

Sodium permanganate monohydrate

sc-236916



The Power to Question

Material Safety Data Sheet

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Sodium permanganate monohydrate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

ChemWatch
Within the US & Canada: 877-715-9305
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(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

Mn-Na-O4, NaMnO4, "permanganic acid, sodium salt"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	0	
Toxicity:	3	
Body Contact:	3	
Reactivity:	2	
Chronic:	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Harmful if swallowed.

Causes burns.

Risk of serious damage to eyes.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

■ Ingestion of permanganates may cause brown discoloration and burns to the mouth with oedema of the glottis, nausea, vomiting and diarrhoea.

Other symptoms, including a high-pitched noisy breathing (stridor) slow pulse, shock and fall in blood pressure may occur.

■ Poisonings rarely occur after oral administration of manganese salts because they are poorly absorbed from the gut.

EYE

■ The material can produce chemical burns to the eye following direct contact.

Vapors or mists may be extremely irritating.

■ If applied to the eyes, this material causes severe eye damage.

■ Eye contact with permanganates may produce brown discoloration.

SKIN

■ The material can produce chemical burns following direct contact with the skin.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

■ There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.

INHALED

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

■ Manganese fume is toxic and produces nervous system effects characterized by tiredness.

Acute poisoning is rare although acute inflammation of the lungs may occur.

■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

■ There is some evidence to suggest that the material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

Manganese is an essential trace element. Chronic exposure to low levels of manganese can include a mask-like facial expression, spastic gait, tremors, slurred speech, disordered muscle tone, fatigue, anorexia, loss of strength and energy, apathy and poor concentration.

Long term exposures to manganese compounds may effect the central nervous system. Symptoms include muscular weakness and tremors similar to Parkinson's disease.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
sodium permanganate	10101-50-5	

Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ Both dermal and oral toxicity of manganese salts is low because of limited solubility of manganese. No known permanent pulmonary sequelae develop after acute manganese exposure.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

■ FOR SMALL FIRE:

· USE FLOODING QUANTITIES OF WATER.
· DO NOT use dry chemicals, CO2 or foam.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Will not burn but increases intensity of fire.
· Heating may cause expansion or decomposition leading to violent rupture of containers.
Decomposition may produce toxic fumes of: metal oxides.

FIRE INCOMPATIBILITY

■ Avoid storage with reducing agents.
· Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Clean up all spills immediately.
· No smoking, naked lights, ignition sources.

MAJOR SPILLS

· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid personal contact and inhalation of dust, mist or vapors.
· Provide adequate ventilation.

RECOMMENDED STORAGE METHODS

- Glass container.
 - DO NOT repack. Use containers supplied by manufacturer only.
- For low viscosity materials
- Drums and jerricans must be of the non-removable head type.
 - Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

- In addition, Goods of Class 5.1, packing group II should be:
 - stored in piles so that
 - the height of the pile does not exceed 1 metre
 - the maximum quantity in a pile or building does not exceed 1000 tonnes unless the area is provided with automatic fire extinguishers
 - the maximum height of a pile does not exceed 3 metres where the room is provided with automatic fire extinguishers or 2 meters if not.
 - the minimum distance between piles is not less than 2 metres where the room is provided with automatic fire extinguishers or 3 meters if not.
 - the minimum distance to walls is not less than 1 metre.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

