

16. OTHER INFORMATION

1) Reference

- Sources of information used in preparing this SDS included one or more of the following: Internal technical data, data from OECD eChemPortal, ECHA, NITE, TOXNET, IPCS and KOSHA search results.

2) Issue Date

- 2008-07-25

3) Revision number and Last date revised

○ **Number of revised**

- 9

○ **Date of last revision**

- 2023-10-19

○ **Last Revision History**

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4) Other

- The information contained in the Safety Data Sheet is at the date of its issuance to the best of our knowledge correct according to the data available to us. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.