

1. Identification

Product identifier TRONOX® Manganese Dioxide

Other means of identification

SDS number B-5019

Product code Manganese dioxide

Synonyms Manganese oxide (MnO₂)

Recommended use Manufacture of alkaline batteries.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company name Tronox LLC

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USA

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2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Acute toxicity, oral Category 4
Acute toxicity, inhalation Category 4
Specific target organ toxicity, repeated exposure Category 2 (brain)

OSHA defined hazards Not classified.

Label elements



Signal word Warning

Hazard statement Harmful if swallowed. Harmful if inhaled. May cause damage to organs (brain) through prolonged or repeated exposure by inhalation.

Precautionary statement

Prevention Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust.

Response If swallowed: Call a poison center/doctor if you feel unwell. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Manganese dioxide	Manganese oxide (MnO ₂)	1313-13-9	92

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Get medical attention if any discomfort continues.
Skin contact	Flush skin thoroughly with water. Get medical attention if irritation develops and persists.
Eye contact	Dust in the eyes: Do not rub eyes. Remove contact lenses, if present and easy to do. Rinse with water. Get medical attention if irritation develops or persists.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Never give anything by mouth to an unconscious person. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Coughing. May cause irritation through mechanical abrasion.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	None.
Specific hazards arising from the chemical	The substance decomposes on heating above 535 °C producing manganese(III)oxide and oxygen.
Special protective equipment and precautions for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Fire fighting equipment/instructions	Use standard firefighting procedures and consider the hazards of other involved materials.
Specific methods	Move container from fire area if it can be done without risk.
General fire hazards	Not itself combustible but assists fire in burning materials. The substance decomposes on heating above 535 °C producing manganese(III)oxide and oxygen , which increases fire hazard.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Avoid inhalation of dust and contact with skin and eyes. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Avoid dust formation.
Methods and materials for containment and cleaning up	Collect powder using special dust vacuum cleaner with particle filter or carefully sweep into closed container. For waste disposal, see Section 13 of the SDS.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water.

7. Handling and storage

Precautions for safe handling	Avoid dust formation. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Avoid inhalation of dust and contact with skin and eyes. Use only with adequate ventilation. Wash thoroughly after handling.
Conditions for safe storage, including any incompatibilities	Store in tightly closed original container in a dry and cool place. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
Manganese dioxide (CAS 1313-13-9)	Ceiling	5 mg/m ³

US. ACGIH Threshold Limit Values

Material	Type	Value	Form
Manganese dioxide (CAS 1313-13-9)	TWA	0.1 mg/m ³	Inhalable fraction.
		0.02 mg/m ³	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value	Form
Manganese dioxide (CAS 1313-13-9)	STEL	3 mg/m ³	Fume.
	TWA	1 mg/m ³	Fume.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Ventilate as needed to control airborne dust. Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear dust-resistant safety goggles where there is danger of eye contact.
Skin protection	
Hand protection	Wear protective gloves. In full contact: Glove material: Nitrile rubber. Layer thickness: 0.11 mm. Breakthrough time: >480 min.
Other	Wear suitable protective clothing.
Respiratory protection	When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Do not breathe dust. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Powder.
Color	Black.
Odor	Odorless.
Odor threshold	Not applicable.
pH	Not available.
Melting point/freezing point	> 723 K
Initial boiling point and boiling range	Not available.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non flammable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	Not applicable.
Vapor density	Not applicable.
Relative density	Not available.

Solubility(ies)

Solubility (water)	0.07 mg/l
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Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	Not available.
Decomposition temperature	995 °F (535 °C)
Viscosity	Not available.
Other information	
Bulk density	86 lb/ft ³
Explosive properties	Not explosive.
Molecular formula	MnO ₂
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal temperature conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid incompatible materials and intense heat. When subjected to intense heat, temperature above 535°C, it will release oxygen which would increase the intensity of a fire.
Incompatible materials	Organic material. Combustible material. Reducing agents. Aluminum. Azides. Chlorates. Oxidizing agents. Phosphides. Strong acids. Halogens. Sulfur.
Hazardous decomposition products	The substance decomposes on heating above 535 °C producing manganese(III)oxide and oxygen.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful by inhalation. Dust may irritate respiratory system.
Skin contact	Dust may irritate skin.
Eye contact	Dust may irritate the eyes.
Ingestion	Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Dusts or powder may irritate the respiratory tract, skin and eyes. Coughing.

Information on toxicological effects

Acute toxicity Inhalation of manganese oxide dust/fumes may cause metal fume fever. The symptoms are shivering, fever, malaise and muscular pain. Harmful if inhaled or swallowed.

Product	Species	Test Results
Manganese dioxide (CAS 1313-13-9)		
Acute		
<i>Oral</i>		
LD50	Rat	>= 3478 mg/kg
Skin corrosion/irritation	Based on available data, the classification criteria are not met.	
Serious eye damage/eye irritation	Based on available data, the classification criteria are not met.	
Respiratory or skin sensitization		
Respiratory sensitization	Based on available data, the classification criteria are not met.	
Skin sensitization	Not a skin sensitizer.	
Germ cell mutagenicity	Based on available data, the classification criteria are not met.	
Carcinogenicity	This material is not classified as a carcinogen by IARC, ACGIH, NTP or OSHA.	
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)		
Not listed.		
Reproductive toxicity	Based on available data, the classification criteria are not met.	
Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.	

Specific target organ toxicity - repeated exposure	May cause damage to the following organs through prolonged or repeated exposure: Brain.
Aspiration hazard	Not classified.
Further information	Chronic exposure to breathing low levels of manganese dust or fume over a long period of time can result in "manganism," a disease of the central nervous system similar to Parkinson's Disease, gait impairment, muscle spasms and behavioral changes. Frequent inhalation of dust over a long period of time increases the risk of developing asthma, chronic lung diseases, and skin irritation.

12. Ecological information

Ecotoxicity	The product is not expected to be hazardous to the environment.
Persistence and degradability	The degradability of the product has not been stated.
Bioaccumulative potential	No data available on bioaccumulation.
Bioconcentration factor (BCF)	
0, Not applicable.	
Mobility in soil	The product is insoluble in water and will sediment in water systems.
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. Disposal considerations

Disposal instructions	Dispose of this material and its container to hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	Not regulated.
Waste from residues / unused products	Dispose of in accordance with local regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT	Not regulated as dangerous goods.
IATA	Not regulated as dangerous goods.
IMDG	Not regulated as dangerous goods.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.	
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.	
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	Not listed.	
CERCLA Hazardous Substance List (40 CFR 302.4)	Manganese dioxide (CAS 1313-13-9)	LISTED
Superfund Amendments and Reauthorization Act of 1986 (SARA)		
Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No	
SARA 302 Extremely hazardous substance	Not listed.	
SARA 311/312 Hazardous chemical	Yes	

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Manganese dioxide	1313-13-9	92

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Manganese dioxide (CAS 1313-13-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Manganese dioxide (CAS 1313-13-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Manganese dioxide (CAS 1313-13-9)

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	27-March-2015
Revision date	-
Version #	01
Further information	HMIS® is a registered trade and service mark of the NPCA.
HMIS® ratings	Health: 2* Flammability: 0 Physical hazard: 0

List of abbreviations

References	Chemical safety report. EPA: Acquire database NLM: Hazardous Substances Data Base US. IARC Monographs on Occupational Exposures to Chemical Agents
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Disclaimer The information in the sheet was written based on the best knowledge and experience currently available.