

**Section-1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION
AND OF THE COMPANY/UNDERTAKING**

1.1 Identification of the substance/preparation:

Commercial name: Granular / pastille Sulphur.

Chemical name: Granular / pastille Sulphur.

Synonyms: Granular / pastille Sulphur, Commercially formed elemental Sulphur.

1.2 Use of the substance /preparation: In manufacturing sulfuric acid, carbon disulfide, sulfites, insecticides, plastics, enamels, metal-glass cements; in vulcanizing rubber; in syntheses of dyes; in making gunpowder, matches; for bleaching wood pulp, straw, wool, silk, felt, linen.

1.3 MANUFACTURER & SUPPLIER: Reliance Industries Limited

Emergency Coordination Centre contact details:

Jamnagar Mfg. Division Village Meghpar / Padana, Taluka Lalpur, Dist. Jamnagar, Gujarat	SSM Office	+ 91 288 6612400 Mobile 9998007989 + 91 288 6611190/1/6
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SSM: Site Shift Manager.

Section 2 – HAZARD IDENTIFICATION

2.1 Classification of the substance/preparation: Hazard class and category code.

GHS Category:

Health	Environmental	Physical
Acute toxicity category: Oral 2	Aquatic Toxicity – Category- NA	Flammable – Category NA

NA: Not available

GHS Category table for reference:

Study/hazard statement	Category 1	Category 2	Category 3	Category 4	Category 5
Acute Oral LD50	≤ 5 mg/kg Fatal if swallowed	> 5 ≤ 50 mg/kg Fatal if swallowed	> 50 ≤ 300 mg/kg Toxic if swallowed	> 300 ≤ 2000 mg/kg Harmful if swallowed	> 2000 ≤ 5000mg/kg May be harmful if swallowed
Acute Dermal LD50	≤ 50 mg/kg Fatal in contact with skin	> 50 ≤ 200 mg/kg Fatal in contact with skin	> 200 ≤ 1000 mg/kg Toxic in contact with skin	> 1000 ≤ 2000 mg/kg Harmful in contact with skin	> 2000 ≤ 5000 mg/kg May be harmful in contact with skin
Acute Inhalation Dust LC50 Gases LC50 Vapours LC50	≤ 0.05 mg/L ≤ 100 ppm/V ≤ 0.5 mg/L Fatal if inhaled	> 0.05 ≤ 0.5 mg/L > 100 ≤ 500 ppm/V > 0.5 ≤ 2.0 mg/L Fatal if inhaled	> 0.5 ≤ 1.0 mg/L > 500 ≤ 2500 ppm/V > 2.0 ≤ 10 mg/L Toxic if inhaled	> 1.0 ≤ 5 mg/L > 2500 ≤ 20000 ppm/V > 10 ≤ 20 mg/L Harmful if inhaled	See footnote below this table
Flammable liquids	Flash point < 23 degrees C and initial boiling point ≤ 35 degrees C. Extremely flammable liquid and vapour	Flash point < 23 degrees C and initial boiling point > 35 degrees C. Highly flammable liquid and vapour	Flash point ≥ 23 degrees C ≤ 60 degrees C. Flammable liquid and vapour	Flash point > 60 degrees C ≤ 93 degrees C. Combustible liquid	Not Applicable

Note: Gases concentration are expressed in parts per million per volume (ppmV).

NOTE 1: Category 5 is for mixtures which are of relatively low acute toxicity but which under certain circumstances may pose a hazard to vulnerable populations. These mixtures are anticipated to have an oral or dermal LD50 value in the range of 2000-5000 mg/kg bodyweight or equivalent dose for other routes of exposure. In light of animal welfare considerations, testing in animals in Category 5 ranges is discouraged and should only be considered when there is a strong likelihood that results of such testing would have a direct relevance for protecting human health.

NOTE 2: These values are designed to be used in the calculation of the ATE for classification of a mixture based on its ingredients and do not represent test results. The values are conservatively set at the lower end of the range of Categories 1 and 2, and at a point approximately 1/10th from the lower end of the range for Categories 3 – 5.

