

# Safety Data Sheet (SDS)

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## SECTION 1: Identification of the substance/mixture and of the company/undertaking

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### 1.1. Product identifier

- **Product name:** High-Purity MnO<sub>2</sub> Catalyst for Air Purifier Formaldehyde Removal
- **Chemical name:** Manganese Dioxide
- **CAS No.:** 1313-13-9 (General for Manganese Dioxide)
- **EC No.:** 215-202-6 (General for Manganese Dioxide)

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

- **Identified uses:** Catalyst for formaldehyde decomposition in air purifiers, industrial air purification units, residential air purifiers, commercial HVAC systems, new house air treatment equipment, automotive cabin air filters.
- **Uses advised against:** No specific uses advised against identified.

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

### 1.4. Emergency telephone number

- **Emergency phone:** +8618273793022 (General Emergency Contact)

## SECTION 2: Hazards identification

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### 2.1. Classification of the substance or mixture

- **GHS Classification (according to various SDS sources):**
  - Acute toxicity, Oral (Category 4) - H302
  - Acute toxicity, Inhalation (Category 4) - H332
  - Specific target organ toxicity - repeated exposure (Category 2) - H373 (Brain)
  - Oxidizing solid (Category 2) - H272 (May intensify fire; oxidizer)

### 2.2. Label elements

- **Pictogram(s):** GHS07 (Exclamation Mark), GHS03 (Flame over Circle), GHS08 (Health Hazard)
- **Signal word:** Warning / Danger (depending on specific hazard)
- **Hazard statement(s):**
  - H272: May intensify fire; oxidizer.
  - H302: Harmful if swallowed.
  - H332: Harmful if inhaled.
  - H373: May cause damage to organs (Brain) through prolonged or repeated exposure if inhaled.

- **Precautionary statement(s):**

- **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.
- P260: Do not breathe dust/fume/gas/mist/vapours/spray.
- P264: Wash face, hands and any exposed skin 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.
- P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

- **Storage:**

- P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

- **Disposal:**

- P501: Dispose of contents/container to an approved waste disposal plant.

### 2.3. Other hazards

- Dust may cause mechanical irritation to eyes and respiratory tract. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

## SECTION 3: Composition/information on ingredients

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### 3.1. Substances

- **Chemical name:** Manganese Dioxide
- **Common name/Synonyms:** Manganese(IV) oxide, Pyrolusite
- **CAS No.:** 1313-13-9
- **EC No.:** 215-202-6
- **Concentration:** 85-95% (MnO<sub>2</sub> Content)
- **Impurities:** Not specified, assumed to be typical for industrial grade manganese dioxide catalyst.

## SECTION 4: First aid measures

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### 4.1. Description of first aid measures

- **General advice:** Consult a physician. Show this safety data sheet to the doctor in attendance.
- **If inhaled:** If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
- **In case of skin contact:** Wash off with soap and plenty of water. Consult a physician.
- **In case of eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- **If swallowed:** Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Consult a physician.

### 4.2. Most important symptoms and effects, both acute and delayed

- The most important known symptoms and effects are described in the labelling (Section 2.2) and/or in Section 11.

#### 4.3. Indication of any immediate medical attention and special treatment needed

- No data available.

## SECTION 5: Firefighting measures

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### 5.1. Extinguishing media

- **Suitable extinguishing media:** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- **Unsuitable extinguishing media:** No data available.

### 5.2. Special hazards arising from the substance or mixture

- Manganese dioxide is a strong oxidizer; fire hazard when in contact with combustible materials. May intensify fire. When heated to decomposition, may emit toxic fumes of manganese/manganese oxides.

### 5.3. Advice for firefighters

- Wear self-contained breathing apparatus for firefighting if necessary.

## SECTION 6: Accidental release measures

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### 6.1. Personal precautions, protective equipment and emergency procedures

- Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

### 6.2. Environmental precautions

- Do not let product enter drains. Discharge into the environment must be avoided.

### 6.3. Methods and material for containment and cleaning up

- Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

### 6.4. Reference to other sections

- For disposal see section 13.

## SECTION 7: Handling and storage

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### 7.1. 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. Keep away from sources of ignition - No smoking. Keep away from combustible material.

### 7.2. Conditions for safe storage, including any incompatibilities

- Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Store away from strong reducing agents, strong acids, organic materials, and combustible materials.

