



The
Manganese
Source®

MATERIAL SAFETY DATA SHEET

Revised: 1/22/01 Page 1 of 8

Erachem Comilog, Inc.
610 Pittman Road.
Baltimore, MD 21226
(800) 876-3464 or (410) 636-7100

Chemetals'

CIR-922

CHEMTREC EMERGENCY TELEPHONE: (800) 424-9300

SECTION 1		PRODUCT INFORMATION													
TRADE NAME:		CIR-922 (Chemetals Iron Reduction)													
CHEMICAL NAME:		Manganese Dioxide													
SYNONYMS:		Manganese (IV) Oxide													
CHEMICAL FAMILY:		Transition Metal Oxide													
FORMULA:		MnO ₂													
NFPA 704M RATING			HMIS RATING												
		<table><tr><td colspan="2"></td></tr><tr><td>HEALTH</td><td><div>*</div><div>1</div></td></tr><tr><td>FLAMMABILITY</td><td><div>0</div></td></tr><tr><td>REACTIVITY</td><td><div>0</div></td></tr><tr><td>PERSONAL PROTECTION</td><td><div>E</div></td></tr><tr><td colspan="2"></td></tr></table>			HEALTH	<div>*</div> <div>1</div>	FLAMMABILITY	<div>0</div>	REACTIVITY	<div>0</div>	PERSONAL PROTECTION	<div>E</div>			<p>0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme</p> <p>* See Sections 6 and 7 for information regarding chronic health effects.</p> <p>See Section 10 for details on required Personal Protection.</p>
HEALTH	<div>*</div> <div>1</div>														
FLAMMABILITY	<div>0</div>														
REACTIVITY	<div>0</div>														
PERSONAL PROTECTION	<div>E</div>														

SECTION 2

HAZARDOUS INGREDIENTS & EXPOSURE DATA

Erachem's hazard evaluation has identified the following chemical ingredients as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200.

<u>INGREDIENT</u>	<u>CAS #</u>	<u>APPROX. %</u>
Manganese Dioxide	1313-13-9	75 - 85
Alumina	1344-28-1	5% Max
Iron Oxides (as Iron)	1309-37-1	5% Max
Silica	7440-21-3	5% Max
Barium Compounds (as Barium)	7440-39-3	0.5% Max

(Product contains between 45 and 55% Manganese)

TLV's and PEL's for MnO₂ have not been established, the following are for compounds as Mn:

Dust Ceiling	5 mg/M ³ (OSHA), 5 mg/M ³ (CANADA)
Dust STEL	3 mg/M ³ (NIOSH)
Dust TWA	1 mg/M ³ (NIOSH), 0.2 mg/M ³ (ACGIH)
Fume Ceiling	5 mg/M ³ (OSHA)
Fume STEL	3 mg/M ³ (OSHA, NIOSH, CANADA)
Fume TWA	1 mg/M ³ (OSHA, NIOSH, CANADA), 0.2 mg/M ³ (ACGIH)



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SECTION 3

PRECAUTIONARY LABEL INFORMATION

WARNING: CONTAINS MANGANESE AND SILICA - AVOID INHALING DUST

Chronic exposure to heavy concentrations of manganese
containing dust can cause central nervous system disorders.

Chronic exposure to silica containing dust can cause silicosis, a fibrotic lung disease.

SECTION 4

FIRST AID INFORMATION

INHALATION: Remove to fresh air. Treat symptoms. Support breathing as required. Call a physician.

EYES: Immediately flush for at least 15 minutes while holding eyelids open to ensure no particles remain in the eye. If symptoms such as irritation develop, consult a physician.

SKIN: Wash thoroughly with mild soap and water. A shower is recommended if significant dust exposure occurs.

INGESTION: If swallowed and the person is conscious, drink water and induce vomiting. Call a physician.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Exposure may aggravate pre-existing respiratory infections. Persons with a history of alcoholism, psychiatric, neurologic, pulmonary, or liver disease may be at a greater risk of developing symptoms of over exposure.

NOTE: After first aid, seek prompt, professional medical attention.

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

SECTION 5

PHYSICAL AND CHEMICAL PROPERTIES

COLOR:	Black
FORM:	Granular
ODOR:	None
SOLUBILITY IN WATER:	Insoluble
SPECIFIC GRAVITY:	Approx. 5.0 (H ₂ O=1)
MELTING POINT:	Above 1000 °C (will begin to loose oxygen at 250 °C)
VAPOR PRESSURE:	Effectively zero at room temperature

NOTE: These physical properties are typical values for this product.



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SECTION 6

HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: INHALATION

TARGET ORGAN EFFECTS: LUNGS/PULMONARY FUNCTION, CENTRAL NERVOUS SYSTEM

SYMPTOMS OF OVER EXPOSURE TO MANGANESE:

ACUTE (Short Term Effects)

Over exposure can cause mild to moderate irritation to skin, eyes, nose and throat depending on the duration of contact. Redness and tearing of eyes and red, dry skin are possible. Inhalation can result in pulmonary effects, consisting of difficult, shallow respiration and fever which mimics metal fume fever as well as cold-like symptoms (chills and muscle aches, dryness of the mouth).