GHS Category table for reference: Continued

Study/hazard statement	Category 1	Category 2	Category 3
Eye Irritation	Effects on the cornea, iris or conjunctiva that are not expected to reverse or that have not fully reversed within 21 days. Causes severe eye damage.	2A: Effects on the cornea, iris or conjunctiva that fully reverse within 21 days. Causes severe eye irritation. 2B : Effects on the cornea, iris or conjunctiva that fully reverse within 7 days. Causes eye irritation.	Not applicable
Skin Irritation	Destruction of skin tissue, with sub categorization based on exposure of up to 3 minutes (A), 1 hour (B), or 4 hours (C). Causes severe skin burns and eye damage.	Mean value of $\geq 2.3 > 4.0$ for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed); inflammation that persists to end of the (normally 14-day) observation period. Causes skin irritation.	Mean value of $\geq 1.5 < 2.3$ for erythema / eschar or edema in at least 2 of 3 tested animals from gradings at 24, 48, and 72 hours (or on 3 consecutive days after onset if reactions are delayed). Causes mild skin irritation.
Environment: Acute Toxicity Category	96 hr LC50 (fish) ≤ 1 mg/L 48 hr EC50 (crustacea) ≤ 1 mg/L, 72/96 hr ErC50 (aquatic plants) ≤ 1 mg/L Very toxic to aquatic life	96 hr LC50 (fish) $> 1 \leq 10$ mg/L 48 hr EC50 (crustacea) $> 1 \leq 10$ mg/L 72/96 hr ErC50 (aquatic plants) $> 1 \leq 10$ mg/L Toxic to aquatic life	96 hr LC50 (fish) $> 10 \leq 100$ mg/L 48 hr EC50 (crustacea) $> 10 \leq 100$ mg/L 72/96 hr ErC50 (aquatic plants) $> 10 \leq 100$ mg/L Harmful to aquatic life
Flammable Aerosol	Extremely flammable aerosol	Flammable aerosol	Not Applicable
Flammable solids	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time ≤ 5 minutes Flammable solid	Using the burning rate test, substances or mixtures other than metal powders: (a) wetted zone does not stop fire for at least 4 minutes and (b) burning time < 45 seconds or burning rate > 2.2 mm/second Using the burning rate test, metal powders that have burning time $> 5 \leq 10$ minutes Flammable solid	Not Applicable
Flammable gases	Gases, which at 20 degrees C and a standard pressure of 101.3 kPa: (a) are ignitable when in a mixture of 13% or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Extremely flammable gas	Gases, other than those of category 1, which, at 20 degrees C and a standard pressure of 101.3 kPa, have a flammable range while mixed in air. Flammable gas	Not Applicable

GHS Label: NA

Signal word: NA

2.2 Information pertaining to particular dangers for human:

The dust of product may cause eye irritation while handling.

2.3 Information pertaining to particular dangers for the environment: NA

2.4 Other adverse effects:

Ignition possible when exposed to sparks, naked flames.

Route of entry:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
Yes	Yes	Yes	Yes	Yes

DATA REFERENCE: <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

Health hazards:

Source	NTP listed?	IARC cancer review group?	OSHA Regulated?
Carcinogenicity	No	No	No

DATA REFERENCE: Toxic release inventory (TRI) basis of Occupational Safety and Health Administration (OSHA) carcinogen, National Toxicological program (NTP), International Agency for Research on Cancer (IARC), <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

Section 3 – COMPOSITION & INFORMATION ON INGREDIENTS

Ingredients / Hazardous	CAS No.	EC No.	Percentage
Sulphur /No	7704-34-9	231-722-6	99.80%

Section 4 – FIRST AID MEASURES

4.1 General advice

IMMEDIATE MEDICAL ATTENTION IS REQUIRED AFTER INHALATION OR AFTER SWALLOWING.

In case of health troubles or doubts, seek medical advice immediately and show this Material Safety Data Sheet.

Ensure activity of vitally important functions until the arrival of the doctor (artificial respiration, inhalation of oxygen, heart massage). If patient is unconscious, transport patient in a stabilized position.

4.2 Inhalation

Remove patient to fresh air, keep him warm and in order to rest quietly. Avoid walking. Seek medical advice.

SYMPTOMS AND EFFECTS: irritation, headache, dizziness, weakness, stupefaction, irritant coughing, convulsions, unconsciousness, possible respiratory inhibition or arrest.

4.3 Skin contact

Immediately take off all contaminated clothing and footwear. Flush effected area with copious quantities of lukewarm water and soap or with another suitable cleaning agent. Use a mild cream to treat skin after complete washing. Seek medical advice.

SYMPTOMS AND EFFECTS: mild irritation.

4.4 Eye contact

Immediately flush eyes with clean lukewarm water and continue flushing for at least 15 minutes – keep the eyelids widely apart and flush thoroughly with mild water stream from the inner to the outer. Seek medical advice.

SYMPTOMS AND EFFECTS: irritation.

