

SAFETY DATA SHEET (SDS)

Product Name: High Purity MnO₂ for Optical Glass Manufacturing **Revision Date:** March 1, 2026

SECTION 1: Identification

1.1 Product Identifier

- **Product Name:** High Purity MnO₂ for Optical Glass Manufacturing
- **Other Means of Identification:** Manganese Dioxide, Manganese(IV) oxide, Pyrolusite, Manganese black, Manganese peroxide
- **CAS Number:** 1313-13-9
- **EC Number:** 215-202-6

1.2 Recommended Use of the Chemical and Restrictions on Use

- **Recommended Use:** Optical glass manufacturing, specialty glass compounds, precision optical coatings, high-end optics and photonics.
- **Restrictions on Use:** Not for food, drug, or household use.

1.3 Details of the Supplier of the Safety Data Sheet

- **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
- **Website:** manganesesupply.com
- **Phone/WhatsApp:** +8618273793022

1.4 Emergency Phone Number

- **Emergency Phone:** +8618273793022

SECTION 2: Hazard(s) Identification

2.1 Classification of the Substance or Mixture

- **GHS Classification (UNECE):**
 - Oxidizing Solid, Category 2 (H272)
 - Specific Target Organ Toxicity - Single Exposure (Respiratory tract irritation), Category 3 (H335)

2.2 GHS Label Elements, Including Precautionary Statements

- **Pictograms:**
 - Flame over circle (Oxidizer)
 - Exclamation mark (Irritant)
- **Signal Word:** Danger
- **Hazard Statements:**
 - H272: May intensify fire; oxidizer.
 - H335: May cause respiratory irritation.
- **Precautionary Statements:**
 - **Prevention:**
 - P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 - P220: Keep away from clothing and other combustible materials.
 - P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
 - P271: Use only outdoors or in a well-ventilated area.
 - P280: Wear protective gloves/protective clothing/eye protection/face protection.
 - **Response:**
 - P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 - P312: Call a POISON CENTER/doctor if you feel unwell.
 - P370 + P378: In case of fire: Use water spray, foam, dry chemical, or carbon dioxide to extinguish.

- **Storage:**
 - P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
 - P405: Store locked up.
- **Disposal:**
 - P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Hazards Not Otherwise Classified (HNOC)

- None known.

SECTION 3: Composition/Information on Ingredients

3.1 Substances

Chemical Name	Common Name	CAS Number	EC Number	Concentration (%)
Manganese Dioxide	Manganese(IV) oxide	1313-13-9	215-202-6	99.60 – 99.90

SECTION 4: First-Aid Measures

4.1 Description of First-Aid Measures

- **General Advice:** Consult a physician. Show this safety data sheet to the doctor in attendance.
- **If Inhaled:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Get medical attention immediately.
- **In Case of Skin Contact:** Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.
- **In Case of 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.

- **If Swallowed:** Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

- **Acute:** May cause respiratory tract irritation. Inhalation of dust may cause coughing, shortness of breath. May cause eye and skin irritation.
- **Delayed:** Chronic exposure to high levels of manganese dust by inhalation may result in central nervous system (CNS) effects, including manganism, a Parkinson's-like syndrome [1].

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

- Treat symptomatically. For chronic inhalation exposure, monitor for neurological symptoms.

SECTION 5: Fire-Fighting Measures

5.1 Extinguishing Media

- **Suitable Extinguishing Media:** Use water spray, foam, dry chemical, or carbon dioxide. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- **Unsuitable Extinguishing Media:** None known.

5.2 Specific Hazards Arising from the Chemical

- **Hazardous Combustion Products:** Manganese oxides.
- **Specific Hazards:** Oxidizer. May intensify fire. Contact with combustible material may cause fire. When heated to decomposition, may emit toxic fumes.

5.3 Special Protective Equipment and Precautions for Fire-Fighters

- Wear self-contained breathing apparatus (SCBA) for firefighting if necessary.
- Wear full protective gear.
- Move containers from fire area if you can do it without risk.

SECTION 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

- **For Non-Emergency Personnel:** Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Wear appropriate personal protective equipment (refer to Section 8).
- **For Emergency Responders:** Use personal protective equipment as required. Ventilate area.

6.2 Environmental Precautions

- Do not allow to enter drains, sewers, or watercourses. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 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

7.1 Precautions for Safe Handling

- **Protective Measures:** Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Keep away from combustible material. Wear personal protective equipment (refer to Section 8).
- **Hygiene Measures:** Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

7.2 Conditions for Safe Storage, Including Any Incompatibilities

- **Storage Conditions:** Store in a cool, dry, well-ventilated place. Keep container tightly closed. Store away from combustible materials, reducing agents, and strong acids. Store locked up.
- **Incompatible Materials:** Reducing agents, strong acids, combustible materials.

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

- **Occupational Exposure Limits (OELs):**
 - **OSHA Permissible Exposure Limit (PEL) for Manganese compounds (as Mn):**
 - Ceiling Limit: 5 mg/m³ [2]
 - **ACGIH Threshold Limit Value (TLV) for Manganese, elemental and inorganic compounds (as Mn):**
 - Inhalable fraction: 0.1 mg/m³ (TWA)
 - Respirable fraction: 0.02 mg/m³ (TWA) [3]

8.2 Appropriate Engineering Controls

- Handle in accordance with good industrial hygiene and safety practice. 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.

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

- **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:** Wear impervious protective clothing, including gloves, lab coat, or apron, as appropriate, to prevent skin contact. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
 - **Hand 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. Recommended glove materials: Nitrile rubber, Neoprene, PVC.

- **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

9.1 Information on Basic Physical and Chemical Properties

- **Appearance:** Black powder
- **Odor:** Odorless
- **Odor Threshold:** Not applicable
- **pH (5% slurry):** 6.5 – 8.0
- **Melting Point/Freezing Point:** ~535 °C (decomposes) [4]
- **Initial Boiling Point and Boiling Range:** Not applicable (decomposes before boiling)
- **Flash Point:** Not applicable
- **Evaporation Rate:** Not applicable
- **Flammability (Solid, Gas):** Non-flammable, but an oxidizer.
- **Upper/Lower Flammability or Explosive Limits:** Not applicable
- **Vapor Pressure:** Not applicable
- **Vapor Density:** Not applicable
- **Relative Density (Bulk Density):** 2.5 – 3.2 g/cm³
- **Water Solubility:** Insoluble in water [4]
- **Partition Coefficient n-octanol/water (log value):** Not applicable
- **Auto-ignition Temperature:** Not applicable

- **Decomposition Temperature:** >535 °C
- **Viscosity:** Not applicable
- **Explosive Properties:** Not explosive
- **Oxidizing Properties:** Oxidizing solid, Category 2
- **Particle Size (D50):** 2.5 – 6.0 µm
- **Loss on Ignition (LOI):** 0.5 – 1.2 %

SECTION 10: Stability and Reactivity

10.1 Reactivity

- Oxidizing agent. Reacts with reducing agents and combustible materials.

10.2 Chemical Stability

- Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions

- Reacts violently with strong reducing agents and combustible materials, potentially causing fire or explosion.

10.4 Conditions to Avoid

- Heat, open flames, ignition sources, contact with incompatible materials.

10.5 Incompatible Materials

- Reducing agents, strong acids, combustible materials.

10.6 Hazardous Decomposition Products

- Other decomposition products - No data available.
- In the event of fire: see Section 5.

SECTION 11: Toxicological Information

11.1 Information on Toxicological Effects

- **Acute Toxicity:**
 - **Oral LD50 (Rat):** > 2000 mg/kg [5]
 - **Dermal LD50 (Rabbit):** No data available
 - **Inhalation LC50 (Rat):** No data available
- **Skin Corrosion/Irritation:** May cause mild skin irritation.
- **Serious Eye Damage/Eye Irritation:** May cause mild eye irritation.
- **Respiratory or Skin Sensitization:** Not expected to be a respiratory or skin sensitizer.
- **Germ Cell Mutagenicity:** No data available.
- **Carcinogenicity:** Not classified as a carcinogen by IARC, NTP, or OSHA [6].
- **Reproductive Toxicity:** No data available.
- **STOT-Single Exposure:** May cause respiratory irritation (Category 3).
- **STOT-Repeated Exposure:** Chronic inhalation of manganese dust can lead to neurological effects (manganism) [1].
- **Aspiration Hazard:** Not an aspiration hazard.

SECTION 12: Ecological Information

12.1 Toxicity

- **Aquatic Toxicity:**
 - **Fish (LC50):** No data available for Manganese Dioxide specifically, but manganese compounds can be toxic to aquatic organisms at high concentrations.
 - **Daphnia (EC50):** No data available.
 - **Algae (EC50):** No data available.

12.2 Persistence and Degradability

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

12.3 Bioaccumulative Potential

- Manganese can bioaccumulate in some organisms, but the bioaccumulation potential of manganese dioxide specifically is low due to its insolubility.

12.4 Mobility in Soil

- Insoluble in water, so mobility in soil is expected to be low.

12.5 Other Adverse Effects

- No data available.

SECTION 13: Disposal Considerations

13.1 Waste Treatment Methods

- **Product:** Dispose of in accordance with local, regional, national, and international regulations. Contact a licensed professional waste disposal service to dispose of this material. Do not allow product to enter drains.
- **Contaminated Packaging:** Dispose of as unused product.

SECTION 14: Transport Information

14.1 UN Number

- UN 3137

14.2 UN Proper Shipping Name

- OXIDIZING SOLID, N.O.S. (Manganese Dioxide)

14.3 Transport Hazard Class(es)

- **ADR/RID/IMDG/IATA:** 5.1 (Oxidizing substances)

14.4 Packing Group

- II

14.5 Environmental Hazards

- Not classified as environmentally hazardous for transport.

14.6 Special Precautions for User

- Refer to sections 6-8 for personal protective equipment and emergency procedures.

SECTION 15: Regulatory Information

15.1 Safety, Health, and Environmental Regulations Specific for the Substance or Mixture

- **USA:**
 - **TSCA:** All components are listed on the TSCA inventory.
 - **SARA 302:** No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
 - **SARA 313:** The following components are subject to reporting levels established by SARA Title III, Section 313:
 - Manganese compounds (CAS No. 7439-96-5, includes Manganese Dioxide) [7]
 - **California Proposition 65:** This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
- **EU:**
 - **REACH:** All components are pre-registered or registered under REACH.
 - **CLP Regulation:** Classified and labeled according to Regulation (EC) No 1272/2008 (CLP).

SECTION 16: Other Information

16.1 Date of Preparation or Last Revision

- **Date of Revision:** March 1, 2026

16.2 Key to Abbreviations and Acronyms Used in the SDS

- **ACGIH:** American Conference of Governmental Industrial Hygienists

- **ADR:** European Agreement concerning the International Carriage of Dangerous Goods by Road
- **CAS:** Chemical Abstracts Service
- **CLP:** Classification, Labelling and Packaging (Regulation)
- **EC:** European Community
- **EC50:** Half maximal effective concentration
- **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
- **LC50:** Lethal concentration, 50%
- **LD50:** Lethal dose, 50%
- **LOI:** Loss on Ignition
- **MnO₂:** Manganese Dioxide
- **MSDS:** Material Safety Data Sheet
- **N.O.S.:** Not Otherwise Specified
- **NIOSH:** National Institute for Occupational Safety and Health
- **NTP:** National Toxicology Program
- **OEL:** Occupational Exposure Limit
- **OSHA:** Occupational Safety and Health Administration
- **PEL:** Permissible Exposure Limit
- **PPE:** Personal Protective Equipment
- **REACH:** Registration, Evaluation, Authorisation and Restriction of Chemicals
- **RID:** Regulations concerning the International Carriage of Dangerous Goods by Rail
- **SARA:** Superfund Amendments and Reauthorization Act
- **SCBA:** Self-Contained Breathing Apparatus
- **SDS:** Safety Data Sheet
- **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

16.3 References [1] ATSDR. Toxicological Profile for Manganese. 2012. Available from: <https://www.atsdr.cdc.gov/toxprofiles/tp151-c2.pdf> [2] OSHA. Permissible Exposure Limits (PELs) - Table Z-1. Available from: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1000TABLEZ1> [3] ACGIH. Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. Latest Edition. [4] PubChem. Manganese dioxide | MnO₂ | CID 14801. Available from: <https://pubchem.ncbi.nlm.nih.gov/compound/Manganese-dioxide> [5] Sigma-Aldrich. Safety Data Sheet: Manganese(IV) oxide. Available from: <https://www.sigmaaldrich.com/US/en/sds/aldrich/529664> [6] IARC, NTP, OSHA Carcinogen Lists. Not listed. [7] EPA. SARA Title III, Section 313. Available from: <https://www.epa.gov/toxics-release-inventory-tri-program/sara-title-iii-section-313>