Material Safety Data Sheet (MSDS)

Porous Manganese Dioxide for Heavy Metal Adsorption

Date of Preparation: February 14, 2026 **Version:** 1.0

Section 1: Identification

Product Identifier: Porous Manganese Dioxide for Heavy Metal Adsorption

Other Means of Identification: Manganese Dioxide, MnO_2, Activated Manganese Dioxide, Porous MnO_2

Recommended Use: Adsorbent for heavy metal removal in industrial wastewater treatment, groundwater remediation, electroplating effluent treatment, mining wastewater treatment, and drinking water pretreatment.

Restrictions on Use: For industrial and professional use only. Not for food, drug, or household use.

Supplier Details:

- **Company Name:** BTLnewmaterial
- **Address:** Room 706, No. 154, Wuyi East Road, Niezhou Residential Committee, Caizichi Sub-district Office, Leiyang City, Hengyang City, Hunan Province, China
- **Email:** lixifirm@outlook.com
- **Phone/WhatsApp:** +8618273793022
- **Website:** manganesesupply.com

Emergency Phone Number: +8618273793022 (During business hours)

Section 2: Hazard(s) Identification

GHS Classification:

- Not classified as hazardous according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

GHS Label Elements:

- **Pictograms:** None
- **Signal Word:** None
- **Hazard Statements:** None
- **Precautionary Statements:** None

Other Hazards Not Otherwise Classified:

- May cause mechanical irritation to eyes, skin, and respiratory tract due to dust. Prolonged or repeated exposure to dust may cause respiratory irritation.

Section 3: Composition/Information on Ingredients

Chemical Name	Common Name	CAS Number	Concentration (%)
Manganese Dioxide	Manganese Dioxide	1313-13-9	85–95
Other components	(Proprietary)	N/A	5–15

Note: The exact percentage (concentration) of composition has been withheld as a trade secret.

Section 4: First-Aid Measures

Description of Necessary First-Aid Measures:

- **Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

- **Skin Contact:** Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.
- **Eye Contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Remove contact lenses, if present and easy to do. Continue rinsing.
- **Ingestion:** Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Most Important Symptoms/Effects, Acute and Delayed:

- **Acute:** May cause mechanical irritation to eyes, skin, and respiratory tract. Ingestion may cause gastrointestinal discomfort.
- **Delayed:** Prolonged or repeated inhalation of manganese dust may lead to manganism, a neurological disorder with symptoms similar to Parkinson's disease.

Indication of Immediate Medical Attention and Special Treatment Needed:

- Treat symptomatically. In case of doubt or if symptoms persist, seek medical attention.

Section 5: Fire-Fighting Measures

Suitable Extinguishing Media:

- Use water spray, dry chemical, foam, or carbon dioxide (CO_2).

Specific Hazards Arising from the Chemical:

- Non-combustible. No unusual fire or explosion hazards noted. Thermal decomposition may produce toxic fumes of manganese oxides.

Special Protective Equipment and Precautions for Firefighters:

- Wear self-contained breathing apparatus (SCBA) and full protective firefighting gear. Prevent runoff from fire control or dilution from entering waterways, sewers, or drinking water supply.

Section 6: Accidental Release Measures

Personal Precautions, Protective Equipment, and Emergency Procedures:

- Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Use personal protective equipment as required (see Section 8).

Environmental Precautions:

- Do not let product enter drains. Do not contaminate surface water or ground water.

Methods and Materials for Containment and Cleaning Up:

- **Small Spills:** Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.
- **Large Spills:** Contain spillage, then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see Section 13).

Section 7: Handling and Storage

Precautions for Safe Handling:

- Avoid contact with skin and eyes. 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, Including Any Incompatibilities:

- Keep container tightly closed in a dry and well-ventilated place. Store away from incompatible materials (see Section 10).