4.5 Swallowing

If patient is conscious and without convulsion, immediately try to induce vomiting. Never give anything by mouth to an unconscious person, just put patient into a stabilized position. Seek medical advice immediately.

SYMPTOMS AND EFFECTS: nausea, vomiting, convulsions.

Section 5 – FIRE FIGHTING MEASURES

5.1 Suitable extinguishing media: Dry chemical powder, CO₂, steam.

Cool containers with water spray.

5.2 Extinguishing media to be avoided: Water of Sulphur if in melt condition.

5.3 Caution about specific danger in case of fire and fire-fighting procedures: Burns with a pale blue flame that may be difficult to see in daylight. Dust suspended in air is readily ignited by flame, static electricity or friction spark. Every reasonable step must be taken to minimize dust formation. Sulphur dioxide may be released/generated if product is heated.

5.4 Special protective equipment for fire-fighters

Wear self-contained breathing air apparatus and protective clothing to prevent contact with skin. Airborne dust can create explosion hazard. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.

Section 6 –ACCIDENTAL RELEASE MEASURES

6.1 Person-related safety precautions

Wear protective clothing and equipment. Isolate hazard area. Do not smoke and do not handle with naked flame. Use explosion-proof lamps and non-sparking tools. Avoid production of dust.

6.2 Precautions for protection of the environment

Prevent from further spill of substance to minimize contamination of drains, surface and ground waters.

6.3 Recommended methods for cleaning and disposal

Collect in bags/containers. Dispose off under valid legal waste regulations.

Section 7 –HANDLING AND STORAGE

7.1 Information for safe handling

Observe all fire-fighting measures (no smoking, do not handle with naked flame and remove all possible sources of ignition). Wear recommended personal protective equipment and observe instructions to prevent possible contact of substance with skin and eyes and inhalation. Avoid production of dust.

7.2 Information for storage

Store in cool, well-ventilated place with effective exhaust, away from heat and all sources of ignition. Take precautionary measures against static discharges. Avoid leak to environment.

7.3 Information for specific use

Take precautionary measures against static discharges. Avoid leak to environment.

Section 8 –EXPOSURE CONTROL & PERSONAL PROTECTION

8.1 Occupational Exposure Limits: NA.

NA: Data not available.

8.2 Occupational exposure controls

Collective protection measures: General and local ventilation, effective exhaust.

Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposure.

Individual protection measures: Personal protective equipment (PPE) for the protection of eyes, hands and skin corresponding with the performed labour has to be kept at disposition for the employees. In the case of continuous use of this equipment during constant work, safety breaks have to be scheduled, if the PPE-character requires this. All PPE have to be kept in disposable state and the damaged or contaminated equipment has to be replaced immediately.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):



Respiratory protection: In case of fire wear a supplied air, full-face piece respirator, airline hood, or full face piece self-contained breathing apparatus.

Eye protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Hand protection: Wear gloves of impervious material.

Body protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Protective coverall antistatic design recommended.

Hygiene Measures: Wash hands, forearms and face thoroughly after handling.

Appropriate techniques should be used to remove potentially contaminated clothing.

Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

8.3 Environmental exposure controls

Proceed in accordance with valid air and water legislative regulations.

Engineering measures: If user operations generate dust or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Bright yellow pastille and/or granules
Odour	Odourless, slight rotten egg odour
Solubility in water	Insoluble
Specific Gravity (water=1) @ 20°C	2.07
Boiling Point °C	444.6°C
Melting Point °C	110°C to 119°C
Relative Vapour Density (Air=1)	NA
Flash point °C	207°C Closed cup
Auto ignition °C	248 - 266°C
Vapour pressure (mmHg) @ 20 °C	NA
Molecular weight	32.06
Explosive limits in air % by volume	LEL 35 g/m ³ , UEL 1400g/m ³ dust in air
pH	Neutral when dry
Viscosity cst @ 20 °C	NA
Pour point °C	NA
Evaporation rate (water=1)	NA
Octanol/water partition coefficient log Kow	NA
% volatile	NA

NA: NOT AVAILABLE

DATA REFERENCE: National Institute for Occupational Safety and Health guide to chemical hazards and International Chemical Safety Cards (WHO/IPCS/ILO) and <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>: "<http://ptcl.chem.ox.ac.uk/>".

Section 10 –CHEMICAL STABILITY AND REACTIVITY INFORMATION

10.1 Conditions to avoid

Prolonged exposure of containers to heat or fire may cause the material to melt/burn.

10.2 Material to avoid: Separated from. strong oxidizers, such as fluorine, chlorine, chlorates, nitrates (nitric acid), peroxides, liquid oxygen, permanganates, dichromates or the like.

10.3 Hazardous decomposition products

Thermal decomposition generates sulphur dioxide gas.

Polymerization: NA.

Section 11 –TOXICOLOGICAL INFORMATION

11.1 Acute effects

Product irritates eyes, skin and respiratory organs when burning.

Acute toxicity data:

Parameter	Route	Species	Values	Exposure period
LD50	Oral	Guinea pig	40mg/Kg	Not applicable

Data Reference: "<http://ptcl.chem.ox.ac.uk>, <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

11.2 Repeated dose toxicity: Cause mild eye irritation.

11.3 Sensitisation: NA.

11.4 CMR effects (carcinogenicity, mutagenicity, toxicity for reproduction)

Not a carcinogen or mutagenic.

11.5 Toxicokinetics, metabolism, distribution: NA.

Section 12 –ECOLOGICAL INFORMATION

12.1 Ecotoxicity data:

Parameter	Route	Species	Values	Exposure period	Condition of bioassay
Tlm	Inhalation	Mosquito fish	10000 ppm	96 hours	Not specified

Data Reference: "<http://ptcl.chem.ox.ac.uk/>", <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>.

12.2 Persistence and degradability: NA.

12.3 Bioaccumulative potential: NA.

12.4 Results of PBT assessment Persistence and Degradation: NA.

12.5 Other adverse effects: NA.

Section 13– DISPOSAL CONSIDERATION

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

13.1 Recommended disposal methods for the substance / preparation

Product reuse or disposal in accordance with valid waste legislative regulations.

13.2 Recommended disposal methods for contaminated packaging

Product is transported in vehicles.

13.3 Waste management measures that control exposure of humans and environment

Proceed in accordance with valid health, air and water legislative regulations.

13.4 Waste regulation: Follow local regulation.

Section 14– TRANSPORT INFORMATION

14.1 International Transport Regulation:

Proper Shipping Name: Granular / pastille Sulphur.

Hazard Class: Not applicable.

UN Number: Not applicable.

Emergency Action Code: Not applicable.

14.2 Special transport precautionary measures: Not applicable.

Data reference: Report of The Maritime Safety Committee on its eighty-fifth session.

(Released by INTERNATIONAL MARITIME ORGANIZATION).

Section 15– REGULATORY INFORMATION

MSDS format on a 16 Section based on guidance provided in:

Indian Regulation:

Manufacture, Storage and Import of Hazardous Chemicals Rule, 1989.
The Factories Act 1948.

International Regulations:

European SDS Directive.

ANSI MSDS Standard.

ISO 11014-1 1994.

WHMIS Requirements.

United States

Hazard Communication Standard.

Canada

Hazardous Products Act and Controlled Products Regulations.

Europe

Dangerous Substance and Preparations Directives.

Australia

National Model Regulations for the Control of Workplace Hazardous Substances.

The Globally Harmonized System of Classification and Labeling of Chemicals endorsed by The UN Economic and Social Council.

*RISK PHRASES: R38 Irritating to skin.

*SAFETY PHRASES: S2 : Keep out of the reach of children, S46 : If swallowed, seek medical advice immediately and show this container or label.

*These standard risk and safety phrases for use when interpreting Material Safety data Sheets are derived from the European Union Regulation, CHIP Regulations - Chemicals (Hazard Information and Packaging for Supply). They are required to be used in Materials Safety Data Sheets to identify potential hazards and offer safe handling advice.

Section 16 – OTHER INFORMATION

Training instructions

Personnel handling the product has to be acquainted demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles.

Tremcard details/Reference: Refer Section 14

Local bodies involved (Applicable only with in India): Local District Authority and Local Crisis Group.

Sources of data used to compile the Material Safety Data Sheet.

Data compilation reference: National Institute for Occupational Safety and Health guide to chemical hazards and International Chemical Safety Cards (WHO/IPCS/ILO) and <http://toxnet.nlm.nih.gov/cgi-bin/sis/search>, <http://webnet3.oecd.org/eChemPortal/Results2.aspx?SubstanceId=169630>, . <http://ecb.jrc.ec.europa.eu/esis/index.php?PGM=ein>, <http://www.cdc.gov/niosh/npg/npgd0049.html>.

Revised sections: 1 to 16.

This MSDS is issued by the Centre for HSE Excellence, Reliance Industries Limited.

Contact Details: For any enquiry/comment regarding this Material Safety Data Sheet, kindly contact the Centre for HSE Excellence at HSE.ExcellenceCentre@ril.com

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End of MSDS.