

SAFETY DATA SHEET

Product: LIQUID SULFUR

N° SDS: Pb0191_e

Revision: 0.2e

Date: 07/31/2025

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SECTION 1: IDENTIFICATION

GHS product identifier:	LIQUID SULFUR
Other means of identification:	PB.990 - ENXOFRE LÍQUIDO
Recommended use of the chemical and restrictions on use:	Used in the chemical industry in the production of phosphate, ammonium sulfate and various chemical products.
Supplier's details:	Petrobras Biocombustível S. A. Address: Rua do Passeio, 38, Setor 4, 2º andar, Centro, CEP: 20021-290 - RJ – Brasil. Phone number: 0800-728-9001
Emergency phone number:	0800 728 9001 Opção 02

SECTION 2: HAZARD IDENTIFICATION

Classification of the substance or mixture:	Flammable Solids - Category 2; Skin Corrosion/Irritation - Category 2.
Classification system adopted:	Globally Harmonized System of Classification and Labeling of Chemicals (GHS), United Nations.

GHS label elements, including precautionary statements

Pictograms:



Signal word:	WARNING
Hazard statement(s):	H228 Flammable solid. H315 Causes skin irritation.
Precautionary statement(s):	PREVENTION: P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P240 Ground and bond container and receiving equipment. P241 Use explosion-proof electrical, ventilating and lighting equipment. P264 Wash hands thoroughly after handling. P280 Wear protective gloves, protective clothing, eye protection, face protection and hearing protection. RESPONSE TO EMERGENCY: P302 + P352 IF ON SKIN: Wash with plenty of water. P321 Specific treatment. P332 + P317 If skin irritation occurs: Get medical help. P362 + P364 Take off contaminated clothing and wash it before reuse. P370 + P378 In case of fire: Use dry sand, carbon dioxide (CO ₂), water mist and powder to extinguish.
Other hazards which do not result in classification:	The product has no other hazards.

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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE

Chemical identity of the substance:	Sulfur.
Common name(s), synonym(s) of the substance:	Precipitated sulfur; elemental sulfur; sulfur meal.
CAS number:	7704-34-9
EC number:	231-722-6
Molecular formula:	S
Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance:	Does not contain components that contribute to the hazard.

SECTION 4: FIRST-AID MEASURES

Description of necessary first-aid measures

Inhalation:	Move the victim to a well-ventilated area and keep him or her at rest in a position that is comfortable for breathing. Monitor respiratory function. If the victim is having difficulty breathing, give oxygen. If necessary, give artificial respiration. If you feel unwell, contact a POISON CENTER or doctor. Take this document with you.
Skin:	Wash exposed skin with sufficient water to remove the product. Remove and isolate contaminated clothing and shoes. In case of skin irritation: Consult a physician. Bring this document.
Eye:	Rinse thoroughly with water for several minutes. If you wear contact lenses, remove them if this is easy to do and continue rinsing. If eye irritation persists: consult a doctor. Bring this document.
Ingestion:	Rinse the victim's mouth with plenty of water. Never give anything by mouth to an unconscious person. If you feel unwell, contact a TOXICOLOGY INFORMATION CENTER or a doctor. Bring this document with you.
Most important symptoms/effects, acute and delayed:	Causes skin irritation with redness and pain. Contact with the molten form can cause skin burns due to the high temperature. Contact with the molten form may cause permanent eye damage due to the high temperature. Ingestion may cause gastrointestinal disturbances with nausea, vomiting and diarrhea.
Indication of immediate medical attention and special treatment needed, if necessary:	Avoid contact with the product when assisting the victim. If necessary, symptomatic treatment should include, above all, supportive measures such as correction of hydroelectrolytic and metabolic disorders, in addition to respiratory assistance. In case of contact with the skin, do not rub the affected area.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing media:	Suitable: dry sand, carbon dioxide (CO ₂), water mist and powder. Unsuitable: water directly onto the burning material.
Specific hazards arising from the chemical:	Combustion of the product or its packaging may form irritating and toxic gases such as carbon monoxide and dioxide and sulfur oxide and dioxide. Very dangerous when exposed to excessive heat or other sources of ignition such as: sparks, open flames or flames from matches and cigarettes, welding operations, pilot lights and electric motors.

