

Material Safety Datasheet (MSDS) for Strontium Manganese Oxide (SMO)

SMO is composed of following oxides

- Strontium oxide (SrO)

- Manganese oxide
 - o MnO
 - o MnO₂
 - o Mn₂O₃
 - o Mn₃O₄

The MSDS for all the individual oxides is provided in this document.

Please turn to next page for individual MSDSs.

MATERIAL SAFETY DATA SHEET

Date Printed: 02/28/2007

Date Updated: 02/05/2006

Version 1.5

Section 1 - Product and Company Information

Product Name STRONTIUM OXIDE, 99.9%
Product Number 415138
Brand ALDRICH

Company Sigma-Aldrich
Address 3050 Spruce Street
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
STRONTIUM OXIDE	1314-11-0	No

Formula SrO

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Corrosive.

Reacts violently with water. Causes burns.

HMIS RATING

HEALTH: 3

FLAMMABILITY: 0

REACTIVITY: 3

SPECIAL HAZARD(S): Water reactive

NFPA RATING

HEALTH: 3

FLAMMABILITY: 0

REACTIVITY: 3

SPECIAL HAZARD(S): Water reactive

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes.

Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

N/A

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide. Dry chemical powder.

Unsuitable: Do not use water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Store in a cool dry place. Handle and store under nitrogen.

Incompatible Materials: Do not allow contact with water

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering

controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	103.62 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	4.7 g/cm ³	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Water.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Nature of decomposition products not known.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

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. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Corrosive solid, basic, inorganic, n.o.s.
UN#: 3262
Class: 8
Packing Group: Packing Group II
Hazard Label: Corrosive
PIH: Not PIH

IATA

Proper Shipping Name: Corrosive solid, basic, inorganic, n.o.s.
IATA UN Number: 3262
Hazard Class: 8
Packing Group: II

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: C
Indication of Danger: Corrosive.
R: 14-34
Risk Statements: Reacts violently with water. Causes burns.
S: 26-30-36/37
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Never add water to this product. Wear suitable protective clothing and gloves.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive.

Risk Statements: Reacts violently with water. Causes burns.

Safety Statements: Never add water to this product. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing and gloves.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

Manganese Oxide MnO



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MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer/Supplier:

ESPI Metals

1050 Benson Way, Ashland, OR 97520

Toll Free (800) 638-2581 * Fax (541) 488-8313

E-Mail: sales@espimetals.com

Product Name: Manganese Oxide

Formula: MnO

CAS Number: 1344-43-0

II. HAZARDOUS INGREDIENTS

Hazardous Components: Manganese Oxide

Percent (%): 0-100

OSHA PEL: 5 mg (Mn)/m³

ACGIH TLV: 0.2 mg (Mn)/m³

HMIS Ratings:

Health: 1

Flammability: 0

Reactivity: 0

III. PHYSICAL DATA

Boiling Point: N/E

Melting Point: N/E

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800.638.2581 toll-free

541.488.8313 fax
800.488.0060 toll-free fax

sales@espimetals.com

Precious Metal Prices

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	Price	Change	High	
Gold	1245.80	-2.80	1253.30	
Silver	20.03	-0.14	20.36	
Platinum	1432.00	+0.00	1447.00	
Palladium	735.00	-7.00	749.00	

Specific Gravity: 5.43 -5.46 g/cc
Solubility in H₂O: Insoluble
Appearance and Odor: Green powder, no odor.

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Autoignition Temperature: N/E

Flammable Limits: Upper: N/A **Lower:** N/A

Extinguishing Media: Use suitable extinguishing media for surrounding material and type of fire.

Special Fire Fighting Procedures: Firefighters must wear full face, self contained breathing apparatus and full protective clothing to prevent contact with skin and eyes.

Unusual Fire & Explosion Hazards: None known

V. HEALTH HAZARD INFORMATION

Health Hazards:

To the best of our knowledge the chemical, physical and toxicological properties of manganese oxide have not been thoroughly investigated and recorded.

