1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: MANGANESE SULPHATE MONOHYDRATE

Recommended Use of the Chemical: Catalyst, fertiliser, fungicide, mineral flotation, pigment, stock feed nutrient.

Supplier: Ixom Operations Pty Ltd
ABN: 51 600 546 512
Street Address: Level 8, 1 Nicholson Street
East Melbourne Victoria 3002
Australia

Telephone Number: +61 3 9906 3000
Emergency Telephone: 1 800 033 111 (ALL HOURS)

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the “Other Information” section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to the provisions of the Australian Code for the Transport of Dangerous Goods by Road and Rail when transported by road or rail in: packagings that do not incorporate a receptacle exceeding 500 kg(L); or IBCs.

This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:
Specific target organ toxicity (repeated exposure) - Category 2
Acute Aquatic Toxicity - Category 2
Chronic Aquatic Toxicity - Category 2

SIGNAL WORD: WARNING

Hazard Statement(s):
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.

Precautionary Statement(s):

Prevention:
P260 Do not breathe mist, vapours, spray.
P273 Avoid release to the environment.

Response:
P314 Get medical advice/attention if you feel unwell.
P391 Collect spillage.

Storage:
No storage statements.
Disposal:
P501 Dispose of contents and container in accordance with local, regional, national, international regulations.

Poisons Schedule (SUSMP): None allocated.

### 3. COMPOSITION AND INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Proportion</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese sulphate, monohydrate</td>
<td>10034-96-5</td>
<td>&gt;=98%</td>
<td>H373, H411</td>
</tr>
</tbody>
</table>

### 4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

**Inhalation:**
Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

**Skin Contact:**
If skin contact occurs, remove contaminated clothing and wash skin with running water. If irritation occurs seek medical advice.

**Eye Contact:**
If in eyes, wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

**Ingestion:**
Rinse mouth with water. If swallowed, give a glass of water to drink. If vomiting occurs give further water. Never give anything by the mouth to an unconscious patient. Seek immediate medical assistance.

**Indication of immediate medical attention and special treatment needed:**
Treat symptomatically.

### 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media:**
Not combustible, however, if material is involved in a fire use: Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

**Hazchem or Emergency Action Code:** 2Z

**Specific hazards arising from the chemical:**
Non-combustible material. Environmentally hazardous.

**Special protective equipment and precautions for fire-fighters:**
Decomposes on heating emitting toxic fumes, including those of oxides of manganese, oxides of sulfur. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition.
6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:
Do not allow container or product to get into drains, sewers, streams or ponds. If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Slippery when spilt. Avoid accidents, clean up immediately. Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust. Collect and seal in properly labelled containers or drums for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling:
Avoid skin and eye contact and breathing in dust. Avoid handling which leads to dust formation.

Conditions for safe storage, including any incompatibilities:
Store in a cool, dry, well ventilated place. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for spills.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Manganese, dust & compounds (as Mn): 8hr TWA = 1 mg/m³
As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:
Ensure ventilation is adequate to maintain air concentrations below Workplace Exposure Standards. Keep containers closed when not in use.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Personal Protective Equipment (PPE) (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):
The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

OVERALLS, SAFETY SHOES, SAFETY GLASSES, GLOVES, DUST MASK.
Safety Data Sheet

Wear overalls, safety glasses and impervious gloves. Avoid generating and inhaling dusts. If determined by a risk assessment an inhalation risk exists, wear a dust mask/respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state:</td>
<td>Powder or Granules</td>
</tr>
<tr>
<td>Colour:</td>
<td>White or Slightly Pink</td>
</tr>
<tr>
<td>Odour:</td>
<td>Odourless</td>
</tr>
<tr>
<td>Molecular Formula:</td>
<td>MnSO4.H2O</td>
</tr>
<tr>
<td>Solubility:</td>
<td>Soluble in water.</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>2.95 @20°C</td>
</tr>
<tr>
<td>Relative Vapour Density (air=1):</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapour Pressure (20 °C):</td>
<td>Not available</td>
</tr>
<tr>
<td>Flash Point (°C):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability Limits (%):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition Temperature (°C):</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting Point/Range (°C):</td>
<td>700 (anhydrous)</td>
</tr>
<tr>
<td>Boiling Point/Range (°C):</td>
<td>850</td>
</tr>
<tr>
<td>pH:</td>
<td>3.0-3.5 (50 g/L, 20°C)</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity: No information available.
Chemical stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Possibility of hazardous reactions: Hazardous polymerisation will not occur.
Conditions to avoid: Avoid exposure to moisture. Avoid high temperatures.
Incompatible materials: Incompatible with strong oxidising agents, strong acids, aluminium, magnesium.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing can result in nausea, vomiting, diarrhoea, and abdominal pain. A side effect of oral manganese administration is an increase in losses of calcium in the faeces and a subsequent lowering of calcium blood levels.
Safety Data Sheet

Eye contact: May be an eye irritant. Exposure to the dust may cause discomfort due to particulate nature. May cause physical irritation to the eyes.

Skin contact: Contact with skin may result in irritation.

Inhalation: Material may be irritant to the mucous membranes of the respiratory tract (airways).

Acute toxicity:
Oral LD50 (rat): 2150 mg/kg (anhydrous)

Chronic effects: Systemic poisoning may result from inhalation or chronic ingestion of manganese containing substances. Chronic exposure has been associated with two major effects: bronchitis/pneumonitis, following inhalation of manganese dusts, and "manganism", a neuropsychiatric disorder that may arise from inhalation exposures. Chronic exposure to low levels may result in the accumulation of toxic concentrations in critical organs. The brain in particular appears to sustain cellular damage to the ganglion. Symptoms appear before any pathology is evident and may include mask-like facial expression, spastic gait, tremors, slurred speech, disordered muscle tone, fatigue, anorexia, asthenia, apathy and the inability to concentrate. Insomnia may be an early finding. Rat studies indicate the gradual accumulation of brain manganese to produce lesions mimicking those found in Parkinsonism.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Avoid contaminating waterways.

Aquatic toxicity:
Toxic to aquatic organisms. May cause long lasting harmful effects to aquatic life.

48hr EC50 (Daphnia magna): 8.3 mg/L (anhydrous)
96hr LC50 (fathead minnow): 30.6 mg/L (anhydrous)

13. DISPOSAL CONSIDERATIONS

Disposal methods:
Refer to Waste Management Authority. Dispose of contents and container in accordance with local, regional, national, international regulations.

14. TRANSPORT INFORMATION

Road and Rail Transport
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to the provisions of the Australian Code for the Transport of Dangerous Goods by Road and Rail when transported by road or rail in: packagings that do not incorporate a receptacle exceeding 500 kg(L); or IBCs.

UN No: 3077
Transport Hazard Class: 9 Miscellaneous Dangerous Goods
Packing Group: III
Proper Shipping Name or Technical Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (MANGANESE SULPHATE MONOHYDRATE)
15. REGULATORY INFORMATION

Classification:
This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.

Classification of the chemical:
Specific target organ toxicity (repeated exposure) - Category 2
Acute Aquatic Toxicity - Category 2
Chronic Aquatic Toxicity - Category 2

Hazard Statement(s):
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.

Poisons Schedule (SUSMP): None allocated.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

This safety data sheet has been prepared by Ixom Operations Pty Ltd (Toxicology & SDS Services).

Reason(s) for Issue:
5 Yearly Revised Primary SDS
Change in Product Use description
Safety Data Sheet

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Ixom Operations Pty Ltd cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Ixom representative or Ixom Operations Pty Ltd at the contact details on page 1.

Ixom Operations Pty Ltd's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.