Section 8: Exposure Controls/Personal Protection

Control Parameters:

Component	CAS No.	Value	Control Parameters	Basis
Manganese Dioxide	1313-13-9	TWA: 0.02 mg/m^3 (respirable fraction)	Manganese, elemental and inorganic	ACGIH TLV (2021)
		TWA: 0.1 mg/m^3 (inhalable fraction)		
		Ceiling: 5 mg/m^3	Manganese compounds (as Mn)	OSHA PEL (1989)

Appropriate Engineering Controls:

- Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of the workday. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

Individual Protection Measures (Personal Protective Equipment):

- **Eye/Face Protection:** Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
- **Skin Protection:** Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
- **Body Protection:** Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- **Respiratory Protection:** For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9: Physical and Chemical Properties

Appearance: Black to dark brown powder or granular solid. **Odor:** Odorless. **Odor Threshold:** Not applicable. **pH:** 3–10 (Stability Range, as per product info). Actual pH of a slurry may vary. **Melting Point/Freezing Point:** Approximately 535 °C (decomposes) [Source: PubChem, Manganese Dioxide]. **Initial Boiling Point and Boiling Range:** Not applicable (decomposes before boiling). **Flash Point:** Not applicable (non-combustible). **Evaporation Rate:** Not applicable (solid). **Flammability (solid, gas):** Non-flammable. **Upper/Lower Flammability or Explosive Limits:** Not applicable. **Vapor Pressure:** Not applicable (solid). **Vapor Density:** Not applicable (solid). **Relative Density:** 4.3–5.2 g/cm³ (Water = 1) [Source: PubChem, Manganese Dioxide]. **Apparent Density:** 0.9–1.2 g/cm³ (as per product info). **Bulk Density:** 0.6–0.8 g/cm³ (as per product info). **Solubility(ies):** Insoluble in water. Soluble in hydrochloric acid with evolution of chlorine. Soluble in sulfuric acid with evolution of oxygen. [Source: PubChem, Manganese Dioxide]. **Partition Coefficient n-octanol/water (log value):** Not applicable. **Auto-Ignition Temperature:** Not applicable. **Decomposition Temperature:** > 535 °C (decomposes) [Source: PubChem, Manganese Dioxide]. **Viscosity:** Not applicable (solid).

Section 10: Stability and Reactivity

Reactivity:

- Stable under recommended storage conditions.

Chemical Stability:

- Stable under normal conditions of use and storage.

Possibility of Hazardous Reactions:

- Reacts with strong reducing agents. Reacts with strong acids to produce chlorine gas (with HCl) or oxygen gas (with H_2SO_4).

Conditions to Avoid:

- Avoid contact with incompatible materials. Avoid dust formation.

Incompatible Materials:

- Strong reducing agents, strong acids, organic materials.

Hazardous Decomposition Products:

- Under fire conditions, may produce toxic fumes of manganese oxides.

Section 11: Toxicological Information

Information on Toxicological Effects:

- **Acute Toxicity:**
    - **Oral LD_{50} (Rat):** > 2000 mg/kg (Manganese Dioxide) [Source: ECHA, Manganese Dioxide].
    - **Dermal LD_{50} (Rabbit):** No data available.
    - **Inhalation LC_{50} (Rat):** No data available.
- **Skin Corrosion/Irritation:** May cause mechanical irritation.
- **Serious Eye Damage/Irritation:** May cause mechanical irritation.
- **Respiratory or Skin Sensitization:** Not expected to be a respiratory or skin sensitizer.
- **Germ Cell Mutagenicity:** No data available.
- **Carcinogenicity:**
    - **IARC:** Not classifiable as to its carcinogenicity to humans (Group 3) for Manganese and its compounds. [Source: IARC Monographs, Vol. 100C].
    - **NTP:** Not listed.
    - **OSHA:** Not listed.
- **Reproductive Toxicity:** No data available.
- **STOT-Single Exposure:** No data available.
- **STOT-Repeated Exposure:** Prolonged or repeated inhalation of manganese dust may cause central nervous system effects (manganism).

- **Aspiration Hazard:** Not an aspiration hazard.