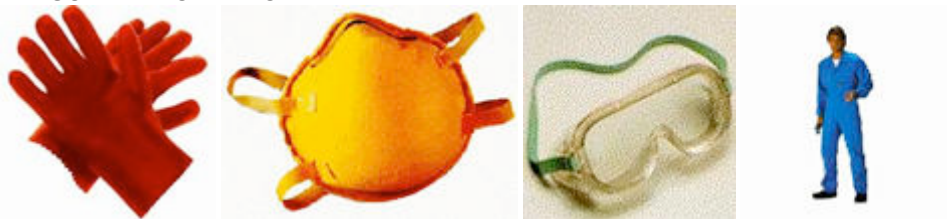
Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US - California Permissible Exposure Limits for Chemical Contaminants	sodium permanganate (Manganese and compounds, as Mn)		0.2						
US - Idaho - Limits for Air Contaminants	sodium permanganate (Manganese compounds (as Mn))						5		
US - Minnesota Permissible Exposure Limits (PELs)	sodium permanganate (Manganese compounds (as Mn))						5		
US - Minnesota Permissible Exposure Limits (PELs)	sodium permanganate (Manganese fume (as Mn))		1		3				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	sodium permanganate (Manganese compounds (as Mn))						5		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	sodium permanganate (Manganese fume (as Mn))		1		3				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	sodium permanganate (Manganese fume (as Mn))		(C)5						
US - Tennessee Occupational Exposure Limits	sodium permanganate (Manganese)						5		

- Limits For Air Contaminants	compounds (as Mn))									
US NIOSH Recommended Exposure Limits (RELs)	sodium permanganate (Manganese compounds and fume (as Mn))		1			3				[*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarb
US - Hawaii Air Contaminant Limits	sodium permanganate (Manganese fume (as Mn))		1			3				
US - Alaska Limits for Air Contaminants	sodium permanganate (Manganese Compounds (as Mn))								5	
US - Hawaii Air Contaminant Limits	sodium permanganate (Manganese compounds (as Mn))								5	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	sodium permanganate (Manganese and compounds (as Mn))		5	-		-				
US - Washington Permissible exposure limits of air contaminants	sodium permanganate (Manganese and compounds (as Mn))								5	
US - Michigan Exposure Limits for Air Contaminants	sodium permanganate (Manganese, Compounds (as Mn))								5	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sodium permanganate (Manganese compounds (as Mn))								5	
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sodium permanganate (Manganese (as Mn): Dust and compounds)		5							
Canada - Northwest Territories Occupational Exposure Limits (English)	sodium permanganate (Manganese & compounds (as Mn))								5	
Canada - Northwest Territories Occupational Exposure Limits (English)	sodium permanganate (Manganese fume (as Mn))		1			3				

Canada - British Columbia Occupational Exposure Limits	sodium permanganate (Manganese - Elemental & inorganic compounds, as Mn)	0.2			R
Canada - Alberta Occupational Exposure Limits	sodium permanganate (Manganese, elemental & inorganic compounds, as Mn)	0.2			
Canada - Nova Scotia Occupational Exposure Limits	sodium permanganate (Manganese - Elemental & inorganic cmpds (as Mn))	0.2			TLV Basis: central nervous system impairment
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sodium permanganate (Manganese and inorganic compounds, (as Mn))	0.2	0.6		
US ACGIH Threshold Limit Values (TLV)	sodium permanganate (Manganese - Elemental & inorganic cmpds (as Mn))	0.2			TLV Basis: central nervous system impairment
Canada - Prince Edward Island Occupational Exposure Limits	sodium permanganate (Manganese - Elemental & inorganic cmpds (as Mn))	0.2			TLV Basis: central nervous system impairment
US - Oregon Permissible Exposure Limits (Z-1)	sodium permanganate (Manganese Compounds (as Mn))			5	

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- particulate.

EYE

- Chemical goggles.
- Full face shield.

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,

- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- DO NOT wear cotton or cotton-backed gloves.
- DO NOT wear leather gloves.
- Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

- Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Mixes with water.

State	Divided solid	Molecular Weight	141.93
Melting Range (°F)	Not available	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not Applicable	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

Black, hygroscopic, crystalline powder; mixes with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable under normal handling conditions.
- Presence of elevated temperatures.
- Presence of incompatible materials.

