Material Safety Data Sheet

Martrex, Inc.

Section 1: Chemical Product and Company Information

Product name: Martrex Manganese Sulfate 31%
Reference Number: n/a
Supplier/ Further Information: Martrex, Inc.
P. O. Box 1709
14525 Highway 7
Minnetonka, Minnesota 55345-3793
Phone: 952/933-5000
Toll Free: 800/328-3627
FAX: 952/933-1889
Web: www.martrexinc.com
EPA Registration Number: n/a
CAS#: 10034-96-5
Chemical Name: Manganese Sulfate Monohydrate
Synonyms: Sulfuric acid, manganese(2+) salt (1:1), monohydrate (8CI,9Cl);
Manganese monosulfate monohydrate; Manganese sulfate(MnSO4)
monohydrate; Manganese(2+) sulfate monohydrate; Manganous sulfate
monohydrate; Sulfuric acid manganese salt
Chemical Family: Inorganic salt
Product Use: n/a
MSDS Number: n/a

24 Hour Emergency Phone - Chemtrec Transport: 1-800-424-9300; Medical: 1-800-441-3637

Section 2: Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CAS#</th>
<th>%</th>
<th>OSHA Limits</th>
<th>ACGIH Limits</th>
<th>OTHER Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Sulfate Monohydrate</td>
<td>10034-96-5</td>
<td>100%</td>
<td>5 mg/m3 (as MN)</td>
<td>5 mg/m3 (as MN)</td>
<td>no data</td>
</tr>
</tbody>
</table>

Section 3: Hazards Identification

Emergency Overview
OSHA Hazards: No known OSHA hazards
Target Organs: Lungs, Nerves.
GHS Label elements, including precautionary statements

Pictogram: 
Signal word: Warning
Hazard Statement(s) 
H373 May cause damage to organs through prolonged or repeated exposure.
H401 Toxic to aquatic life.
Precautionary statement(s): none
FPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Potential Acute Health Effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Ingestion: May be harmful if swallowed
Carcinogenicity Data: See Section 11 for more Toxicological information

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation 1-800-441-3637 Medical
### Section 4: First Aid Measures

**General advice:** Consult a physician. Show this safety data sheet to the doctor in attendance.

**If inhaled:** If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

**In case of skin contact:** Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed:** Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**NOTE TO THE PHYSICIAN:** Treat symptomatically and supportively.

### Section 5: Fire Fighting Measures

**Suitable extinguishing media:**
- Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for fire-fighters:**
- Wear self contained breathing apparatus for fire fighting if necessary.

**Flammability Classification:** This product is essentially non-flammable and is used commercially as a fire retardant.

**Auto-Ignition Temperature:** Not applicable

**Flash Points:** Not applicable

**Flammable Limits:** Not applicable

**Products of Combustion:** no data

**Fire Hazards in Presence of Various Substances:** Not applicable.

**Explosion Hazards in Presence of Various Substances:** no data

**Fire Extinguishing Media:** Use media suitable to extinguish source of fire.

**Special Fire Fighting Information:** Wear appropriate personal protective equipment as specified in Section 8.

**Hazardous Combustion Products:** See Section 10 Reactivity Incompatibilities.

### Section 6: Accidental Release Measures

**Personal precautions:** Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

**Environmental precautions:** Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**Methods and materials for containment and cleaning:** Pick up and arrange disposal without creating dust.

**Spill and Leak Personal Procedures:** Wear appropriate personal protective as specified in Section 8.

**Environmental and Regulatory Reporting:** See Sections 12, 13 and 15

### Section 7: Handling and Storage

**Precautions for safe handling:** Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

**Conditions for safe storage:** Keep container tightly closed in a dry and well-ventilated place.

**Hygroscopic** Keep in a dry place
Section 8: Exposure Controls / Personal Protection

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Hazardous Component</th>
<th>CAS#</th>
<th>Value</th>
<th>Control Parameters</th>
<th>Update</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Sulfate Monohydrate</td>
<td>10034-96-5</td>
<td>CEIL</td>
<td>5 mg/m3</td>
<td>1993-06-30</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TWA</td>
<td>1995-05-23</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Remarks: Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL.
See Notice of Intended Changes (NIC)

Personal protective equipment

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection: For prolonged or repeated contact use protective gloves.

