SAFETY DATA SHEET
SULFUR POWDER
REVISION 4, DATE 03 JAN 2022

1. IDENTIFICATION

Product Name	**Sulfur Powder**
Other Names	Sulphur
Uses	Industrial and laboratory application.
Chemical Family	No Data Available
Chemical Formula	S
Chemical Name	Sulfur
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust)	Not Scheduled

Globally Harmonised System

Hazard Classification		Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)	
Hazard Categories		Flammable Solids - Category 2 Skin Corrosion/Irritation - Category 2 Serious Eye Damage/Irritation - Category 2B	
Pictograms			
Signal Word		Warning	
Hazard Statements		**H228**	Flammable solid.
		H315 + H320	Causes skin and eye irritation.
Precautionary Statements	Prevention	**P240**	Ground and bond container and receiving equipment.
		P241	Use explosion-proof electrical/ventilating/lighting and all other equipment.
		P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
		P280	Wear protective gloves/protective clothing/eye protection/face protection.
	Response	**P370 + P378**	In case of fire: Use carbon dioxide (CO2), dry chemical, regular foam extinguishing agent or water spray for extinction.
		P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
		P337 + P313	If eye irritation persists: Get medical advice.
		P332 + P313	If skin irritation occurs: Get medical advice.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
		P362 + P364	Take off contaminated clothing and wash it before reuse.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Sulphur	S	7704-34-9	>90 - 100 %
Inert ingredients	Unspecified	Unspecified	0 - <10 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	IF SWALLOWED: Rinse mouth, then give a glass of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical advice/attention if you feel unwell. Never give anything by mouth to an unconscious person.
Eye	IF IN EYES: Do not rub eyes! Immediately flush eyes with running water for several minutes, holding eyelids open and occasionally lifting the upper and lower lids. Remove contact lenses if present and easy to do. Continue rinsing for at least 15 minutes. If eye irritation persists, get medical advice/attention. *Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin	IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If respiratory symptoms persist, get medical advice/attention. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
Advice to Doctor	Treat symptomatically. Keep victim calm and warm. *Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Medical Conditions Aggravated by Exposure	Sensitive persons can experience skin sensitisation from repeated exposure to Sulfur dust; Allergic responses can occur.

5. FIRE FIGHTING MEASURES

General Measures	If safe to do so, move undamaged containers from fire area. Cool containers with water spray until well after fire is out. Care should be taken that the Sulfur dust is not scattered into the air.
Flammability Conditions	FLAMMABLE SOLID: May be ignited by friction, heat, sparks or flame.
Extinguishing Media	Use dry chemical, Carbon dioxide (CO2), foam or water spray for extinction. High pressure water jets disperse the dust into the air and should NOT be used. Incipient fires in Sulfur storage piles can be smothered by gently shoveling more Sulfur, sand or fine earth on them to exclude all air.
Fire and Explosion Hazard	Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence. May burn fiercely. May re-ignite after fire is extinguished.
Hazardous Products of Combustion	Fire may produce irritating and/or toxic gases, including Sulfur oxides.
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Contaminated runoff may cause pollution.
Personal Protective Equipment	Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.
Flash Point	>180 - 218 °C (as dust)
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	232 °C
Hazchem Code	1Z

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	No action shall be taken involving any personal risk or without suitable training. Ensure adequate ventilation. ELIMINATE all ignition sources (no smoking, flares, sparks or flame). Do not touch or walk through spilled material. Avoid generating dust. Avoid breathing dust and contact with eyes, skin and clothing.
Clean Up Procedures	Move containers from spill area. Recover material without delay. Use clean, non-sparking tools to collect material and place it into suitable, labelled containers for later disposal (see SECTION 13). Cover with damp absorbent (inert material, sand or soil) to suppress dust/fire potential.
Containment	Prevent entry into waterways, drains or confined areas. Prevent dust cloud - Sulfur dusts may form explosive mixtures with air; Explosion may be avoided by preventing atmospheres becoming dust-laden by adequate ventilation or by hose-down instead of sweeping.

Decontamination	No information available.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses. If contamination of drains or waterways has occurred, advise local emergency services.
Evacuation Criteria	Spill or leak area should be isolated immediately. Evacuate the accident area. Keep unauthorised personnel away. Keep upwind and to higher ground.
Personal Precautionary Measures	Use personal protective equipment as required (see SECTION 8).

