

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 1 - Chemical Product and Company Identification ***

Chemical Name: Manganese Sulfate, Monohydrate

Product Use: For Commercial Use

Synonyms: Sulfuric Acid, manganese (2+) salt (1:1), Monohydrate; Manganese mesosulfate; Manganous sulfate monohydrate.

Manufacturer Information

Chem One Corporation (Importer of record)
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Phone: (713) 896-9966
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Emergency # 1-800-424-9300

General Comments

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

*** Section 2 - Composition / Information on Ingredients ***

CAS #	Component	Percent
10034-96-5	Manganese Sulfate Monohydrate	> 98%

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Manganese (7439-96-5), Manganese, elemental & inorganic Compounds, as Mn, and Manganese fume, Mn

Information/Information on Non-Hazardous Components

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

*** Section 3 - Hazards Identification ***

Emergency Overview

Manganese Sulfate Monohydrate is a light gray to white solid in granular or powder form. The primary health hazard associated with this product is the potential for irritation of the eyes, skin, nose and other tissues that come in contact with dusts or particulates of this product. Inhalation overexposures may cause metal fume fever. Thermal decomposition of this product produces irritating vapors and toxic gases (e.g. sulfur oxides and manganese). Emergency responders should wear proper personal protective equipment for the releases to which they are responding.

Hazard Statements

HARMFUL IF SWALLOWED. CAUSES IRRITATION TO EYES, SKIN, AND RESPIRATORY TRACT. HARMFUL IF INHALED. INHALATION OVEREXPOSURE CAN CAUSE METAL FUME FEVER. CHRONIC OVEREXPOSURE MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing dusts or particulates. Avoid prolonged or repeated contact with skin. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Potential Health Effects: Eyes

Exposure to particulates or solution of Manganese Sulfate Monohydrate may cause irritation of the eyes with symptoms such as stinging, tearing and redness. Prolonged contact may cause corneal injury and conjunctivitis.

Potential Health Effects: Skin

Manganese Sulfate Monohydrate can cause irritation of the skin, with symptoms such as reddening, discomfort and itching. Repeated skin contact may lead to dermatitis (red, cracked skin).

Potential Health Effects: Ingestion

Ingestion of Manganese Sulfate Monohydrate can cause nausea, vomiting, and abdominal cramps. Chronic ingestion of this product may cause systemic poisoning with symptoms similar to those described for chronic inhalation.

Potential Health Effects: Inhalation

Breathing dusts or particulates generated by Manganese Sulfate Monohydrate can lead to irritation of the nose, throat or respiratory system. Symptoms of such exposure could include coughing, sneezing, coughing and bronchitis. Repeated or prolonged exposure can cause metal fume fever, with resulting flu-like symptoms of chills and fever, sweating, and weakness. Chronic overexposure can also cause central nervous system effects including muscle weakness, speech impairment, insomnia, tremors and mental incapacity. Symptoms of such reaction can be delayed for several years.

HMIS Ratings: Health: 2 Fire: 0 Reactivity: 0 Personal Protective Equipment: B chemical goggles, impervious gloves

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact with eyes, rinse immediately with plenty of water for at least 20 minutes. Seek immediate medical attention if adverse effect occurs.

First Aid: Skin

Remove all contaminated clothing. For skin contact, wash thoroughly with soap and water for at least 20 minutes. Seek immediate medical attention if irritation develops or persists.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Have victim rinse mouth thoroughly with water, if conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

First Aid: Inhalation

Remove source of contamination or move victim to fresh air. If breathing has stopped, apply artificial respiration. Get immediate medical attention.

First Aid: Notes to Physician

Provide general supportive measures and treat symptomatically.

*** Section 5 - Fire Fighting Measures ***

Flash Point: Not flammable

Method Used: Not applicable

Upper Flammable Limit (UEL): Not applicable

Lower Flammable Limit (LEL): Not applicable

Auto Ignition: Not applicable

Flammability Classification: Not applicable

Rate of Burning: Not applicable

General Fire Hazards

Manganese Sulfate Monohydrate is not combustible.

Hazardous Combustion Products

Manganese and sulfur oxide.

Extinguishing Media

Use methods for surrounding fire.

Fire Fighting Equipment/Instructions

Firefighters should wear full protective clothing including self-contained breathing apparatus. Cool containers with flooding quantities of water. If possible control runoff from fire control or dilution water to prevent environmental contamination.

NFPA Ratings: Health: 2 Fire: 0 Reactivity: 0 Other:

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Stop the flow of material, if this is without risk. Contain the discharged material. If sweeping of a contaminated area is necessary use a dust suppressant agent, which does not react with product. Wipe down area routinely to avoid the accumulation of dusts.

Clean-Up Procedures

Small releases can be cleaned-up in gloves, goggles and suitable body protection. In case of a large spill (in which excessive dusts can be generated), clear the affected area, protect people, and respond with trained personnel. Place all spill residues in an appropriate container and seal. Thoroughly wash the area after a spill or leak clean-up. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater.

Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Remove soiled clothing and launder before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 7 - Handling and Storage ***

Handling Procedures

All employees who handle this material should be trained to handle it safely. Do not breathe dust. Avoid all contact with skin and eyes. Use this product only with adequate ventilation. Wash thoroughly after handling.

Storage Procedures

Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers).

Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers that held this product. Keep this material away from food, drink and animal feed. Do not store this material in open or unlabeled containers. Limit quantity of material stored.

*** Section 8 - Exposure Controls / Personal Protection ***

Exposure Guidelines

A: General Product Information

Follow the applicable exposure limits.

B: Component Exposure Limits

The exposure limits given are for Manganese, elemental & inorganic Compounds, as Mn (7439-96-5) or Manganese fume, as Mn.

ACGIH: 0.2 mg/m³ TWA

OSHA: 5 mg/m³ STEL, Ceiling

DFG MAKs: 0.5 mg/m³ TWA, Ceiling, Peak, 30 minutes, average value

NIOSH: 1 mg/m³ TWA

3 mg/m³ STEL

Engineering Controls

Use mechanical ventilation such as dilution and local exhaust.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields or chemical goggles.

Personal Protective Equipment: Skin

Wear impervious gloves. Nitrile, PVC, rubber or equivalent gloves are recommended. Wear long-sleeved shirt and trousers.

Personal Protective Equipment: Respiratory

Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients), if applicable. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). If airborne concentrations are above the applicable exposure limits, use NIOSH-approved respiratory protection. The following NIOSH Guidelines for Manganese and Compounds (as Mn) are presented for further information.

Up to 10 mg/m³: Dust and mist respirator except single-use and quarter-mask respirator or SAR.

Up to 25 mg/m³: SAR operated in a continuous-flow mode, or powered air-purifying respirator with dust and mist filters.

Up to 50 mg/m³: Full-facepiece respirator with high-efficiency particulate filter(s), or SAR with a tight-fitting facepiece operated in a continuous-flow mode, or powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter, or full-facepiece SCBA, or full-facepiece SAR.

Up to 500 mg/m³: Positive pressure SAR.

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 8 - Exposure Controls / Personal Protection (Continued) ***

Personal Protective Equipment: Respiratory (continued):

NIOSH Guidelines for Manganese and Compounds (as Mn) [continued]:

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Positive pressure, full-facepiece SCBA, or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Escape: Full-facepiece respirator with high-efficiency particulate filter(s), or escape-type SCBA.

NOTE: The IDLH concentration for Manganese Compounds and fume (as Mn) is 500 mg/m³.

Personal Protective Equipment: General

Have an eyewash fountain and safety shower available in the work area. Wash hands thoroughly after handling material.

*** Section 9 - Physical & Chemical Properties ***

Physical Properties: Additional Information

The data provided in this section is to be used for product safety handling purposes. Please refer to Product Data Sheets, Certificates of Conformity or Certificates of Analysis for chemical and physical data for determinations of quality and for formulation purposes.