STORAGE INCOMPATIBILITY

- Segregate permanganates from concentrated acids, tin, sulfur, alcohol, peroxides, bromides, iodides, arsenates, glycols, ammonium compounds, metallic powders, phosphorous, hydrazine, ferrous or mercury salts, oxalates and combustible materials and organic substances generally.
- Permanganates may react vigorously with metallic powders, ammonium compounds, phosphorous, carbon, arsenates, ethylene glycol, sulfur, hydrazine, metal hydrides, peroxides, alcohol and other combustible materials.
- Permanganates may react violently when exposed to sulfuric acid or hydrogen peroxide.
- May form explosive compounds with ammonium compounds, cellulose (such as cotton, paper).
- Permanganates are readily decomposed by many reducing substances such as
- ferrous or mercury salts, iodides, bromides, oxalates, etc., especially in the presence of an acid.
- Permanganates react with concentrated acids to produce oxygen and with hydrochloric acid to produce chlorine.
- May cause spontaneous ignition if mixed with glycol anti-freeze compounds.

- Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
 - Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
 - Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
 - Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
 - Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
 - Contact with acids produces toxic fumes.
 - WARNING: Avoid or control reaction with peroxides. All transition metal peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.
 - The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive.
 - Avoid reaction with borohydrides or cyanoborohydrides.
 - Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
 - These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
 - The state of subdivision may affect the results.
 - Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
- Avoid storage with reducing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

sodium permanganate

TOXICITY AND IRRITATION

SODIUM PERMANGANATE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

No significant acute toxicological data identified in literature search.

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This material and its container must be disposed of as hazardous waste.

Avoid release to the environment.

Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
sodium permanganate	No Data Available	No Data Available		

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

‡ Puncture containers to prevent re-use and bury at an authorized landfill.

For small quantities of permanganate:

- Dissolve solid residue in water. Add a reducer (hypochlorite, a bisulfate, or a ferrous salt but not carbon, sulfur or strong reducing

agent) and sulfuric acid to promote reduction.

- Neutralise with soda ash.
- Bury precipitate in an authorised landfill.
- Decontaminate empty containers with reducer, acid and soda ash, as above.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

For small quantities of oxidizing agent:

- Cautiously acidify a 3% solution to pH 2 with sulfuric acid.
- Gradually add a 50% excess of sodium bisulfite solution with stirring.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: None Hazard class or Division: 5.1

Identification Numbers: UN1503 PG: II

Label Codes: 5.1 Special provisions: IB6, IP2, T3, TP33

Packaging: Exceptions: 152 Packaging: Non- bulk: 212

Packaging: Exceptions: 152 Quantity limitations: 5 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 25 kg Vessel stowage: Location: D aircraft only:

Vessel stowage: Other: 56, 58, 138

Hazardous materials descriptions and proper shipping names:

Sodium permanganate

Air Transport IATA:

UN/ID Number: 1503 Packing Group: II

Special provisions: None

Cargo Only

Packing Instructions: 25 kg Maximum Qty/Pack: 562

Passenger and Cargo Passenger and Cargo

Packing Instructions: 5 kg Maximum Qty/Pack: 558

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 2.5 kg Maximum Qty/Pack: Y544

Shipping Name: SODIUM PERMANGANATE

Maritime Transport IMDG:

IMDG Class: 5.1 IMDG Subrisk: None

UN Number: 1503 Packing Group: II

EMS Number: F-H , S-Q Special provisions: None

Limited Quantities: 1 kg Marine Pollutant: Yes

Shipping Name: SODIUM PERMANGANATE

Section 15 - REGULATORY INFORMATION

sodium permanganate (CAS: 10101-50-5,79048-36-5) is found on the following regulatory lists;

"Canada - Saskatchewan Industrial Hazardous Substances","Canada Non-Domestic Substances List (NDSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US NFPA 1 Annex B Typical

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Contact with air may produce sufficient heat to ignite combustible materials.*.
- Inhalation may produce health damage*.
- Cumulative effects may result following exposure*.

* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name CAS sodium permanganate 10101-50-5, 79048-36-5

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- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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