Safety Data Sheet (SDS)

Section 1: Identification

- **Product Identifier**: Concentrated Manganese Dioxide (MnO_2)
- **Other Means of Identification**: Manganese(IV) oxide, Pyrolusite, Black Manganese Oxide
- **Recommended Use**: Colorant for artisan glass blowing studios, ceramic glazes, pigments.
- **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 (General)

Section 2: Hazard(s) Identification

- **GHS Classification (UNECE)**:
  - Acute toxicity, Oral - Category 4
  - Acute toxicity, Inhalation - Category 4
  - Specific target organ toxicity - Repeated exposure - Category 2 (Central Nervous System, Respiratory System)

- **Signal Word**: WARNING
- **Hazard Statements**:
  - H302: Harmful if swallowed.
  - H332: Harmful if inhaled.
  - H373: May cause damage to organs (Central Nervous System, Respiratory System) through prolonged or repeated exposure.
- **Pictograms**:
  - GHS07 (Exclamation Mark)
  - GHS08 (Health Hazard)
- **Precautionary Statements**:
  - **Prevention**:
    - P260: Do not breathe dust/fume/gas/mist/vapours/spray.
    - P264: Wash thoroughly after handling.
    - P270: Do not eat, drink or smoke when using this product.
    - P271: Use only outdoors or in a well-ventilated area.
    - P280: Wear protective gloves/protective clothing/eye protection/face protection.
  - **Response**:
    - P301 + P312 + P330: IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
    - P304 + P340 + P312: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
    - P314: Get medical advice/attention if you feel unwell.
  - **Storage**:
    - P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
  - **Disposal**:
    - P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3: Composition/Information on Ingredients

Chemical Name	Common Name	CAS Number	Concentration (wt%)
Manganese Dioxide	Manganese(IV) oxide	1313-13-9	≥ 98%

Section 4: First-Aid Measures

- **Description of Necessary Measures**:
  - **Inhalation**: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Get medical attention immediately.
  - **Skin Contact**: Wash off immediately with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists.
  - **Eye Contact**: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
  - **Ingestion**: Do NOT induce vomiting. Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- **Most Important Symptoms/Effects, Acute and Delayed**: Harmful if swallowed or inhaled. Prolonged or repeated exposure may cause damage to the central nervous system and respiratory system (manganism).
- **Indication of Immediate Medical Attention and Special Treatment Needed**: Treat symptomatically. Symptoms may be delayed.

Section 5: Fire-Fighting Measures

- **Suitable Extinguishing Media**: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water spray, dry chemical, carbon dioxide (CO_2), or foam.

- **Specific Hazards Arising from the Chemical**: Not considered to be a fire hazard. Non-combustible. However, manganese dioxide is an oxidizing agent and may intensify fire; oxidizer. Contact with combustible material may cause fire.
- **Special Protective Equipment and Precautions for Firefighters**: Wear self-contained breathing apparatus (SCBA) and full protective gear. Evacuate personnel to safe areas.

Section 6: Accidental Release Measures

- **Personal Precautions, Protective Equipment, and Emergency Procedures**: Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation. Avoid breathing dust.
- **Environmental Precautions**: Do not allow product to enter drains, watercourses, or soil. If contamination of rivers, lakes, or drains occurs, inform appropriate authorities.
- **Methods and Materials for Containment and Cleaning Up**: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal. Clean contaminated surface thoroughly.

Section 7: Handling and Storage

- **Precautions for Safe Handling**: Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Avoid contact with skin, eyes, and clothing. Do not breathe dust. Do not ingest. Keep away from combustible material. Wash thoroughly after handling.
- **Conditions for Safe Storage, Including Any Incompatibilities**: Store in a cool, dry, well-ventilated place. Keep container tightly closed. Store away from incompatible materials (e.g., strong reducing agents, combustible materials, acids). Keep away from food and drink.

Section 8: Exposure Controls/Personal Protection

- **Control Parameters**:
    - **OSHA Permissible Exposure Limits (PEL)**:

        - Manganese compounds (as Mn): Ceiling 5 mg/m^3
    - **ACGIH Threshold Limit Values (TLV)**:
        - Manganese, elemental and inorganic compounds (as Mn):
            - TWA (inhalable fraction): 0.02 mg/m^3
            - TWA (respirable fraction): 0.05 mg/m^3
- **Appropriate Engineering Controls**: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Ensure that eyewash stations and safety showers are close to the workstation location.
- **Individual Protection Measures**:
    - **Eye/Face Protection**: Safety glasses with side-shields. Goggles.
    - **Skin Protection**: Protective gloves (e.g., nitrile, PVC). Long-sleeved protective clothing.
    - **Respiratory Protection**: If exposure limits are exceeded or irritation is experienced, NIOSH-approved respirators for dust/mist/fume are recommended. Use a full-face respirator if there is a potential for an uncontrolled release, exposure levels are not known, or in circumstances where air-purifying respirators may not provide adequate protection.
    - **General Hygiene Considerations**: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of the workday. Keep away from food, drink, and animal feeding stuffs.

Section 9: Physical and Chemical Properties

Property	Value	Unit	Notes
Appearance	Dark brown/black powder	–	Stable under high-temperature glass melting
Odor	Odorless	–	
Odor Threshold	Not applicable	–	
pH	Not available	–	
Melting Point	535 (decomposes)	°C	[1]
Boiling Point	Not applicable	–	Decomposes before boiling
Flash Point	Not applicable	–	Non-combustible
Evaporation Rate	Not applicable	–	Solid
Flammability (solid, gas)	Non-flammable	–	Oxidizing agent
Upper/Lower Flammability Limits	Not applicable	–	
Vapor Pressure	Not applicable	–	Solid
Vapor Density	Not applicable	–	Solid
Relative Density (Bulk Density)	1.0 – 1.3	g/cm^3	Easy to handle in studio processes
Solubility in Water	Insoluble	–	
Partition Coefficient (n-octanol/water)	Not applicable	–	Inorganic substance
Auto-ignition Temperature	Not applicable	–	
Decomposition Temperature	535	°C	[1]
Viscosity	Not applicable	–	Solid

Property	Value	Unit	Notes
Particle Size (D50)	5 – 25	μm	Fine powder for smooth dispersion
Moisture	≤0.5	%	Low moisture to prevent reaction issues
Molar Mass	86.9368	g/mol	[1]

Section 10: Stability and Reactivity

- **Reactivity**: Oxidizing agent. Reacts with strong reducing agents and combustible materials.
- **Chemical Stability**: Stable under recommended storage conditions.
- **Possibility of Hazardous Reactions**: Hazardous polymerization does not occur.
- **Conditions to Avoid**: Incompatible materials, dust formation, high temperatures (above decomposition temperature).
- **Incompatible Materials**: Strong reducing agents, strong acids, combustible materials, organic materials.
- **Hazardous Decomposition Products**: Oxygen (upon decomposition at high temperatures).

Section 11: Toxicological Information

- **Routes of Exposure**: Inhalation, Ingestion, Skin contact, Eye contact.
- **Symptoms Related to Physical, Chemical and Toxicological Characteristics**:
  - **Inhalation**: Irritation of the respiratory tract, cough, shortness of breath. Prolonged or repeated inhalation of manganese dusts may lead to manganism, a neurological disorder with symptoms similar to Parkinson's disease (tremors, rigidity, psychological disturbances).
  - **Ingestion**: Nausea, vomiting, abdominal pain. Harmful if swallowed.
  - **Skin Contact**: May cause irritation.
  - **Eye Contact**: May cause mechanical irritation.

- **Acute Toxicity**:
  - **Oral (LD50)**: 3478 mg/kg (Rat) [Source: PubChem, Sigma-Aldrich SDS]
  - **Inhalation (LC50)**: Not readily available, but classified as Category 4 (Harmful if inhaled).
  - **Dermal (LD50)**: Not readily available.
- **Skin Corrosion/Irritation**: Not classified as a skin corrosive/irritant.
- **Serious Eye Damage/Irritation**: Not classified as an eye irritant.
- **Respiratory or Skin Sensitization**: Not classified as a respiratory or skin sensitizer.
- **Germ Cell Mutagenicity**: No data available.
- **Carcinogenicity**: Not classified as a carcinogen by IARC, NTP, or OSHA.
- **Reproductive Toxicity**: No data available.
- **STOT-Single Exposure**: No data available.
- **STOT-Repeated Exposure**: May cause damage to organs (Central Nervous System, Respiratory System) through prolonged or repeated exposure. Chronic inhalation of manganese dust can lead to manganism.
- **Aspiration Hazard**: Not an aspiration hazard.

Section 12: Ecological Information

- **Ecotoxicity**: Manganese compounds can be toxic to aquatic organisms at high concentrations. Specific data for MnO_2 is limited, but general manganese toxicity should be considered.
- **Persistence and Degradability**: Inorganic substance, not readily biodegradable. Persistence in the environment is high.
- **Bioaccumulative Potential**: Manganese can bioaccumulate in some organisms, but the bioaccumulation potential of MnO_2 itself is generally low due to its insolubility.
- **Mobility in Soil**: Low mobility in soil due to low solubility.
- **Other Adverse Effects**: No other adverse environmental effects are expected.

Section 13: Disposal Considerations

- **Waste Treatment Methods**: Dispose of in accordance with federal, state, and local environmental regulations. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Ensure compliance with all applicable regulations.

Section 14: Transport Information

- **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 classified as an environmental hazard for transport.
- **Special Precautions for User**: None.

Section 15: Regulatory Information

- **Safety, Health and Environmental Regulations Specific for the Product**: Consult federal, state, and local regulations for specific requirements. This product may be subject to various regulations depending on its use and location.
  - **USA (OSHA Hazard Communication Standard, 29 CFR 1910.1200)**: Classified as a hazardous substance.
  - **Canada (WHMIS 2015)**: Classified in accordance with the Hazardous Products Regulations (HPR).
  - **European Union (REACH Regulation (EC) No $^{1907}/_{2006}$)**: Consult relevant ECHA guidance.

Section 16: Other Information

- **Date of Preparation**: March 2, 2026

- **Revision Number**: 1.0
- **Key/Legend**:
  - GHS: Globally Harmonized System of Classification and Labelling of Chemicals
  - CAS: Chemical Abstracts Service
  - LD50: Lethal Dose, 50%
  - LC50: Lethal Concentration, 50%
  - TWA: Time-Weighted Average
  - STOT: Specific Target Organ Toxicity
  - OSHA: Occupational Safety and Health Administration
  - ACGIH: American Conference of Governmental Industrial Hygienists
  - NIOSH: National Institute for Occupational Safety and Health
- **References**:
  - [1] PubChem. Manganese dioxide. Available at: https://pubchem.ncbi.nlm.nih.gov/compound/Manganese-dioxide
  - [2] Sigma-Aldrich. Safety Data Sheet: Manganese(IV) oxide. Available at: https://www.sigmaaldrich.com/US/en/sds/aldrich/529664
  - [3] ATSDR. Toxicological Profile for Manganese. Available at: https://www.atsdr.cdc.gov/toxprofiles/tp151-c2.pdf
  - [4] Fisher Scientific. Safety Data Sheet: Manganese Dioxide. Available at: https://www.fishersci.com/store/msds?partNumber=S25420A