Eye protection: Safety glasses with side-shields conforming to EN166

Skin and body protection: Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygienic Work Practices: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Section 9: Physical and Chemical Properties

Chemical Name: Manganese Sulfate Monohydrate
Percent Equivalent: 57%
Physical State: solid powder
Color and Appearance: light red
pH: 3.0 - 3.5 at 50 g/l at 20 °C (68 °F)
Melting Point: 700 °C (1,292 °F)
Boiling Point: no data
Flash point: no data
Ignition temperature: no data
Lower explosion limit: no data
Upper explosion limit: no data
Specific Gravity: 1.43 @ 60°F
Vapor Pressure: no data
Density: 2.95 g/cm3
Solubility in water: No data
Chemical Formula: MnSO₄ • H₂O
Formula Wt: 169.02 g/mol

Section 10: Stability and Reactivity

Chemical Stability (stable under normal temperature and pressures):
Stable ___ Unstable ___

Hazardous Polymerization:
May Occur ___ Will Not Occur ___

Conditions to Avoid: Avoid moisture
Materials to Avoid: no data
Hazardous Decomposition Products: Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Manganese/manganese oxides

Section II: Toxicological Information

Acute toxicity:
- **Harmful**: danger of serious damage to health by prolonged exposure if swallowed.
- **Skin corrosion/irritation**: no data available
- **Serious eye damage/eye irritation**: no data available
- **Respiratory or skin sensitization**: no data available
- **Germ cell mutagenicity**: no data available
- **Genotoxicity in vitro - Hamster - ovary**: Cytogenetic analysis
- **Genotoxicity in vitro - Hamster - ovary**: Sister chromatid exchange
- **Genotoxicity in vivo - mouse - Oral**: Micronucleus test
- **Genotoxicity in vivo - mouse - Oral**: Cytogenetic analysis
- **Genotoxicity in vivo - mouse - Oral**: sperm

Carcinogenicity
- **Carcinogenicity - mouse - Oral**
  - **Tumorigenic**: Equivocal tumorigenic agent by RTECS criteria. **Endocrine**: Thyroid tumors.
  - **IARC**: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
  - **ACGIH**: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
  - **NTP**: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
  - **OSHA**: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
- **Reproductive toxicity - mouse - male - Oral**
  - **Paternal Effects**: Spermatogenesis (including genetic material, sperm morphology, motility, and count).
  - no data available

Specific target organ toxicity - single exposure (GHS): no data available
Specific target organ toxicity - repeated exposure (GHS): May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard: no data available

Potential health effects
- **Inhalation**: May be harmful if inhaled. May cause respiratory tract irritation.
- **Ingestion**: May be harmful if swallowed.
- **Skin**: May be harmful if absorbed through skin. May cause skin irritation.
- **Eyes**: May cause eye irritation.

Signs and Symptoms of Exposure: Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds. Prolonged or repeated inhalation may cause: Pneumonia

Additional Information: RTECS: OP0893500
Section 12: Ecological Information

Toxicity: no data available
Persistence and degradability: no data available
Bio-accumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Section 13: Disposal Considerations

Product: Observe all federal, state, and local environmental regulations.
Contaminated packaging: Dispose of as unused product.

Section 14: Transport Information

DOT (US): Not dangerous goods
IMDG:
  UN-Number: 3077  Class: 9  Packing group: III  EMS-No: F-A, S-F
  Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Manganese Sulfate Monohydrate)
  Marine pollutant: No
IATA:
  UN-Number: 3077  Class: 9  Packing group: III
  Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Manganese Sulfate Monohydrate)

Section 15: Regulatory Information

OSHA Hazards: No known OSHA hazards
DSL Status: All components of this product are on the Canadian DSL list.
SARA Components:
  SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Sulfate Monohydrate</td>
<td>10034-96-5</td>
<td>1987-01-01</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards: No SARA Hazards
Massachusetts Right To Know Components:
No components are subject to the Massachusetts Right to Know Act.
Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Sulfate Monohydrate</td>
<td>10034-96-5</td>
<td>1987-01-01</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese Sulfate Monohydrate</td>
<td>10034-96-5</td>
<td>1987-01-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Section 16: Other Information

<table>
<thead>
<tr>
<th>Rating Number</th>
<th>Health Hazard</th>
<th>Flamibility Hazard</th>
<th>Instability Hazard</th>
<th>Special Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Can be lethal</td>
<td>Will vaporize and readily burn at normal temperatures</td>
<td>May explode at normal temperatures and pressures</td>
<td>ALK Alkaline</td>
</tr>
<tr>
<td>3</td>
<td>Can cause serious or permanent injury</td>
<td>Can be ignited under almost all ambient temperatures</td>
<td>May explode at high temperature or shock</td>
<td>ACID Acidic</td>
</tr>
<tr>
<td>2</td>
<td>Can cause temporary incapacitation or residual injury</td>
<td>Must be heated or high ambient temperature to burn</td>
<td>Violent chemical change at high temperatures or pressures</td>
<td>BIO BioHazard</td>
</tr>
<tr>
<td>1</td>
<td>Can cause significant irritation</td>
<td>Must be preheated before ignition can occur</td>
<td>Normally stable, High temperatures make unstable</td>
<td>COR Strong Corrosive</td>
</tr>
<tr>
<td>0</td>
<td>No Hazard</td>
<td>Will not burn</td>
<td>Stable</td>
<td>OXY Oxidizer</td>
</tr>
</tbody>
</table>

This chart for reference only - For complete specifications consult the NFPA Standard

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300  Transportation 1-800-441-3637 Medical
**Disclaimer:** Martrex, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. **MARTREX, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MARTREX, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**