Safety Data Sheet

1. Identification

Product Identifier: Manganese Dioxide (MnO_2) Flux for High-Purity Metal Smelting

Other Means of Identification: Pyrolusite, Manganese(IV) oxide, Black manganese oxide

Recommended Use of the Chemical and Restrictions on Use:

- **Recommended Use:** Oxidizing and fluxing agent in metallurgical refining processes, thermite and metallothermic reactions, specialty alloy production, laboratory-scale metallurgical research.
- **Restrictions on Use:** None known.

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 (General)

2. Hazard(s) Identification

Classification of the Substance or Mixture:

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

Label Elements:

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

Other Hazards Not Otherwise Classified:

- May cause irritation to eyes, skin, and respiratory tract upon prolonged or repeated exposure to dust.
- Fine dust may form explosive mixtures with air.

3. Composition/Information on Ingredients

Chemical Identity: Manganese Dioxide (MnO_2)

Common Name: Pyrolusite

CAS Number: 1313-13-9

Concentration: 90-95% (as MnO_2)

Impurities: May contain trace amounts of other manganese oxides, iron, silica, and other naturally occurring minerals.

4. First-Aid Measures

Description of Necessary First-Aid Measures:

- **Inhalation:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, administer artificial respiration. Get medical attention if symptoms persist.
- **Skin Contact:** Wash thoroughly with soap and water. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists.
- **Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if

irritation persists.

- **Ingestion:** Rinse mouth. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

Most Important Symptoms/Effects, Acute and Delayed:

- **Acute:** May cause 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, If Necessary:

- Treat symptomatically. Provide general supportive measures and treat symptomatically. Contact a poison control center or physician for advice.

5. Fire-Fighting Measures

Suitable Extinguishing Media:

- Use extinguishing media appropriate for surrounding fire. Water spray, foam, dry chemical, carbon dioxide (CO_2).

Specific Hazards Arising from the Chemical:

- Non-combustible. However, it may act as an oxidizing agent at high temperatures, supporting combustion of other materials. Thermal decomposition may produce hazardous fumes of manganese oxides.

Special Protective Equipment and Precautions for Firefighters:

- Firefighters should wear full protective clothing and self-contained breathing apparatus (SCBA) for fire involving chemicals.

6. Accidental Release Measures

Personal Precautions, Protective Equipment, and Emergency Procedures:

- Evacuate unnecessary personnel. Keep people away from and upwind of spill/leak. Wear appropriate personal protective equipment (PPE) as described in Section 8.

Environmental Precautions:

- Prevent further leakage or spillage if safe to do so. Do not allow to enter drains, sewers, or watercourses. If contamination of sewers or waterways occurs, inform appropriate authorities.

Methods and Materials for Containment and Cleaning Up:

- **Small Spills:** Carefully sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust generation.
- **Large Spills:** Contain spillage and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Avoid dust generation.

7. Handling and Storage

Precautions for Safe Handling:

- Avoid contact with skin, eyes, and clothing. Avoid breathing dust. Use only with adequate ventilation. Wear appropriate personal protective equipment (PPE) when handling. Wash thoroughly after handling.

Conditions for Safe Storage, Including Any Incompatibilities:

- Store in a dry, cool, and well-ventilated area. Keep container tightly closed. Store away from incompatible materials (e.g., strong reducing agents, acids, combustible materials).

8. Exposure Controls/Personal Protection

Control Parameters:

- **Occupational Exposure Limits (OELs):**
    - **Manganese (as Mn, respirable fraction):**

- ACGIH TLV: 0.02 mg/m^3 (TWA, respirable fraction); 0.1 mg/m^3 (TWA, inhalable fraction)
- OSHA PEL: 5 mg/m^3 (Ceiling, as Mn fume)
- NIOSH REL: 1 mg/m^3 (TWA, as Mn); 3 mg/m^3 (STEL, as Mn)

Appropriate Engineering Controls:

- Provide adequate ventilation (e.g., local exhaust ventilation, general dilution ventilation) to control airborne dust levels below occupational exposure limits. Ensure eyewash stations and safety showers are readily accessible.

Individual Protection Measures, Such as Personal Protective Equipment (PPE):

- **Eye/Face Protection:** Safety glasses with side shields or chemical safety goggles.
- **Skin Protection:** Protective gloves (e.g., nitrile, PVC) and protective clothing to prevent skin contact.
- **Respiratory Protection:** If engineering controls are not sufficient to maintain airborne concentrations below OELs, use a NIOSH-approved respirator with a particulate filter (e.g., N95, P100).
- **Thermal Hazards:** Not applicable.

9. Physical and Chemical Properties

Appearance: Black powder

Odor: Odorless

Odor Threshold: Not applicable

pH: 6.0 - 8.0 (aqueous suspension, typical)

Melting Point/Freezing Point: Decomposes at ~535 °C (995 °F)

Initial Boiling Point and Boiling Range: Not applicable (decomposes before boiling)

Flash Point: Not applicable (non-combustible)

Evaporation Rate: Not applicable

Flammability (solid, gas): Non-flammable, but an oxidizer at high temperatures.

Upper/Lower Flammability or Explosive Limits: Not applicable

Vapor Pressure: Not applicable

Vapor Density: Not applicable

Relative Density (Specific Gravity): 4.4 - 5.0 g/cm^3 (typical, for solid material)

Bulk Density: 0.8–1.1 g/cm^3 (as per product page)

Solubility(ies): Insoluble in water; soluble in strong acids with reduction.

