

1. Identification

Product identifier	Tronox® Ultrafine Electrolytic Manganese Dioxide (UF-EMD)	
Other means of identification		
SDS number	B-5019	
Product code	Manganese dioxide	
Recommended use	Manufacture of alkaline batteries.	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Company name	Tronox LLC	
Address	3301 NW 150th Street Oklahoma City, OK 73134 USA	
Email	ChemProdSteward@tronox.com	
Telephone	+1-405-775-5000 (24-hours)	
Emergency telephone number	+1-877-358-7421	
	+1-760-476-3962 (Access code: 333318)	

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.	
Precautionary statement		
Prevention	Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area.	
Response	If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If inhaled: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention 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

Mixtures

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

Calcium sulfate	7778-18-9	1.5
Manganese sulfate	7785-87-7	1.5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

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	Contact with an open wound can prevent healing. Clean wound of contamination thoroughly. 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)

Components	Type	Value	Form
Calcium sulfate (CAS 7778-18-9)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Manganese dioxide (CAS 1313-13-9)	Ceiling	5 mg/m3	
Manganese sulfate (CAS 7785-87-7)	Ceiling	5 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Calcium sulfate (CAS 7778-18-9)	TWA	10 mg/m3	Inhalable fraction.
Manganese dioxide (CAS 1313-13-9)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Manganese sulfate (CAS 7785-87-7)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Calcium sulfate (CAS 7778-18-9)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Manganese dioxide (CAS 1313-13-9)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
Manganese sulfate (CAS 7785-87-7)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	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

Powder.

Physical state

Solid.

Form

Powder.

Color

Black.

Odor

Odorless.

Odor threshold	Not available.
pH	5 - 7 Typical.
Melting point/freezing point	2450 °F (1343.33 °C) / Not applicable.
Initial boiling point and boiling range	Not applicable.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Not available.
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	0.5
Solubility(ies)	
Solubility (water)	Negligible.
Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	995 °F (535 °C)
Viscosity	Not applicable.
Other information	
Bulk density	26.8 lb/ft³
Flammability	Not applicable.

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.

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.
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 available.

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
Manganese sulfate (CAS 7785-87-7)	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
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SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Manganese dioxide	1313-13-9	92
Manganese sulfate	7785-87-7	1.5

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

Manganese dioxide (CAS 1313-13-9)
Manganese sulfate (CAS 7785-87-7)

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

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.
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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.
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US. Massachusetts RTK - Substance List

Calcium sulfate (CAS 7778-18-9)

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

Calcium sulfate (CAS 7778-18-9)
Manganese dioxide (CAS 1313-13-9)
Manganese sulfate (CAS 7785-87-7)

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

Calcium sulfate (CAS 7778-18-9)

US. Rhode Island RTK

Manganese dioxide (CAS 1313-13-9)
Manganese sulfate (CAS 7785-87-7)

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

Country(s) or region	Inventory name	On inventory (yes/no)*
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: 1 Physical hazard: 1

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.
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