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May accumulate static charge due to flow or agitation. Vapors from heated product may ignite due to static discharge. Vapors are denser than air and tend to accumulate in low or confined areas such as manholes and basements. They may travel great distances causing flashback or new fires in both open and confined spaces. Containers may explode if heated.

Special protective actions for fire-fighters: If cargo is involved in fire, isolate and evacuate the area to a minimum radius of 800 meters. Wear self-contained breathing apparatus (SCBA) with positive pressure and full protective clothing. Containers and tanks involved in the fire should be cooled with water mist.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Isolate the leak from sources of ignition. Keep unauthorized persons away from the area. Stop the leak if it can be done without risk. Prevent sparks or flames. Do not smoke. Do not touch damaged containers or spilled product unless wearing suitable clothing. Avoid exposure to the product. Stay in a safe place with the wind at your back. Use personal protective equipment as described in section 8.

For emergency responders: Use full PPE with safety glasses, PVC safety gloves, long-sleeved coveralls and closed shoes. In the event of a leak, where exposure is high, it is recommended to use an appropriate respiratory protection mask with a filter against vapors or mists.

Environmental precautions: Prevent spilled product from reaching watercourses and sewage systems.

Methods and materials for containment and cleaning up: Use water mist to reduce vapor dispersion. Collect the product with a clean shovel or other instrument that does not disperse the product. Place the product in appropriate containers and remove them to a safe location. Use non-sparking tools to collect the product. All equipment used for handling must be electrically grounded. For final disposal, proceed as per Section 13 of this document.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling

Precautions for safe handling: Handle in a well-ventilated area or with general ventilation/local exhaust system. Avoid dust formation. Use personal protective equipment as described in section 8. Avoid contact with incompatible materials.

General hygiene: Wash hands and face thoroughly after handling and before eating, drinking, smoking or using the toilet. Contaminated clothing should be changed and washed before reuse. Remove contaminated clothing and protective equipment before entering eating areas.

Conditions for safe storage, including any incompatibilities

Technical measures for prevention of fire and explosion: Keep away from heat, sparks, open flames and hot surfaces. Do not smoke. Keep container tightly closed. Ground the container and receiver during transfers. Use only non-sparking tools. Avoid the build-up of electrostatic charges. Use explosion-proof electrical, ventilation and lighting equipment.

Conditions for safe storage, including any incompatibilities: Store in a well-ventilated place away from sunlight. Keep the container closed. The storage location must have a containment basin to retain the product in case of a leak. The storage location must have an impermeable floor, free of combustible materials and a containment dam to retain in case of a leak.

It is not necessary addition of stabilizers and antioxidants to ensure the durability.

This material may react dangerously with some incompatible materials as outlined in Section 10.

Keep away from incompatible materials.

Packaging compatibilities: Similar to the original packaging.

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Inadequate packaging materials: There are not known unsuitable material.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**Control parameters**

Occupational exposure limit: No occupational exposure limits are established.

Biological limit: No biological indicators of exposure are established.

Other limits and values: No other limits and values are established.

Appropriate engineering controls: A risk assessment is recommended to define the engineering control measures necessary to eliminate or minimize the risk. These measures help to reduce exposure to the product.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection: Safety glasses or splash face shield.

Skin protection: Closed safety footwear and protective clothing against Flash Fire (FR). PVC protective gloves.

Respiratory protection: In case of high exposure to product vapors/mists, use respiratory protection combined with an air-supplied respirator, full facepiece operated in positive pressure mode.

Thermal hazards: It does not present thermal hazards.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid, molten (liquid due to high temperature).

Colour: Straw yellow.

Odour: Characteristic of rotten egg.

Melting point/freezing point: 115.2 °C (239.36 °F).

Boiling point or initial boiling point and boiling range: 444.6 °C (832.28 °F) at 101.325 kPa.

Flammability: Flammable.

Lower and upper explosion limit/flammability limit: Upper: 1400 g/m³ and Lower: 35 g/m³.

Flash point: 207 °C (404.6 °F) - Closed cup.

Auto-ignition temperature: 232 °C (449.6 °F).

Decomposition temperature: Not available.

pH: Not available.