CHRONIC (Long Term Effects)

Chronic exposure can result in conjunctivitis from irritant dusts and dermatitis. Chronic inhalation of manganese containing dust can result in Central Nervous System disorders that may appear after 6 months to 2 years of elevated exposure. The symptoms, which resemble Parkinsons Disease, are described below:

Stage I (subclinical/reversible): Indifference; irritability; headache; anorexia; sleep disturbances; decreased libido; arthralgia; muscular spasm and diminished fine motor coordination; emotional and behavioral disorders called "manganic psychosis" are more frequently seen among miners at this stage.

Stage II (clinical/intermediate): Speech becomes slow and stammering with monotonous voice; mask-like faces; excessive salivation; awkward gestures; tremors of tongue, arms, and legs; gait disturbances.

Stage III (late): Muscular rigidity; bradykinesia with slow spasmodic gait; emotional instability; postural instability and imbalance; diminished mental ability.

SYMPTOMS OF OVER EXPOSURE TO SILICA:

Exposure to silica dust is acutely irritating to eyes, lungs and skin and can result in benign pneumoconiosis. Chronic exposure can result in silicosis. Simple silicosis occurs after 20+ years exposure. May be relatively asymptomatic and show little respiratory impairment. Progressive massive fibrosis (PMF) is accompanied by cough, dyspnea, weight loss and hemoptysis. Accelerated silicosis occurs after 5-15 years exposure. X-ray changes appear earlier and the disease progresses at a faster rate. Acute silicosis (also known as silicoproteinosis, characterized by progressive dyspnea, fever, cough, and weight loss) occurs after 1-3 years exposure.

SYMPTOMS OF OVER EXPOSURE TO BARIUM OXIDE, ALUMINA & IRON OXIDES:

Exposure to dust is acutely irritating to eyes, lungs and skin and can result in benign pneumoconiosis. Chronic exposure can result in pulmonary fibrosis.



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SECTION 7

TOXICOLOGY INFORMATION

Manganese Dioxide

iv LD₅₀ (rabbit) = 45 mg/kg

Manganese Compounds as (Mn)

Oral LD₅₀ (rat) = 9000 mg/kg

IDLH = 10000 mg/M³

IDLH = Immediately dangerous to life and health

LD₅₀ = Lethal dose which leads to death of 50% of a population.

LDL₀ = Lowest lethal concentration that results in the death of any member of the test population.

CARCINOGENICITY: Manganese is not listed by NTP, IARC, OSHA or EPA as carcinogenic.

SECTION 8

FIRE AND EXPLOSION INFORMATION

FLASH POINT: Not Flammable

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

EXTINGUISHER MEDIA: Dry chemical, Carbon dioxide or water extinguishers suitable.

OTHER HAZARDS: See incompatibility below.

SECTION 9

REACTIVITY INFORMATION

INCOMPATIBILITY:

Under certain conditions, Manganese Dioxide can act as a strong oxidizer and must not be mixed with strong reducing agents or heated and/or rubbed in contact with easily oxidizable matter. Avoid contact with any volatile organic compounds (such as methanol and acetone), especially in vapor form.

Avoid contact with Hydrochloric Acid. Manganese Dioxide will react with HCl to form toxic Chlorine gas.

Also, manganese is a transition metal and could function as a catalyst for other reactions. Keep away from organic materials, combustible materials, chlorates, aluminum powder, sulfur, hydrazine, hydroxyl amine, hydroxyl ammonium sulfate, ClF₃, H₂O₂, H₂SO₅, KN₃, RbHC₂, H₂S & Na₂O₂.

THERMAL DECOMPOSITION PRODUCTS: Lower Manganese Oxides and Oxygen



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SECTION 10

PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION:

Where airborne concentrations may exceed OSHA/ACGIH permissible air concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, fume, and mists having a TWA not less than 0.05 mg/cubic meter.

A general dust mask is recommended for applications where airborne concentrations are below the regulatory limits.

VENTILATION: General ventilation is recommended.

PROTECTIVE EQUIPMENT:

Safety glasses or goggles are recommended where the possibility of getting dust particles in eyes exists. Gloves or other protective clothing recommended if skin contact is appreciable.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

The availability of an eye wash fountain and safety shower is recommended.

SECTION 11

SPILL AND DISPOSAL INFORMATION

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE 24-HOUR CHEMTREC HOTLINE (800) 424-9300.

SPILL CONTROL AND RECOVERY:

Use clean-up procedure that minimizes exposure to dust. Vacuuming is preferred for dust. Use of approved respirators is required for applications where adequate ventilation cannot be provided. Place all material in closed container if dry. Refer to CERCLA in Section 13.