Partition Coefficient n-octanol/water (log Kow): Not applicable

Auto-Ignition Temperature: Not applicable

Decomposition Temperature: ~535 °C (995 °F)

Viscosity: Not applicable (solid)

Particle Size: 100–325 mesh (as per product page)

Surface Area: 15–35 m^2/g (as per product page)

10. Stability and Reactivity

Reactivity:

- Stable under normal conditions of use and storage. Reacts with strong reducing agents and acids.

Chemical Stability:

- Stable under recommended storage conditions.

Possibility of Hazardous Reactions:

- Reacts violently with strong reducing agents, acids (e.g., hydrochloric acid, sulfuric acid) to release chlorine gas or oxygen.
- May ignite combustible materials at elevated temperatures.

Conditions to Avoid:

- High temperatures, incompatible materials, dust generation.

Incompatible Materials:

- Strong reducing agents, strong acids, easily oxidizable materials, combustible materials.

Hazardous Decomposition Products:

- Manganese oxides (at high temperatures), oxygen (when reacting with acids).

11. Toxicological Information

Information on the Likely Routes of Exposure:

- Inhalation, skin contact, eye contact, ingestion.

Symptoms Related to the Physical, Chemical, and Toxicological Characteristics:

- **Inhalation:** Irritation of the respiratory tract, cough, shortness of breath. Prolonged exposure to high concentrations of dust may lead to manganism.
- **Skin Contact:** May cause mild irritation, redness.
- **Eye Contact:** May cause irritation, redness, tearing.
- **Ingestion:** May cause gastrointestinal upset, nausea, vomiting, abdominal pain.

Delayed, Immediate, and Chronic Effects from Short- and Long-Term Exposure:

- **Short-term (Acute):** Irritation to eyes, skin, respiratory tract.
- **Long-term (Chronic):** Prolonged or repeated inhalation of manganese dust can cause manganism, a neurological disorder characterized by psychiatric disturbances, gait disturbances, and Parkinsonian symptoms.

Numerical Measures of Toxicity (e.g., Acute Toxicity Estimates):

- **Manganese Dioxide (CAS: 1313-13-9):**
  - **LD_{50} Oral (Rat):** > 2000 mg/kg (OECD Guideline 401)
  - **LC_{50} Inhalation (Rat):** > 5.14 mg/L (4h, OECD Guideline 403) (for dust)
  - **LD_{50} Dermal (Rabbit):** > 2000 mg/kg (OECD Guideline 402)

Interactive Effects: No data available.

Where Specific Chemical Data Are Not Available: Not applicable.

Mixtures of Chemicals: Not applicable.

Information on Carcinogenicity, Mutagenicity, and Other Health Hazards:

- **Carcinogenicity:** Not classified as a human carcinogen by IARC, NTP, or OSHA.
- **Germ Cell Mutagenicity:** Not classified as mutagenic.
- **Reproductive Toxicity:** Not classified as a reproductive toxicant.
- **STOT-Single Exposure:** May cause respiratory irritation.
- **STOT-Repeated Exposure:** May cause damage to the central nervous system through prolonged or repeated inhalation exposure (manganism).
- **Aspiration Hazard:** Not an aspiration hazard.

12. Ecological Information

Ecotoxicity (aquatic and terrestrial):

- **Manganese Dioxide (CAS: 1313-13-9):**
  - **Fish (LC_{50}):** > 100 mg/L (96h, generally considered low toxicity to fish)
  - **Daphnia (EC_{50}):** > 100 mg/L (48h, generally considered low toxicity to aquatic invertebrates)
  - **Algae (EC_{50}):** > 100 mg/L (72h, generally considered low toxicity to algae)

Persistence and Degradability:

- Manganese dioxide is an inorganic compound and is not expected to be biodegradable. It can undergo redox transformations in the environment.

Bioaccumulative Potential:

- Manganese is an essential trace element, but excessive levels can accumulate in organisms. Bioaccumulation potential of MnO_2 is generally low due to its insolubility.

Mobility in Soil:

- Low mobility in soil due to its insolubility and strong adsorption to soil particles.

Other Adverse Effects:

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

13. Disposal Considerations

Waste Treatment Methods:

- **Disposal Instructions:** Dispose of contents/container in accordance with local, regional, national, and international regulations. Do not allow this material to drain into sewers/water supplies.
- **Contaminated Packaging:** Dispose of in the same manner as unused product. Empty containers may retain product residue.

14. Transport Information

UN Number: Not regulated as dangerous goods for transport.

UN Proper Shipping Name: Not applicable.

Transport Hazard Class(es): Not applicable.

Packing Group: Not applicable.

Environmental Hazards: Not classified as an environmental hazard for transport.

Special Precautions for User: Not applicable.

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 subject to reporting requirements.
    - **SARA Title III:** Not subject to reporting requirements.
- **EU Regulations:**
    - **REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals):** Manganese dioxide is registered under REACH.
    - **CLP (Classification, Labelling and Packaging):** Not classified as hazardous under CLP.
- **Other National Regulations:** Consult local authorities for specific national regulations.

16. Other Information

Date of Preparation: March 14, 2026

Revision History: Initial release.

Disclaimer: The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.