Some manganese compounds are experimental tumorigens. They can cause central nervous and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia (Sax, Dangerous Properties of Industrial Materials).

Acute Effects:

Inhalation: May cause irritation of the respiratory tract and mucous membranes, increase the incidence of upper respiratory tract and pulmonary infections. May cause metal fume fever. May also cause emphysema and acute pulmonary edema.

Ingestion: Absorption of manganese compounds from the gastrointestinal tract is poor under normal conditions. May cause abdominal pain and nausea.

Skin: May cause irritation.

Eye: May cause irritation.

Chronic Effects:

Inhalation: May cause pulmonary pneumonitis, manganism (psychosis and neurological disorders affecting the central nervous system).

Ingestion: May cause manganism.

Skin: May cause dermatitis.

Eye: May cause conjunctivitis.

Target Organs: May affect the central nervous system, respiratory system, liver and reproductive system.

Medical Conditions Generally Aggravated By Exposure: Pre-existing respiratory disorders.

Carcinogenicity: NTP: No **IARC:** No **OSHA:** No

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EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove victim to fresh air, keep warm and quiet, give oxygen if breathing is difficult and seek medical attention immediately.

INGESTION: Give 1-2 glasses of water or milk and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with soap and water. Seek medical attention.

EYE: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: No data

Incompatibility (Material to Avoid): Strong oxidizing agents

Hazardous Decomposition Products: Manganese fume

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation. Sweep or vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

Waste Disposal Method: Dispose of in accordance with all Local, State and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH-approved dust respirator.

Ventilation: Use local exhaust to maintain concentration at or below the PEL, TLV. Mechanical exhaust is not recommended.

Eye Protection: Safety glasses

Protective Gloves: Impervious gloves

Other Protective Clothing or Equipment: Protective gear suitable to prevent contamination.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Listed: Yes

DOT Regulations:

Hazard Class: None

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

Issued by: S. Dierks

Revised/Verified: August 2011

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Manganese Oxide MnO₂



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MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer/Supplier:

ESPI Metals

1050 Benson Way, Ashland, OR 97520

Toll Free (800) 638-2581 * Fax (541) 488-8313

E-Mail: sales@espimetals.com

Product Name: Manganese Oxide (Manganese IV Oxide)

Formula: MnO₂

CAS Number: 1313-13-9

II. HAZARDOUS INGREDIENTS

Hazardous Components: Manganese Oxide

Percent (%): 0-100

OSHA PEL: 5 mg (Mn)/m³

ACGIH TLV: 0.2 mg (Mn)/m³

HMIS Ratings:

Health: 1

Flammability: 0

Reactivity: 2

III. PHYSICAL DATA

Boiling Point: N/E

Melting Point: 535 °C

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Gold	▼ 1245.80	-2.80	1253.30	
Silver	▼ 20.00	-0.17	20.36	
Platinum	▼ 1431.00	-1.00	1447.00	
Palladium	▼ 735.00	-7.00	749.00	

Specific Gravity: 5.026 g/cc
Solubility in H₂O: Insoluble
Appearance and Odor: Black powder, no odor.

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Autoignition Temperature: N/E

Flammable Limits: Upper: N/A **Lower:** N/A

Extinguishing Media: Use suitable extinguishing media for surrounding material and type of fire.

Special Fire Fighting Procedures: Wear NIOSH/MSHA approved self contained breathing apparatus, protective clothing, boots and gloves. If without risk, remove material from fire area.

Unusual Fire & Explosion Hazards: This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Promotes fire.

V. HEALTH HAZARD INFORMATION

Health Hazards:

To the best of our knowledge the chemical, physical and toxicological properties of manganese oxide have not been thoroughly investigated and recorded.

Some manganese compounds are experimental tumorigens. They can cause central nervous and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia (Sax, Dangerous Properties of Industrial Materials).

Acute Effects:

Inhalation: May cause irritation of the respiratory tract and mucous membranes, increase the incidence of upper respiratory tract and pulmonary infections. May cause metal fume fever. May also cause emphysema and acute pulmonary edema.

Ingestion: Absorption of manganese compounds from the gastrointestinal tract is poor under normal conditions. May cause abdominal pain and nausea.

Skin: May cause irritation.

Eye: May cause irritation.

Chronic Effects:

Inhalation: May cause pulmonary pneumonitis, manganism (psychosis and neurological disorders effecting the central nervous system).

Ingestion: May cause manganism.

Skin: May cause dermatitis.

Eye: May cause conjunctivitis.

Target Organs: May affect the central nervous system, respiratory system, liver, reproductive system.

Carcinogenicity: NTP: No **IARC:** No **OSHA:** No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove victim to fresh air; keep warm and quiet; give oxygen if breathing is difficult and seek

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medical attention immediately.

INGESTION: Give 1-2 glasses of water or milk and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing; brush material off skin; wash affected area with soap and water. Seek medical attention.

EYE: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: No data

Incompatibility (Material to Avoid): Reducing agents, easily oxidized materials, organic materials, acids, aluminum powder, interhalogens.

Hazardous Decomposition Products: Toxic metal oxide fumes.

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation and extinguish sources of ignition. Scoop up or vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust. Use non-sparking tools.

Waste Disposal Method: Dispose of in accordance with Federal, State and Local regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH approved respirator.

Ventilation: Use local exhaust to maintain concentration at or below the PEL, TLV. Mechanical exhaust is not recommended.

Eye Protection: Safety glasses

Protective Gloves: Impervious gloves

Other Protective Equipment: Protective gear suitable to prevent contamination.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Minimize dust generation and accumulation. Ensure good ventilation at the workplace.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Listed: Yes

DOT Regulations:

Hazard Class: None

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

Issued By: S. Dierks

Revised/Verified: August 2011

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Manganese Oxide Mn₂O₃



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Manufacturer/Supplier:

ESPI Metals

1050 Benson Way, Ashland, OR 97520

Toll Free (800) 638-2581 * Fax (541) 488-8313

E-Mail: sales@espimetals.com

Product Name: Manganese Oxide (Manganese III Oxide)

Formula: Mn₂O₃

CAS Number: 1317-34-6

II. HAZARDOUS INGREDIENTS

Hazardous Components: Manganese Oxide

Percent (%): 0-100

OSHA PEL: 5 mg (Mn)/m³

ACGIH TLV: 0.2 mg (Mn)/m³

HMIS Ratings:

Health: 1

Flammability: 0

Reactivity: 0

III. PHYSICAL DATA

Boiling Point: N/E

Melting Point: N/E

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Precious Metal Prices

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Gold	1245.80	-2.80	1253.30	
Silver	20.03	-0.14	20.36	
Platinum	1432.00	+0.00	1447.00	
Palladium	735.00	-7.00	749.00	

Specific Gravity: 4.50 gm/cc
Solubility in H₂O: Insoluble
Appearance and Odor: Black crystalline powder

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Autoignition Temperature: N/A

Flammable Limits: Upper: N/A **Lower:** N/A

Extinguishing Media: Use suitable extinguishing media for surrounding material and type of fire.

Special Fire Fighting Procedures: Firefighters must wear full face, self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes.

Unusual Fire & Explosion Hazards: May emit toxic fumes when heated to decomposition.

V. HEALTH HAZARD INFORMATION

Health Hazards:

To the best of our knowledge the chemical, physical and toxicological properties of manganese oxide have not been thoroughly investigated and recorded.

Some manganese compounds are experimental tumorigens. They can cause central nervous and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia (Sax, Dangerous Properties of Industrial Materials).

Acute Effects:

Inhalation: May cause irritation of the respiratory tract and mucous membranes, increase the incidence of upper respiratory tract and pulmonary infections. May cause metal fume fever. May also cause emphysema and acute pulmonary edema.

Ingestion: Absorption of manganese compounds from the gastrointestinal tract is poor under normal conditions. May cause abdominal pain and nausea.

Skin: May cause irritation.

Eye: May cause irritation.