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practices. Avoid breathing dust and contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/eye protection/face protection (see SECTION 8). FLAMMABLE SOLID: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking. Ground/bond container and receiving equipment. Take precautionary measures against static discharges. Use explosion-proof electrical/ventilating/lighting equipment. Take precautions to avoid sparking when tank covers are released; Open slowly and allow tanks to vent accumulated (highly flammable) Hydrogen sulfide gas if present. *Molten Sulfur should be maintained at temperatures between 115 °C minimum, to prevent accumulation of solid Sulfur, and 145 °C maximum, to prevent Sulfur fires inside tanks. Dedicated heated and vented tanks required.
Storage	Store in accordance with local regulations. Store in a cool, dry and well-ventilated place. Keep container tightly closed when not in use - Check regularly for leaks; Avoid physical damage to containers. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking. Keep away from food, drink and animal feedstuffs. Keep away from incompatible materials (see SECTION 10).
Container	Keep in the original container. Do not store in unlabelled containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product. For dusts from solid substances without specific occupational exposure standards: - Safe Work Australia Exposure Standard (Nuisance dusts): 8 hr TWA = 10 mg/m3 (measured as inhalable dust). - New Zealand WES (Particulates not otherwise classified): TWA = 10 mg/m3 (total); TWA = 3 mg/m3 (respirable).
Exposure Limits	No Data Available
Biological Limits	No information available.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
Personal Protection Equipment	- Respiratory protection: In case of inadequate ventilation, wear respiratory protection. Recommended: Wear a dust mask/respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to avoid eye contact. Recommended: Safety glasses with side-shields or chemical goggles, as appropriate. - Hand protection: Wear protective gloves. Recommended: For prolonged or repeated contact, wear gloves with a protection class of 5 or higher (breakthrough time: >240 min); For brief contact only, wear gloves with a protection class of 3 or higher (break through time: >60 min). Select gloves tested to a relevant standard (AS/NZS 2161.1 or national equivalent). - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: Overalls, safety shoes; PVC apron. Choose body protection according to the amount and concentration of the hazardous substance (s) at the specific workplace.
Special Hazards Precaustions	Prevent concentration in hollows and sumps. Do NOT enter confined spaces until atmosphere has been checked.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash hands before breaks and at the end of the workday. Take off contaminated clothing and wash before storage or reuse. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	Divided solid (powder)
Odour	Odourless
Colour	Yellow
pH	No Data Available
Vapour Pressure	No Data Available
Relative Vapour Density	0.133 Air = 1
Boiling Point	444.6 °C
Melting Point	112.8 - 119 °C
Freezing Point	No Data Available
Solubility	Insoluble in water; Slightly soluble in alcohol, ethene - Soluble in Carbon disulfide, benzene, toluene
Specific Gravity	1.92 - 2.07 (Water = 1)
Flash Point	>180 - 218 °C (as dust)
Auto Ignition Temp	232 °C
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	No Data Available
Specific Heat	No Data Available
Molecular Weight	32.06 g/mol
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	15 - 20 °C
Viscosity	No Data Available
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	Sulfur is a flammable substance in both solid and liquid states.
Potential for Dust Explosion	May form flammable dust clouds in air; The dust is characterised by a very low ignition point of 190 °C compared to other combustible dusts; dust clouds are readily ignited by weak frictional sparks if the oxygen content is above 8%.
Fast or Intensely Burning Characteristics	May burn fiercely. May re-ignite after fire is extinguished. May melt and flow when heated or involved in a fire.
Flame Propagation or Burning Rate of Solid Materials	No information available.
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No information available.
Properties That May Initiate or Contribute to Fire Intensity	FLAMMABLE SOLID: May be ignited by friction, heat, sparks or flame. *Reacts violently with strong oxidants causing fire and explosion hazard, especially if powdered.
Reactions That Release Gases or Vapours	Fire/decomposition may produce irritating and/or toxic gases, including Sulfur oxides (Sulfur dioxide).
Release of Invisible Flammable Vapours and Gases	Molten sulfur reacts with hydrocarbons to form toxic and flammable gases.

10. STABILITY AND REACTIVITY

General Information	Reacts violently with oxidising agents.
Chemical Stability	Product is considered stable. *Unstable in the presence of incompatible materials.
Conditions to Avoid	Avoid dust generation. Keep away from heat and all sources of ignition.
Materials to Avoid	Incompatible/reactive with oxidising agents, reducing agents, bases, halides, flammable materials, metal oxides, metal salts, strong acids. Corrosive to (damp) steel.
Hazardous Decomposition Products	Fire/decomposition may produce irritating and/or toxic gases, including Sulfur oxides (Sulfur dioxide). Molten sulfur reacts with hydrocarbons to form toxic and flammable gases.
Hazardous Polymerisation	Hazardous polymerisation will not occur.

