1. IDENTIFICATION

Product Name	**Manganese sulphate**
Other Names	Manganese sulfate, monohydrate; Sulfuric acid, manganese(2+) salt (1:1), monohydrate
Uses	Feed additive, fertiliser, manufacturing other chemicals, textile dyeing, ceramics, mineral flotation.
Chemical Family	No Data Available
Chemical Formula	MnSO4.H2O
Chemical Name	Manganese sulphate, monohydrate
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Pty 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
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766

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

Acute Toxicity (Oral) - Category 5

Specific Target Organ Toxicity (Repeated Exposure) - Category 2

Acute Hazard To The Aquatic Environment - Category 2

Long-term Hazard To The Aquatic Environment - Category 2

Pictograms

Signal Word Warning

Hazard Statements		**H303**	May be harmful if swallowed.
		H373	May cause damage to organs through prolonged or repeated exposure.
		H411	Toxic to aquatic life with long lasting effects.
Precautionary Statements	Prevention	**P260**	Do not breathe dusts or mists.
		P273	Avoid release to the environment.
	Response	**P391**	Collect spillage.
		P312	Call a POISON CENTER or doctor/physician if you feel unwell.
	Disposal	**P501**	Dispose of contents/container in accordance with local / regional / national / international regulations.

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

HSNO Classifications	Health Hazards	**6.1D**	Substances that are acutely toxic - Harmful
		6.9A	Substances that are toxic to human target organs or systems
	Environmental Hazards	**9.1B**	Substances that are ecotoxic in the aquatic environment
		9.3C	Substances that are harmful to terrestrial vertebrates

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Manganese sulphate, monohydrate	MnSO4.H2O	10034-96-5	98 - 100 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed IF SWALLOWED: Rinse mouth, then drink plenty of water. Do not induce vomiting. Call a Poison Centre or doctor/physician or advice. Never give anything by mouth to an unconscious person.

Eye IF IN 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.

Skin IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash 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. Get medical advice/attention if respiratory symptoms persist or if you feel unwell. Apply resuscitation if victim is not breathing. Administer oxygen if breathing is difficult.

Advice to Doctor Treat symptomatically. Ensure that attending medical personnel are aware of the identity and nature of the product(s) involved, and take precautions to protect themselves.

Medical Conditions Aggravated by Exposure No information available.

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.
Flammability Conditions	Non-combustible; Material does not burn.
Extinguishing Media	If material is involved in a fire, use dry chemical, Carbon dioxide (CO2), foam or water spray for extinction. Use fire fighting measures that suit the surrounding fire.
Fire and Explosion Hazard	Decomposes on heating, emitting toxic fumes.
Hazardous Products of Combustion	Fire or heat may produce irritating, toxic and/or corrosive fumes, including Manganese oxides, Sulphur oxides.
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may pollute waterways.
Personal Protective Equipment	Wear self-contained breathing apparatus (SCBA) in combination with normal firefighting clothing (full fire kit).
Flash Point	No Data Available
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	No Data Available
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation. Do not touch or walk through spilled material. Avoid dust formation. Avoid breathing dust and contact with eyes, skin and clothing.
Clean Up Procedures	Collect material (sweep up, shovel) and place it into suitable, properly labelled containers for disposal (see SECTION 13).
Containment	Stop leak if safe to do so - Prevent entry into waterways, drains or confined areas.
Decontamination	No information available.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses.
Evacuation Criteria	Spill or leak area should be isolated immediately. 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 practice. Avoid dust formation. Do not breathe dust and avoid contact with eyes, skin and clothing. Use personal protective equipment as required (see SECTION 8). Avoid release to the environment - Collect spillage (see SECTION 6).
Storage	Store in a cool, dry and well-ventilated place. Keep container tightly closed. Protect from moisture. Keep away from food/feedstuffs and incompatible materials (see SECTION 10).
Container	Keep in the original container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product. For Manganese, dust & compounds: - Safe Work Australia Exposure Standard: TWA = 1 mg/m3 (as Mn).

	- New Zealand WES (2018) for Manganese fume, dust and compounds (as Mn): TWA = 0.2 mg/m3; TWA = 0.02 mg/m3 (respirable dust). - NIOSH REL for Manganese compounds and fume (as Mn): TWA = 1 mg/m3; STEL = 3 mg/m3. - OSHA PEL for Manganese compounds and fume (as Mn): 5 mg/m3 Ceiling. - Immediately dangerous to life or health (IDLH) concentration: 500 mg/m3 (as Mn). Emergency limits (Manganese sulphate): TEEL-1: 9.2 mg/m3; TEEL-2: 15 mg/m3; TEEL-3: 90 mg/m3.
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: Wear respiratory protection in case of inadequate ventilation or an inhalation risk exists. Recommended: Dust mask/respirator, Filter type: P1 (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to avoid eye contact. Recommended: Safety glasses or chemical goggles. - Hand protection: Handle with gloves. Recommended: Impervious gloves. - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: Overalls, safety shoes.
Special Hazards Precaustions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash hands and face thoroughly before breaks and after work. Remove contaminated clothing and shoes immediately and wash before reuse. Store protective clothing separately.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	Powder or granules
Odour	Odourless
Colour	Pink
pH	3 - 3.5 50 g/L (20°C)
Vapour Pressure	No Data Available
Relative Vapour Density	No Data Available
Boiling Point	850 °C
Melting Point	700 °C (anhydrous)
Freezing Point	No Data Available
Solubility	Soluble in water
Specific Gravity	No Data Available
Flash Point	No Data Available
Auto Ignition Temp	No Data Available
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	2.95 g/cm3
Specific Heat	No Data Available
Molecular Weight	169.01 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	No Data Available
Viscosity	No Data Available
Volatile Percent	No Data Available

VOC Volume	No Data Available
Additional Characteristics	No information available.
Potential for Dust Explosion	No information available.
Fast or Intensely Burning Characteristics	No information available.
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	Non-combustible; Material does not burn.
Reactions That Release Gases or Vapours	Decomposes on heating, emitting toxic fumes, including Manganese oxides, Sulphur oxides.
Release of Invisible Flammable Vapours and Gases	No information available.

10. STABILITY AND REACTIVITY

General Information	No information available.
Chemical Stability	Material is stable under normal conditions.
Conditions to Avoid	Avoid dust formation. Protect from moisture. Avoid (over)heating.
Materials to Avoid	Incompatible/reactive with oxidising agents.
Hazardous Decomposition Products	No decomposition when used as directed. Decomposes on heating, emitting toxic fumes, including Manganese oxides, Sulphur oxides.
Hazardous Polymerisation	Will not occur.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: May be harmful if swallowed.
- Skin corrosion/irritation: May cause skin irritation.
- Eye damage/irritation: May cause eye irritation.
- Respiratory/skin sensitisation: No information available.
- Germ cell mutagenicity: Not considered to be genotoxic.
- Carcinogenicity: Not considered to be carcinogenic.
- Reproductive toxicity: Not considered likely to have reproductive or developmental toxicity.
- STOT (single exposure): May cause respiratory tract irritation (mucous membranes).
- STOT (repeated exposure): May cause damage to organs through prolonged or repeated exposure. Chronic exposure to manganese via inhalation and oral routes may impair the central nervous system (CNS) function in humans.
- Aspiration toxicity: No information available.

Acute

Ingestion

Acute toxicity (Oral):
- LD50, Rats: 782 - 2,150 mg/kg bw.

Carcinogen Category None

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity:
- LC50, Fish (Fathead minnow): 30.6 mg/L (96 h) [anhydrous].
- EC50, Invertebrates (Daphnia magna): 8.3 mg/L (48 h) [anhydrous].

Persistence/Degradability No information available.

The product is soluble in water.

Mobility

Environmental Fate	Toxic to aquatic life with long lasting effects - Avoid release to the environment.
Bioaccumulation Potential	No information available.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of contents/container in accordance with local/regional/national regulations.
Special Precautions for Land Fill	Contaminated packaging: Since emptied containers may retain product residues, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Manganese sulphate, monohydrate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	3077
Hazchem	2Z
Pack Group	III
Special Provision	No Data Available

Sea Transport
IMDG Code

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Manganese sulphate, monohydrate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3077
Hazchem	2Z
Pack Group	III
Special Provision	No Data Available
EMS	F-A, S-F
Marine Pollutant	Yes

Air Transport
IATA DGR

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Manganese sulphate, monohydrate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3077
Hazchem	2Z
Pack Group	III
Special Provision	No Data Available

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	HSR004019

National/Regional Inventories

Australia (AICS)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	232-089-9
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	MANSUL0100, MANSUL0400, MANSUL0500, MANSUL0800, MANSUL1000, MANSUL1001, MANSUL1002, MANSUL1003, MANSUL1004, MANSUL1005, MANSUL1006, MANSUL1007, MANSUL1008, MANSUL1009, MANSUL1010, MANSUL1011, MANSUL1012, MANSUL1013, MANSUL1014, MANSUL1015, MANSUL1016, MANSUL1017, MANSUL1018, MANSUL1019, MANSUL1020, MANSUL1021, MANSUL1022, MANSUL1023, MANSUL1024, MANSUL1025, MANSUL1026, MANSUL1027, MANSUL1028, MANSUL1100, MANSUL1200, MANSUL1201, MANSUL1300, MANSUL1301, MANSUL1400, MANSUL1500, MANSUL1600, MANSUL1605, MANSUL1610, MANSUL1615, MANSUL1620, MANSUL1700, MANSUL1800, MANSUL1801, MANSUL1802, MANSUL1803, MANSUL1804, MANSUL1805, MANSUL1806, MANSUL1807, MANSUL1808, MANSUL1809, MANSUL1810, MANSUL1811, MANSUL1812, MANSUL1813, MANSUL1814, MANSUL1815, MANSUL1816, MANSUL1817, MANSUL1818, MANSUL1819, MANSUL1820, MANSUL1821, MANSUL1822, MANSUL1823, MANSUL1824, MANSUL1825, MANSUL1826, MANSUL1900, MANSUL1950, MANSUL2000, MANSUL2001,