Section 12: Ecological Information

Ecotoxicity:

- **Fish:** No data available for Porous Manganese Dioxide. For Manganese Dioxide (CAS 1313-13-9), LC_{50} > 100 mg/L (96h, Fish) [Source: ECHA, Manganese Dioxide].
- **Daphnia and other aquatic invertebrates:** No data available.
- **Algae:** No data available.

Persistence and Degradability:

- Manganese dioxide is an inorganic compound and is not expected to be biodegradable. It is persistent in the environment.

Bioaccumulative Potential:

- Manganese is an essential trace element, but excessive levels can be toxic. Bioaccumulation in aquatic organisms is possible.

Mobility in Soil:

- Low mobility in soil due to its insoluble nature.

Other Adverse Effects:

- No other adverse environmental effects are expected from this product.

Section 13: Disposal Considerations

Waste Treatment Methods:

- **Product:** Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dispose of in accordance with local, regional, national, and international regulations.

- **Contaminated Packaging:** Dispose of as unused product.

Section 14: Transport Information

DOT (US), IMDG, IATA:

- **UN Number:** Not regulated as a hazardous material for transport.
- **UN Proper Shipping Name:** Not applicable.
- **Transport Hazard Class(es):** Not applicable.
- **Packing Group:** Not applicable.
- **Environmental Hazards:** Not applicable.
- **Special Precautions for User:** None.

Section 15: Regulatory Information

Safety, Health, and Environmental Regulations Specific for the Product:

- **US Federal Regulations:**
    - **TSCA (Toxic Substances Control Act):** All components are listed on the TSCA inventory or are exempt.
    - **CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):** Not regulated.
    - **SARA 302 (Extremely Hazardous Substances):** Not regulated.
    - **SARA 313 (Toxic Chemical Release Inventory):** Manganese compounds are subject to reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
    - **OSHA (Occupational Safety and Health Administration):** See Section 8 for exposure limits.
- **EU Regulations:**
    - **REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals):** All components are registered or exempt from registration.

    - **CLP (Classification, Labelling and Packaging):** Not classified as hazardous.
- **Other National Regulations:** Consult local regulatory authorities for specific requirements.

Section 16: Other Information

Date of Preparation: February 14, 2026

Key/Legend:

- **ACGIH:** American Conference of Governmental Industrial Hygienists
- **CAS:** Chemical Abstracts Service
- **CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act
- **CLP:** Classification, Labelling and Packaging
- **DOT:** Department of Transportation
- **ECHA:** European Chemicals Agency
- **GHS:** Globally Harmonized System of Classification and Labelling of Chemicals
- **IARC:** International Agency for Research on Cancer
- **IATA:** International Air Transport Association
- **IMDG:** International Maritime Dangerous Goods
- **LC_{50}:** Lethal Concentration 50%
- **LD_{50}:** Lethal Dose 50%
- **MnO_2:** Manganese Dioxide
- **MSDS:** Material Safety Data Sheet
- **N/A:** Not Applicable
- **NIOSH:** National Institute for Occupational Safety and Health
- **NTP:** National Toxicology Program
- **OSHA:** Occupational Safety and Health Administration
- **PEL:** Permissible Exposure Limit

- **REACH:** Registration, Evaluation, Authorisation and Restriction of Chemicals
- **SARA:** Superfund Amendments and Reauthorization Act
- **SCBA:** Self-Contained Breathing Apparatus
- **STOT:** Specific Target Organ Toxicity
- **TDS:** Technical Data Sheet
- **TLV:** Threshold Limit Value
- **TSCA:** Toxic Substances Control Act
- **TWA:** Time-Weighted Average
- **UN:** United Nations

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References:

- PubChem. Manganese Dioxide. Available at: https://pubchem.ncbi.nlm.nih.gov/compound/Manganese-dioxide
- ECHA. Manganese Dioxide. Available at: https://echa.europa.eu/substance-information/-/substanceinfo/100.014.249
- ACGIH. Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. (Latest Edition).
- OSHA. Permissible Exposure Limits. Available at: https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1000TABLEZ1

- IARC Monographs on the Identification of Carcinogenic Hazards to Humans. Available at: https://monographs.iarc.who.int/