11. TOXICOLOGICAL INFORMATION

General Information	- Acute toxicity: May be harmful if ingestion. May cause gastrointestinal tract irritation with symptoms including nausea, vomiting and diarrhoea. Poorly absorbed. Ingestion of large amounts may cause sore throat, headache, nausea and possible unconsciousness in severe cases. May be converted to toxic hydrogen sulfide in the intestines. Excessive amounts that are ingested may affect the central nervous system, behaviour and kidneys. - Skin corrosion/irritation: Causes skin irritation. May cause irritation, rash and dermatitis. - Eye damage/irritation: Causes eye irritation. Symptoms include of tearing, redness, pain, burning, scratchy discomfort and blurred vision. Prolonged or repeated exposure may lead to possible eye damage. - Respiratory/skin sensitisation: No information available. - Germ cell mutagenicity: No evidence of mutagenic properties. - Carcinogenicity: No evidence of carcinogenic properties. - Reproductive toxicity: No information available. - STOT (single exposure): Inhalation of dusts causes irritation to the mucous membranes and upper respiratory tract. Inhalation of sulfur causes irritation to the mucous membranes of the respiratory tract (nose, throat and lungs), causing coughing, sneezing, wheezing and laboured breathing. Inflammation of the respiratory tract may result in bronchitis, pulmonary edema, pneumonia, asthma. - STOT (repeated exposure): Chronic exposure may lead to irritation of mucous membranes, chronic bronchitis, emphysema and bronchial asthma. May cause possible skin sensitization and permanent eye damage (clouding of lens and chronic irritation). - Aspiration toxicity: No information available.
Acute	
Ingestion	Acute toxicity (Oral): - LD50, Rat: >2,000 mg/kg
Other	Acute toxicity (Dermal): - LD50, Rat: >2,000 mg/kg
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	No information available.
Persistence/Degradability	No information available.
Mobility	No information available.
Environmental Fate	Prevent entry into drains and waterways.
Bioaccumulation Potential	No information available.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	The generation of waste should be avoided or minimised wherever possible. When recycling of the product is not possible, dispose to landfill or incinerate in accordance with local/regional/national regulations.
Special Precautions for Land Fill	Recycle containers if possible, or dispose of in an authorised landfill.

14. TRANSPORT INFORMATION

Land Transport (Australia)
ADG Code

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
EPG	20 Solids - Flammable
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available

Land Transport (Malaysia)
ADR Code

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
EPG	20 Solids - Flammable
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
EPG	20 Solids - Flammable
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available

Land Transport (United States of America)
US DOT

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
ERG	133 Flammable Solids
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available

Sea Transport
IMDG Code

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available
EMS	F-A, S-G
Marine Pollutant	No

Air Transport
IATA DGR

Proper Shipping Name	SULPHUR
Class	4.1 Flammable Solids
Subsidiary Risk(s)	No Data Available
UN Number	1350
Hazchem	1Z
Pack Group	III
Special Provision	No Data Available

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	Not Scheduled

Environmental Protection Authority (New Zealand)
Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	Class 4 Substances Group Standard 2020 HSR002522 *HSR001284 (Revoked)

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	Not Determined
Europe (REACh)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Not Determined
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Not Determined
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Not Determined

16. OTHER INFORMATION

Related Product Codes	SULPHD1100, SULPHD2100, SULPHD2200, SULPHU0300, SULPHU0301, SULPHU0302, SULPHU0303, SULPHU0700, SULPHU1005, SULPHU1015, SULPHU1101, SULPHU1400, SULPHU1401, SULPHU2008, SULPHU2700, SULPHU2701, SULPHU4810, SULPHU5000, SULPHU5001, SULPHU6500, SULPHU6501, SULPHU6502, SULPHU6503, SULPHU6510, SULPHU6511, SULPHU6512, SULPHU6513, SULPHU6600, SULPHU6601, SULPHU6602, SULPHU7000, SULPHU7500, SULPHU7600, SULPHU8100, SULPHU8300, SULPHU8500, SULPHU8600, SULPHU9200, SULPHU9300, SULPHU9400, SULPHU9500, SULPHU9600, SULPHU9900, SULPHW7100
Revision	4
Revision Date	03 Jan 2022
Key/Legend	< Less Than > Greater Than **AICS** Australian Inventory of Chemical Substances **atm** Atmosphere **CAS** Chemical Abstracts Service (Registry Number) **cm^2** Square Centimetres **CO2** Carbon Dioxide **COD** Chemical Oxygen Demand **deg C (°C)** Degrees Celcius **EPA (New Zealand)** Environmental Protection Authority of New Zealand **deg F (°F)** Degrees Farenheit

g Grams
g/cm^3 Grams per Cubic Centimetre
g/l Grams per Litre
HSNO Hazardous Substance and New Organism
IDLH Immediately Dangerous to Life and Health
immiscible Liquids are insoluable in each other.
inHg Inch of Mercury
inH2O Inch of Water
K Kelvin
kg Kilogram
kg/m^3 Kilograms per Cubic Metre
lb Pound
LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
ltr or **L** Litre
m^3 Cubic Metre
mbar Millibar
mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m^3 Milligrams per Cubic Metre
Misc or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.
mm Millimetre
mmH2O Millimetres of Water
mPa.s Millipascals per Second
N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Heath and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight