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MATERIAL SAFETY DATA SHEET

Section 1- PRODUCT IDENTIFICATION

COMPOSITION Mn	PRODUCT NAME Manganese
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Section 2- HAZARDOUS INGREDIENTS

Note: Products under normal conditions do not represent an inhalation, ingestion or contact health hazard.

MATERIAL OR COMPONENT	CAS NUMBER	WT%	EXPOSURE LIMITS	
			OSHA PEL (Mg/M3)	ACGIH TLV(MG/M3)
Manganese	7439-96-5	0.0-100.0%	5mg/m³	0.2mg/m³

Section 3- PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS) <input type="checkbox"/> Liquid <input type="checkbox"/> Solid <input type="checkbox"/> Gas <input type="checkbox"/> Other	APPEARANCE AND ODOR Grey-pink or silvery, brittle, metallic powder or pieces. Odorless
MELTING POINT (BASE METAL) 1241C° - 1247C°	SPECIFIC GRAVITY 7.20

Section 4- FIRE AND EXPLOSION

Flash Point (Method Used) N/A	Flammable Limits N/A	LEL N/A	UEL N/A
EXTINGUISHING MEDIA Not applicable. Use suitable extinguishing media for surrounding materials and type of fire.			
SPECIAL FIRED FIGHTING PROCEDURES Wear full face, self-contained breathing apparatus with full protective clothing. Manganese will burn when heated in air. Fumes from fire are hazardous.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Violent reaction with NO₂ + oxidants. Incandescent reaction with Phosphorous, Nitryl Fluoride & Nitric Acid. May react with oxidizing agents. Will react with water at 212°F or steam to produce Hydrogen.			

Section 5- REACTIVITY DATA

STABILITY Stable	CONDITIONS TO AVOID None
INCOMPATIBILITY (MATERIALS TO AVOID) Carbon Dioxide, Aluminum dust, Ammonium Nitrate, Fluorine, Chlorine+heat, Hydrogen Peroxide, Bromine Pentafluoride, Sulfur Dioxide+heat, NO₂+oxidants, Phosphorous, Potassium, Sodium Hydroxides, Nitryl Fluorides, Nitric Acid, Oxidizing Agents, Water and steam.	
HAZARDOUS DECOMPOISTION PRODUCTS Manganese Oxide, Hydrogen Gas	

Section 6- HEALTH HAZARD GUIDE

MAJOR EXPOSURE HAZARD

Inhalation **Skin** **Skin Absorption** **Eye Contact** **Ingestion**

EFFECTS OF OVEREXPOSURE

Some Manganese compounds are experimental tumorigens. They can cause central nervous and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic Manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of Manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia. (Sax, Dangerous Properties of Industrial Materials, eighth edition)

INHALATION: Acute: Inhalation of Manganese compounds is considered the primary route of exposure. They may cause irritation of the respiratory tract and mucous membranes. Inhalation of Manganese compounds' fine dusts and fumes may cause metal fume fever. **Chronic:** Chronic inhalation of Manganese compounds' dust particles, approximately 3µm in size, for a period of a few months may cause pulmonary pneumonitis. However, dust particles, approximately 5µm in size, inhaled for about 4 hours daily for 3 months did not produce pneumonitis, but may cause fibrotic changes in the lungs, decrease in hemoglobin and a change in erythrocyte levels. Manganese compounds may also cause manganism, psychic and neurological disorders effecting the central nervous system to develop. (Manganism is not fatal but can cause permanent disability) **Signs & Symptoms:** May cause red, dry throat. Metal fumes fever may cause chills, fever, muscle aches, headache, dry throat, sleepiness, weakness in the legs, muscular twitching, nocturnal leg cramps and slowness of speech. Manganism may cause a slapping gait, cramps, tremors, slurred speech, hallucinations, insomnia and mental confusion. These symptoms resemble Parkinson's disease. Other symptoms of manganism included inflammation of the kidneys, cirrhosis of the liver, anorexia, muscular fatigue, sexual impotence, reduction of the white blood cells and anemia.

INGESTION: Acute: Absorption of manganese compounds from the gastrointestinal tract is poor under normal conditions. **Chronic:** No chronic health effects recorded. **Signs & Symptoms:** No acute or chronic health affects recorded.

DERMAL/SKIN CONTACT: Acute: May cause irritation. Moderately toxic by subcutaneous route. **Chronic:** May cause dermatitis. **Signs & Symptoms:** May cause redness, itching.

EYE CONTACT: Acute: May cause irritation. **Chronic:** Irritant dusts may cause conjunctivitis damage. **Signs & Symptoms:** May cause redness, itching and watering.

TARGET ORGANS: May affect the central nervous system, kidneys, respiratory system, eyes, skin and blood.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: It has been recorded that when exposed to Manganese dust and fumes, there is a higher incidence of upper respiratory infection and pneumonia compared to the general population.

CARCINOGENICITY: NTP? No IARC Monographs? No OSHA Regulated? No

CARCINOGENICITY/OTHER INFORMATION:

orl-rat LD50: 9gm/kg ; skn-rbt 500mg/24H MLD eye-rbt 500mg/24H MLD ; mrc-smc 8mmol/L/18H ims-rat TDLO: 400mg/kg/1Y-I:ETA ; ihl-man TCLO: 2300ug/m³:BRN,CNS ; orl-rat LD50: 9000mg/kg

EMERGENCY & FIRST AID PROCEDURES

INGESTION: Give 1-2 glasses of milk or water and induce vomiting. Seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

INHALATION: Remove from exposed area to fresh air immediately; keep warm and quiet, give oxygen if breathing is difficult. Seek medical attention.

SKIN CONTACT: Remove contaminated clothing; brush material off skin; wash affected area with mild soap and water. Seek medical attention if irritation persists.

EYE CONTACT: Flush eyes with lukewarm water lifting up the upper and lower lids for at least 15 minutes. If irritation persists, seek medical attention.

Section 7- SPILL OR LEAK PROCEDURES

SPILL OR LEAK PROCUDRES

Wear a self-contained breathing apparatus and full protective clothing. Isolate the area of the spill, insure proper ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper

disposal. Take care not to raise dust. Use non-sparking tools.

WASTE DISPOSAL METHODS

Observe all federal, state and local regulations when storing or disposing.

HAZARD LABEL INFORMATION

Store in tightly sealed container in a cool, dry area. Wash thoroughly after handling. Avoid breathing dust.

Section 8- SPECIAL PROTECTION

RESPIRATORY:

NIOSH approved respirator

VENTILATION

Local exhaust: May be necessary to control any air contaminants to within their PELs & TLVs during the use of this product.

Mechanical: Not recommended

Special: Handled in a controlled environment. Handle in an inert gas such as argon

EYE PROTECTION & PROTECTIVE CLOTHING

Rubber gloves. Protective gear suitable to prevent contamination. Safety glasses.

Section 9- SPECIAL PRECAUTIONS

WORK/HYGIENIC/MAINTENANCE PRACTICES: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air.

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