DISPOSAL:

Dispose of in accordance with applicable federal, state, and local regulations.

SECTION 12

TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE: Not Regulated. Although this material can act as an oxidizer under certain conditions and can support combustion, it is not considered an oxidizer by the Department of Transportation.



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SECTION 13

REGULATORY INFORMATION

The following regulations apply to this product:

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

OSHA regulations require that the hazards associated with this material and all information included in this data sheet be communicated to your employees.

EPCRA 302/303/304:

This product does not contain ingredients specified in the List of Extremely Hazardous Substances.

EPCRA 311/312/313:

Erachem's hazard evaluation has found this product to be hazardous. Owners and operators that are required to have available MSDS's under OSHA's Hazard Communication Standard must submit these MSDSs or a list of these MSDSs to specified agencies in accordance with section 311.

According to section 312, owners or operators that are required to have available MSDS's under OSHA's Hazard Communication Standard must submit hazardous chemical inventory forms (Tier I or II) to the SERC, LEPC and local fire departments annually by March 1. The product should be reported under the following EPA Hazardous categories:

CHEMICAL NAME: Manganese Dioxide

CAS#: 1313-13-9

- ☒ Immediate (acute) health hazard
- ☒ Delayed (chronic) health hazard
- ☐ Fire hazard
- ☐ Sudden release of pressure hazard
- ☐ Reactive hazard

This product is a manganese compound which is included on the Section 313 list of toxic chemicals. Owners or operators of certain facilities are required to submit annual reports (Form R) of routine emissions and accidental releases to EPA and designated state agencies.

TOXIC CHEMICAL NAME: Manganese compounds (55% Mn, max) CODE: N450

For more information regarding EPCRA reporting requirements, contact your local emergency planning committee (LEPC), your state emergency response commission (SERC) or the EPA's EPCRA Hotline at (800) 535-0202.



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SECTION 13

REGULATORY INFORMATION (continued)

CERCLA 103:

Manganese compounds have been listed as hazardous air pollutants under section 112(b) of the Clean Air Act. A statutory RQ of 1 lb applies until RQs are adjusted. A release of more than 1 lb. of manganese to the environment via the air must be reported to the National Response Center at (800) 424-8802.

RCRA:

This material as supplied is not a listed or characteristic hazardous material as defined by RCRA. However, wastes generated by particular processing of this material may be considered hazardous waste. See 40 CFR 261 for more information.

TSCA:

This material is not on the TSCA 8(a) list, therefore no special reporting is required. This material is listed on EPA's 8(b) master inventory list and can be processed and exported. As an inorganic substance, it is exempt from Inventory Update Reporting. Any unusual, adverse health or environmental effects attributed to this product should be reported to Erachem Comilog, Inc. For more information regarding TSCA, contact the TSCA Assistance Information Service at (202) 554-1404.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:

This product does not contain any chemicals which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS:

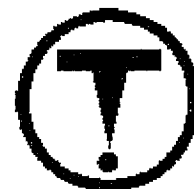
This product does not contain ingredients listed on the Michigan Critical Materials Register.

INTERNATIONAL REGULATIONS:

This product contains the following hazardous substance(s):

CHEMICAL NAME: Manganese compounds (55% Mn, max) CAS# 7439-96-5

Based on the toxicological properties of manganese, this is a WHMIS controlled product under The House of Commons of Canada Bill C-70. Class D, Division 2, Subdivision B Toxic Material labels are required in Canada.



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SECTION 14

ADDITIONAL INFORMATION

Store in closed containers away from heat and easily oxidizable materials, strong reducing agents and hydrochloric acid.

Avoid generation of airborne dusts.

SECTION 15

BIBLIOGRAPHY

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, Sax, N. Irving, ed., Van Nostrand Reinhold Company, N.Y., 6th Edition, 1984.

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NATIONAL FIRE PROTECTION AGENCY, Fire Protection Guide to Hazardous Materials, 10th Edition, 1991.

PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, Clayton, G.D., Clayton, F.E., eds., John Wiley and Sons, N.Y., 3rd edition, Vol. 2 A-C, 1981.

THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES AND PHYSICAL AGENTS IN THE WORKROOM ENVIRONMENT WITH INTENDED CHANGES, American Conference of Governmental Industrial Hygienists, OH.

Title 29 Code of Federal Regulations Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

All information, recommendations and suggestions appearing in this bulletin concerning the use of our products are based upon tests and data believed to be reliable; however, it is the user's responsibility to determine the suitability for their own use of the products described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by Erachem Comilog, Inc. as to the effects of such use or the results to be obtained, nor does Erachem Comilog, Inc. assume any liability arising out of use, by others, of the products referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist because of applicable laws or government regulations. Nothing herein contained is to be construed as permission or as a recommendation to infringe any patent.