Kinematic viscosity: Not available.

Solubility: Insoluble in water. Soluble in benzene, toluene, carbon tetrachloride and carbon disulfide.

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Partition coefficient n-octanol/water (log value):	log K_{ow} : 0.23 (calculated).
Vapour pressure:	3.95 x10 ⁻⁶ mmHg (526.6219 x10 ⁻⁶ Pa) at 30.4 °C (86.72 °F).
Density and/or relative density:	Not available.
Relative vapour density:	7.837 (Air = 1).
Particle characteristics:	Not available.
Other information:	Dynamic viscosity: 0.17 Pa.s at 120 °C (248 °F).

SECTION 10: STABILITY AND REACTIVITY

Reactivity:	Reactivity is not to be expected under normal conditions of temperature and pressure.
Chemical stability:	Product stable under normal temperature and pressure conditions.
Possibility of hazardous reactions:	May form explosive mixtures with strong oxidizing agents. May react violently with aluminum, ammonia, boron, calcium, zinc carbides, phosphorus, halogens, halogens, indium, lithium, nickel, ammonium nitrate, palladium, ammonium perchlorate, potassium, sodium and uranium with risk of explosion.
Conditions to avoid:	High temperatures. Sources of ignition. Contact with incompatible materials.
Incompatible materials:	Aluminum, ammonia, ammonium nitrate, Ammonium perchlorate, boron, calcium, halogen, halogen compounds, indian, lithium, nickel, palladium, phosphorus, potassium, sodium, strong oxidizing agents, uranium and zinc carbides.
Hazardous decomposition products:	No dangerous decomposition products are known.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity:	Product not classified as acute toxic. LC ₅₀ Dusts and mists (rats, 4h): 5.43 mg/L. LD ₅₀ Oral (rats): >2000 mg/kg. LD ₅₀ Dermal (rats): > 2000 mg/kg.
Skin corrosion/irritation:	Causes skin irritation with redness and pain. Contact with the molten form can cause skin burns due to the high temperature.
Serious eye damage/irritation:	Contact with the molten form may cause permanent eye damage due to the high temperature.
Respiratory or skin sensitization:	It is not expected to present respiratory or skin sensitization.
Germ cell mutagenicity:	It is not expected to show mutagenicity in germ cells.
Carcinogenicity:	It is not expected to be carcinogenic.
Reproductive toxicity:	It is not expected to be reproductively toxic.
STOT - Single exposure:	Not classified for specific target organ toxicity – single exposure. Ingestion may cause gastrointestinal disturbances with nausea, vomiting and diarrhea.
STOT - Repeated exposure:	It is not expected to exhibit specific target organ toxicity on repeated exposure.

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Aspiration hazard: It is not expected to present an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity: It is not expected to be ecotoxic.

Persistence and degradability: Due to the lack of data, it is expected to be persistent and not rapidly degraded.

Bioaccumulative potential: Presents low bioaccumulative potential in aquatic organisms.
log K_{ow} : 0.23 (calculated).

Mobility in soil: Not determined.

Other adverse effects: No other environmental effects known.

SECTION 13: DISPOSAL CONSIDERATIONS**Disposal methods**

Must be disposed of as waste in compliance with local regulations. The treatment and disposal should be evaluated for each specific product.

Keep the product remains in its original and properly closed containers. Disposal should be performed as established for the product.

SECTION 14: TRANSPORT INFORMATION

Road: UN - United Nations: Model Regulations:
• Recommendations on the Transport of Dangerous Goods.

UN number: 2448

UN proper shipping name: SULPHUR, MOLTEN

Transport hazard class(es): 4.1

Packing group: III

Environmental hazards: The product is not considered dangerous for the environment for land transport.

Railway regulations: COTIF - Convention concerning International Carriage by Rail:
• Appendix C: RID - Regulations concerning the International Carriage of Dangerous Goods by Rail.

UN number: 2448

UN proper shipping name: SULPHUR, MOLTEN

Transport hazard class(es): 4.1

Packing group: III

Environmental hazards: The product is not considered dangerous for the environment in rail transport.

Sea: IMO - International Maritime Organization:
• IMDG Code - International Maritime Dangerous Goods Code.