### 7.3. Specific end use(s)

- Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

## SECTION 8: Exposure controls/personal protection

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### 8.1. Control parameters

- **Occupational exposure limits:** (General for Manganese and its inorganic compounds)

- **OSHA PEL:** 5 mg/m<sup>3</sup> (Ceiling, as Mn)
- **ACGIH TLV:** 0.02 mg/m<sup>3</sup> (Respirable fraction, as Mn), 0.1 mg/m<sup>3</sup> (Inhalable fraction, as Mn)
- **NIOSH REL:** 1 mg/m<sup>3</sup> (TWA, as Mn), 3 mg/m<sup>3</sup> (STEL, as Mn)

## 8.2. Exposure controls

- **Appropriate engineering controls:** Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
- **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:** Complete suit protecting against chemicals, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
  - **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).
  - **Control of environmental exposure:** Do not let product enter drains.

## SECTION 9: Physical and chemical properties

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### 9.1. Information on basic physical and chemical properties

- **Appearance:** Black powder
- **Odor:** Odorless
- **Odor Threshold:** Not applicable
- **pH:** Not applicable (insoluble in water)
- **Melting point/freezing point:** ~535 °C (decomposes)
- **Initial boiling point and boiling range:** Not applicable
- **Flash point:** Not applicable
- **Evaporation rate:** Not applicable
- **Flammability (solid, gas):** Non-flammable, but an oxidizer
- **Upper/lower flammability or explosive limits:** Not applicable
- **Vapour pressure:** Not applicable
- **Vapour density:** Not applicable
- **Relative density:** 5.026 g/cm<sup>3</sup> (approximate)
- **Water solubility:** Insoluble
- **Partition coefficient: n-octanol/water:** Not applicable
- **Auto-ignition temperature:** Not applicable
- **Decomposition temperature:** >535 °C
- **Viscosity:** Not applicable (solid)
- **Explosive properties:** Not explosive
- **Oxidizing properties:** Oxidizing solid (Category 2)

### 9.2. Other information

- **MnO<sub>2</sub> Content:** 85–95%
- **Crystal Type:**  $\gamma$ -MnO<sub>2</sub> / Activated MnO<sub>2</sub>
- **Particle Size:** 100–500 mesh (customizable)
- **Surface Area (BET):** 80–250 m<sup>2</sup>/g
- **Bulk Density:** 0.4–0.8 g/cm<sup>3</sup>
- **Moisture Content:** ≤ 3%
- **Formaldehyde Removal Efficiency:** ≥ 90% (1 ppm, 25°C)
- **Operating Temperature:** 0–80°C
- **Service Life:** 12–36 months (application dependent)

## SECTION 10: Stability and reactivity

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### 10.1. Reactivity

- Oxidizing agent. Reacts with reducing agents.

### 10.2. Chemical stability

- Stable under recommended storage conditions.

### 10.3. Possibility of hazardous reactions

- Reacts violently with strong reducing agents, strong acids, and combustible organic materials.

### 10.4. Conditions to avoid

- Heat, flames, sparks, direct sunlight, incompatible materials.

### 10.5. Incompatible materials

- Strong reducing agents, strong acids, organic materials, combustible materials.

### 10.6. Hazardous decomposition products

- Hazardous decomposition products formed under fire conditions: Manganese/manganese oxides. Other decomposition products - no data available.

## SECTION 11: Toxicological information

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### 11.1. Information on toxicological effects

- **Acute toxicity:**
  - **Oral LD50:** >3478 mg/kg (Rat) [4]
  - **Inhalation LC50:** No data available, but harmful if inhaled.
  - **Dermal LD50:** No data available.
- **Skin corrosion/irritation:** May cause mild skin irritation.
- **Serious eye damage/eye irritation:** May cause mechanical irritation.
- **Respiratory or skin sensitisation:** No data available.
- **Germ cell mutagenicity:** No data available.
- **Carcinogenicity:** Not classified as a carcinogen by IARC, ACGIH, NTP, or OSHA.
- **Reproductive toxicity:** No data available.
- **STOT-single exposure:** No data available.
- **STOT-repeated exposure:** May cause damage to organs (Brain) through prolonged or repeated exposure if inhaled.

- **Aspiration hazard:** No data available.
- **Additional Information:** Repeated or prolonged exposure to manganese dusts or fumes may cause manganism, a neurological disorder with symptoms similar to Parkinson's disease.

## SECTION 12: Ecological information

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### 12.1. Toxicity

- **Toxicity to fish:** No data available.
- **Toxicity to daphnia and other aquatic invertebrates:** No data available.
- **Toxicity to algae:** No data available.

### 12.2. Persistence and degradability

- Manganese dioxide is an inorganic compound and is not expected to be biodegradable.

### 12.3. Bioaccumulative potential

- Manganese is a naturally occurring element. Bioaccumulation in aquatic organisms is possible.

### 12.4. Mobility in soil

- No data available.

### 12.5. Results of PBT and vPvB assessment

- This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### 12.6. Other adverse effects

- An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

## SECTION 13: Disposal considerations

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### 13.1. 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. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.
- **Contaminated packaging:** Dispose of as unused product.

## SECTION 14: Transport information

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### 14.1. UN number

- **ADR/RID:** UN 3137
- **IMDG:** UN 3137
- **IATA:** UN 3137

### 14.2. UN proper shipping name

- **ADR/RID:** OXIDIZING SOLID, N.O.S. (Manganese dioxide)
- **IMDG:** OXIDIZING SOLID, N.O.S. (Manganese dioxide)
- **IATA:** OXIDIZING SOLID, N.O.S. (Manganese dioxide)

### 14.3. Transport hazard class(es)

- **ADR/RID:** 5.1
- **IMDG:** 5.1
- **IATA:** 5.1

#### 14.4. Packing group

- **ADR/RID:** II
- **IMDG:** II
- **IATA:** II

#### 14.5. Environmental hazards

- **ADR/RID:** No
- **IMDG Marine pollutant:** No
- **IATA:** No

#### 14.6. Special precautions for user

- No data available.

## SECTION 15: Regulatory information

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### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

- **EU Regulations:** (e.g., REACH, CLP)
- **US Federal Regulations:** (e.g., TSCA, SARA, CERCLA)
- **State Regulations:** (e.g., California Proposition 65)
- **International Regulations:** (e.g., GHS)

### 15.2. Chemical safety assessment

- For this product a chemical safety assessment was not carried out.

## SECTION 16: Other information

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### 16.1. Date of preparation or last revision

- **Date:** March 03, 2026

### 16.2. Abbreviations and acronyms

- **ADR:** European Agreement concerning the International Carriage of Dangerous Goods by Road
- **CAS:** Chemical Abstracts Service
- **CLP:** Classification, Labelling and Packaging
- **EC:** European Community
- **GHS:** Globally Harmonized System of Classification and Labelling of Chemicals
- **IATA:** International Air Transport Association
- **IMDG:** International Maritime Dangerous Goods
- **LC50:** Lethal Concentration 50%
- **LD50:** Lethal Dose 50%
- **MSDS:** Material Safety Data Sheet
- **PBT:** Persistent, Bioaccumulative and Toxic
- **PEL:** Permissible Exposure Limit

- **REACH:** Registration, Evaluation, Authorisation and Restriction of Chemicals
- **RID:** Regulations concerning the International Carriage of Dangerous Goods by Rail
- **SDS:** Safety Data Sheet
- **STEL:** Short-Term Exposure Limit
- **STOT:** Specific Target Organ Toxicity
- **TWA:** Time Weighted Average
- **vPvB:** very Persistent and very Bioaccumulative

### 16.3. Key literature references and sources for data

- [1] Fisher Scientific SDS for Manganese Dioxide: <https://www.fishersci.com/store/msds?partNumber=S25420A&productDescription=MANGANESE+DIOXIDE+PWD+500G+LG&vendorId=VN00115888&countryCode=U>
- [2] Sigma-Aldrich SDS for Manganese Dioxide: <https://www.sigmaaldrich.com/US/en/sds/aldrich/529664>
- [3] Flinn Scientific SDS for Manganese Dioxide: [https://www.flinnsci.com/sds\\_489-manganese-dioxide/sds\\_489/](https://www.flinnsci.com/sds_489-manganese-dioxide/sds_489/)
- [4] NIST SDS for Manganese Dioxide: <https://tsapps.nist.gov/srmext/msds/25D-MSDS.pdf>
- [5] New Jersey Department of Health Hazardous Substance Fact Sheet - Manganese: <https://nj.gov/health/eoh/rtkweb/documents/fs/1155.pdf>

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