MANSUL2100, MANSUL2200, MANSUL2300, MANSUL2301, MANSUL2400, MANSUL2500, MANSUL2501, MANSUL2502, MANSUL2600, MANSUL2601, MANSUL2602, MANSUL2603, MANSUL2604, MANSUL2605, MANSUL2606, MANSUL2607, MANSUL2608, MANSUL2609, MANSUL2610, MANSUL2611, MANSUL2612, MANSUL2613, MANSUL2614, MANSUL2700, MANSUL2800, MANSUL3000, MANSUL3001, MANSUL3002, MANSUL3003, MANSUL3004, MANSUL3100, MANSUL3101, MANSUL3102, MANSUL3103, MANSUL3104, MANSUL3105, MANSUL3106, MANSUL3107, MANSUL3108, MANSUL3109, MANSUL3110, MANSUL3111, MANSUL3112, MANSUL3113, MANSUL3114, MANSUL3115, MANSUL3116, MANSUL3117, MANSUL3118, MANSUL3119, MANSUL3120, MANSUL3121, MANSUL3122, MANSUL3123, MANSUL3124, MANSUL3125, MANSUL3126, MANSUL3127, MANSUL3128, MANSUL3129, MANSUL3130, MANSUL3131, MANSUL3132, MANSUL3133, MANSUL3134, MANSUL3135, MANSUL3136, MANSUL3137, MANSUL3138, MANSUL3139, MANSUL3140, MANSUL3141, MANSUL3142, MANSUL3200, MANSUL3201, MANSUL3202, MANSUL3300, MANSUL3301, MANSUL3400, MANSUL3500, MANSUL3501, MANSUL3502, MANSUL3503, MANSUL3600, MANSUL3700, MANSUL3800, MANSUL4000, MANSUL4001, MANSUL4002, MANSUL4003, MANSUL4100, MANSUL4200, MANSUL4300, MANSUL4400, MANSUL4500, MANSUL4501, MANSUL4600, MANSUL4650, MANSUL4660, MANSUL4661, MANSUL4700, MANSUL4750, MANSUL4751, MANSUL4752, MANSUL4800, MANSUL4900, MANSUL5000, MANSUL5001, MANSUL5002, MANSUL5100, MANSUL5300, MANSUL5301, MANSUL5305, MANSUL5500, MANSUL5501, MANSUL5502, MANSUL5503, MANSUL5600, MANSUL5700, MANSUL5800, MANSUL5900, MANSUL6000, MANSUL6001, MANSUL6100, MANSUL6200, MANSUL6201, MANSUL6202, MANSUL6300, MANSUL6400, MANSUL6500, MANSUL6501, MANSUL6502, MANSUL6550, MANSUL6551, MANSUL6570, MANSUL6571, MANSUL6600, MANSUL6601, MANSUL6605, MANSUL6700, MANSUL6800, MANSUL7000, MANSUL7001, MANSUL7500, MANSUL7900, MANSUL8000, MANSUL8001, MANSUL8002, MANSUL8003, MANSUL8004, MANSUL8005, MANSUL8006, MANSUL8007, MANSUL8008, MANSUL8010, MANSUL8050, MANSUL8055, MANSUL8060, MANSUL8070, MANSUL8071, MANSUL8075, MANSUL8076, MANSUL8080, MANSUL8081, MANSUL8082, MANSUL8083, MANSUL8084, MANSUL8086, MANSUL8088, MANSUL8090, MANSUL8091, MANSUL8092, MANSUL8093, MANSUL8100, MANSUL8105, MANSUL8800, MANSUL8850, MANSUL8851, MANSUL8860, MANSUL9000, MANSUL9001, MANSUL9002, MANSUL9003, MANSUL9010, MANSUL9011, MANSUL9012, MANSUL9013, MANSUL9100, MANSUL9300, MANSUL9400, MANSUL9500, MANSUL9501, MANSUL9502, MANSUL9600, MANSUL9601, MANSUL9602, MANSUL9700, MANSUL9701, MANSUL9702, MANSUL9800, MANSUL9900, MANSUP1000

Revision 3

Revision Date 08 Jan 2017

Key/Legend

< Less Than
> Greater Than
AICS Australian Inventory of Chemical Substances
atm Atmosphere
CAS Chemical Abstracts Service (Registry Number)
cm² 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/cm³ 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/m³ 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
m³ Cubic Metre
mbar Millibar
mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m³ 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