Appearance:	Light gray to powder or granules	Odor:	Odorless
Physical State:	Solid	pH:	Slightly acidic in water
Vapor Pressure:	8 mm Hg (at 68 deg F)	Vapor Density:	Not applicable
Boiling Point:	Not available	Melting Point:	1292 deg F (700 deg C)
Solubility (H₂O):	99.8% minimum	Specific Gravity:	2.95(H ₂ O = 1)
Freezing Point:	Not applicable	Particle Size:	All grades from 16-325 mesh (40% powder grade is > 325 mesh)
Softening Point:	Not applicable	Bulk Density:	All grades from 0.60-1.50 g/cm ³
Molecular Weight:	169.01	Chemical Formula:	MnSO ₄ •H ₂ O

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

Stable.

Chemical Stability: Conditions to Avoid

Avoid high temperatures, moisture, and incompatible materials.

Incompatibility

Manganese Sulfate, Monohydrate is incompatible with powdered metals, strong acids and strong oxidizing materials.

Hazardous Decomposition

Sulfur oxides and manganese.

Hazardous Polymerization

Will not occur.

*** Section 11 - Toxicological Information ***

Acute and Chronic Toxicity

A: General Product Information

May cause eye, skin, nose, throat and respiratory tract irritation. Depending on the duration of contact, over-exposures can irritate or burn the eyes. If inhaled, irritation of the respiratory system can occur, with coughing and breathing difficulty.

Harmful if swallowed. Inhalation over-exposures may cause metal fume fever, with resulting flu-like symptoms.

Chronic: Long term skin overexposure to this product may lead to dermatitis (red, itchy skin). Chronic inhalation or ingestion overexposures can cause central nervous system effects including muscle weakness, impairment of speech, insomnia and incoordination. Chronic overexposure to this product may also cause kidney damage, changes in the liver and blood disorders.

B: Component Analysis - LD₅₀/LC₅₀

Manganese (7439-96-5):

Oral-rat LD₅₀ = 9 g/kg

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 11 – Toxicological Information ***

B: Component Analysis - TDLo/LDLo

Manganese Sulfate Monohydrate (10034-96-5):

TDLo (Oral-Rat) 42 gm/kg/14 days-continuous: Liver: changes in liver weight; Blood: changes in other cell count (unspecified), changes in leukocyte (WBC) count; TDLo (Oral-Rat) 28437 mg/kg/13 weeks-continuous: Lungs, Thorax, or Respiration: changes in lung weight; Blood: changes in leukocyte (WBC) count; Nutritional and Gross Metabolic: weight loss or decreased weight gain; TDLo (Oral-Mouse) 546 gm/kg/13 weeks-continuous: Liver: changes in liver weight; Blood: pigmented or nucleated red blood cells, other changes; TDLo (Oral-Mouse) 513 mg/kg (male 5 days pre): Reproductive effects; TDLo (Oral-Mouse) 1314 g/kg/2 years-continuous: Equivocal tumorigenic agent

Carcinogenicity

A: General Product Information

There was equivocal evidence of carcinogenic activity of Manganese Sulfate, Monohydrate in male and female mice, based on the marginally increased incidences of thyroid gland follicular cell adenoma and the significantly increased incidences of follicular cell hyperplasia.

B: Component Carcinogenicity

Manganese & inorganic Compounds as Mn and Manganese fume, as Mn (7439-96-5)

EPA: EPA-D (Not Classifiable as to Human Carcinogenicity - inadequate human and animal evidence of carcinogenicity or no data available)

Epidemiology

Workers in plants having high levels of manganese dust showed high incidence of respiratory disease, and pathologic changes included epithelial necrosis with symptoms similar to Parkinson's disease and rigidity of facial expression.

Neurotoxicity

Manganese Sulfate, Monohydrate is a neurotoxin. Combination of ingestion and inhalation can incur harmful effects on the central nervous system. Symptoms may include leg cramps, tremors, difficult walking, poor coordination, memory loss, questionable judgment and unstable emotions.

Mutagenicity

Manganese Sulfate, Monohydrate was active for gene conversion and mutations in *S. cerevisiae*, and for inducing translocations, in Cytogenetic analysis, Sperm Morphology and Sister chromatid exchange in mice.

Teratogenicity

Tests in mice produced spermatogenesis (including genetic material, sperm morphology, motility and count) in mice. Victims of manganese poisoning have reported impotence and decreased sexual desire.

Other Toxicological Information

Workers exposed to airborne manganese have had a higher incidence of pneumonia.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

No information available.