UN number: 2448

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UN proper shipping name:	SULPHUR, MOLTEN	
Transport hazard class(es):	4.1	
Packing group:	III	
Environmental hazards:	It's not considered a marine pollutant for transportation.	
EmS:	F-A,S-H	
Air:	IATA - International Air Transport Association: • DGR - Dangerous Goods Regulation.	
UN number:	FORBIDDEN FOR AIR TRANSPORT	
Special precautions for user:	Not applicable.	
Transport in bulk according to IMO instruments:	Consult regulations: • International Maritime Organization: MARPOL: Articles, protocols, annexes, unified interpretations of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, consolidated edition. IMO, London, 2006; • International Maritime Organization: IBC code: International code for the construction and equipment of shipping carrying dangerous chemicals in bulk: With Standards and guidelines relevant to the code. IMO, London, 2007.	

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product in question

Convention concerning Safety in the use of Chemicals at Work (Convention 170) - International Labour Organization, 1990.

SECTION 16: OTHER INFORMATION

This document was prepared based on current knowledge about the proper product handling and under normal conditions of use, in accordance with the application specified on the packaging. Any other use of the product involving their combination with other products, and use various forms of those indicated, are the responsibility of the user. Warns that the handling of any chemical substance requires the prior knowledge of its hazards for the user. In the workplace it is for the user company's product promotes training of its collaborators about the possible risks arising from exposure to the chemical.

Change control:

Version	Manufacture date	Changes
0.2e	07/31/2025	Change in section: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16.

Abbreviations:

ACGIH - American Conference of Governmental Industrial Hygienists;
CAS - Chemical Abstracts Service;
EC - European Community;
EEC - European Economic Community;
EPA - United States Environmental Protection Agency;
IARC - International Agency for Research on Cancer;

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 K_{ow} - Octanol-water partition coefficient;LC₅₀- Lethal Concentration 50%;LD₅₀- Lethal Dose 50%;

NIOSH - National Institute for Occupational Safety and Health;

OSHA - Occupational Safety & Health Administration;

PBT - Persistent, bioaccumulative and toxic;

UN - United Nations;

vPvB - Very Persistent and very Bioaccumulative.

Bibliographic references:

ACGIH - AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIALS HYGIENISTS. TLVs® and BEIs®: Based on the Documentation of the Threshold Limit Values (TLVs®) for Chemical Substances and Physical Agents & Biological Exposure Indices (BEIs®). Cincinnati-USA, 2025.

CONCAWE - HAZARD CLASSIFICATION AND LABELLING OF PETROLEUM SUBSTANCES IN THE EUROPEAN ECONOMIC AREA. Available in: <<https://www.concawe.eu/>>. Access at: Jun. 2025.

ECHA - EUROPEAN CHEMICAL AGENCY. Available in: <<http://echa.europa.eu/web/guest>>. Access at: Jun. 2025.

EPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY. Available in: <<https://www.epa.gov/>>. Access at: Jun. 2025.

GESTIS - SUBSTANCE DATABASE. Available in: <<https://gestis-database.dguv.de/>>. Access at: Jun. 2025.

GHS - GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS. 10th rev. ed. New York and Geneva: United Nations, 2023.

HSDB - HAZARDOUS SUBSTANCES DATA BANK. Available in: <<http://pubchem.ncbi.nlm.nih.gov/>>. Access at: Jun. 2025.

IARC - INTERNATIONAL AGENCY FOR RESEARCH ON CANCER. Available in: <<http://monographs.iarc.fr/ENG/Classification/index.php>>. Access at: Jun. 2025.

NIOSH - NATIONAL INSTITUTE OF OCCUPATIONAL AND SAFETY. International Chemical Safety Cards. Available in: <<http://www.cdc.gov/niosh/>>. Access at: Jun. 2025.

OSHA - OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION. UNITED STATES DEPARTMENT OF LABOUR. <<https://www.osha.gov/chemicaldata/search>>. Access at: Jun. 2025.

REACH - REGISTRATION, EVALUATION, AUTHORIZATION AND RESTRICTION OF CHEMICALS. Commission Regulation (EC) No 1272/2008 of December 2008 amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals. Available in: <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:en:PDF>>. Access at: Jun. 2025.