B: Ecotoxicity

No ecotoxicity data are available for this product's components.

Environmental Fate

No data available for this product.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

As shipped, this product is not considered a hazardous waste by EPA.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

All wastes must be handled in accordance with local, state and federal regulations or with regulations of Canada and its Provinces. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

*** Section 14 - Transportation Information ***

NOTE: The data in this section (Section 14) is meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

Shipping Name: Not regulated
Hazard Class: Not applicable
UN/NA #: Not applicable
Packing Group: Not applicable
Required Label(s): Not applicable

Additional Shipping Information

None.

United Parcel Service Shipping Information

Shipping Name: Not Applicable
Hazard Class: Not Applicable
UN/NA #: Not Applicable
Packing Group: Not Applicable
Ground Shipment Maximum Unit Quantity: Not Applicable
Required Label (s) Ground Shipments: Not Applicable
Air Shipment Maximum Net Quantity: Not Applicable
Required Label (s) Air Shipments: Not Applicable

International Transportation Regulations

Canadian Transport Canada Classification: Manganese Sulfate, Monohydrate is not regulated under Transport Canada.
I.M.O. Classification: Manganese Sulfate, Monohydrate is not regulated under I.M.O.

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

No additional information.

B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

SARA 313: Category code N450 (as Manganese compounds) for reporting under Section 313.

CERCLA: There is no RQ assigned to this broad class (Manganese compounds), although the class is a CERCLA hazardous substance.

State Regulations

A: General Product Information

California Proposition 65

Manganese Sulfate, Monohydrate is not on the California Proposition 65 chemical lists.

B: Component Analysis - State

Manganese Sulfate Monohydrate appears on one or more of the following state hazardous substance lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Manganese Sulfate Monohydrate	10034-96-5	No	No	No	No	No	No
Manganese and compounds	7439-96-5	Yes	No	No	Yes	No	No
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes

Other Regulations

A: General Product Information

No other information available.

B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Manganese Sulfate Monohydrate	10034-96-5	No	No	No

As a hydrate of a listed compound, Manganese Sulfate Monohydrate is not required to be listed on the TSCA or DSL Inventories.

*** Section 15 - Regulatory Information (Continued) ***

C: Component Analysis - WHMIS IDL

Material Safety Data Sheet

Material Name: Manganese Sulfate, Monohydrate

ID: C1-127

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Manganese Sulfate Monohydrate	10034-96-5	1%

ANSI LABELING (Z129.1): **WARNING!** HARMFUL IF SWALLOWED. CAUSES SKIN AND EYE IRRITATION. HARMFUL IF INHALED. INHALATION OVEREXPOSURE CAN CAUSE METAL FUME FEVER. CHRONIC OVEREXPOSURES CAN CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. Keep from contact with clothing. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing dusts or particulates. Avoid prolonged or repeated contact with skin. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH/MSHA-approved respiratory protection, as appropriate. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Sweep up material. Place residue in suitable container. Consult Material Safety Data Sheet for additional information.

*** Section 16 - Other Information ***

Other Information

Chem One Corp. ("Chem One") shall not be responsible for the use of any information, product, method, or apparatus herein presented ("Information"), and you must make your own determination as to its suitability and completeness for your own use, for the protection of the environment, and for health and safety purposes. You assume the entire risk of relying on this Information. In no event shall Chem One be responsible for damages of any nature whatsoever resulting from the use of this product or products, or reliance upon this Information. By providing this Information, Chem One neither can nor intends to control the method or manner by which you use, handle, store, or transport Chem One products. If any materials are mentioned that are not Chem One products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed. Chem One makes no representations or warranties, either express or implied of merchantability, fitness for a particular purpose or of any other nature regarding this information, and nothing herein waives any of Chem One's conditions of sale. This information could include technical inaccuracies or typographical errors. Chem One may make improvements and/or changes in the product (s) and/or the program (s) described in this information at any time. If you have any questions, please contact us at Tel. 713-896-9966 or E-mail us at Safety@chemone.com.

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration

Contact: Mr. Clare L. Welker **Contact Phone:** (713) 896-9966

This is the end of MSDS # C1-127