Chronic Effects:

Inhalation: May cause pulmonary pneumonitis, manganism (psychosis and neurological disorders effecting the central nervous system).

Ingestion: None recorded.

Skin: May cause dermatitis.

Eye: May cause conjunctivitis.

Target Organs: May affect the central nervous system, respiratory system, liver and reproductive system.

Carcinogenicity: NTP: No **IARC:** No **OSHA:** No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove victim to fresh air, keep warm and quiet, give oxygen if breathing is difficult and seek

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medical attention.

INGESTION: Give 1-2 glasses of water or milk and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with soap and water. Seek medical attention.

EYE: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: No data

Incompatibility (Material to Avoid): Strong oxidizing agents.

Hazardous Decomposition Products: Manganese fume.

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust. Use non-sparking tools.

Waste Disposal Method: Dispose of in accordance with Federal, State and Local regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH-approved dust respirator.

Ventilation: Use local exhaust to maintain concentration at or below the PEL, TLV. Mechanical exhaust is not recommended.

Eye Protection: Safety glasses

Protective Gloves: Impervious gloves.

Other Protective Clothing or Equipment: Protective gear suitable to prevent contamination.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Listed: Yes

DOT Regulations:

Hazard Class: None

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

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Revised/Verified: August 2011

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Manganese Oxide Mn₃O₄



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1050 Benson Way, Ashland, OR 97520

Toll Free (800) 638-2581 * Fax (541) 488-8313

E-Mail: sales@espimetals.com

Product Name: Manganese Oxide

Formula: Mn₃O₄ (plus MnO)

CAS Number: 1317-35-7

II. HAZARDOUS INGREDIENTS

Hazardous Components: Manganese Oxide

Percent (%): 0-100

OSHA PEL: 5 mg(Mn)/m³

ACGIH TLV: 0.2 mg(Mn)/m³

III. PHYSICAL DATA

Boiling Point: N/E

Melting Point: 1564 °C

Specific Gravity: 4.856 g/cc

Solubility in H₂O: Insoluble

Appearance and Odor: Black crystalline powder and pieces, no odor.

What's New?

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Platinum	1432.00	+0.00	1447.00	
Palladium	735.00	-7.00	749.00	

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Autoignition Temperature: N/E

Flammable Limits: Upper: N/A **Lower:** N/A

Extinguishing Media: Use suitable extinguishing media for surrounding material and type of fire.

Special Fire Fighting Procedures: Wear NIOSH/MSHA approved self contained breathing apparatus, protective clothing, boots and gloves. If without risk, remove material from fire area.

Unusual Fire & Explosion Hazards: When heated to decomposition this material may emit toxic fumes.

V. HEALTH HAZARD INFORMATION

Effects of Exposure:

To the best of our knowledge the chemical, physical and toxicological properties of manganese oxide have not been thoroughly investigated and reported.

Some manganese compounds are experimental tumorigens. They can cause central nervous system and pulmonary system damage by inhalation of fumes and dust. Very few poisonings have occurred from ingestion. Chronic manganese poisoning is a clearly characterized disease which results from inhalation of fumes or dusts of manganese. The central nervous system is the chief site of damage. Exposure to dusts and fumes can possibly increase the incidence of upper respiratory infections and pneumonia (Sax, Dangerous Properties of Industrial Materials).

Acute Effects:

Inhalation: Inhalation of manganese compounds is considered the primary route of exposure, they may cause irritation of the respiratory tract and mucous membranes. Inhalation of manganese compounds' fine dusts and fumes may cause metal fume fever.

Ingestion: Absorption of manganese compounds from the gastrointestinal tract is poor under normal conditions.

Skin: Absorption by skin is poor.

Eye: May cause moderate irritation.

Chronic Effects:

Inhalation: Chronic inhalation of manganese compounds' dust particles, approximately 3 μm in size, for a period of a few months may cause pulmonary pneumonitis. Manganese compounds may also cause manganism, psychic and neurological disorders affecting the central nervous system, to develop (not fatal but can cause permanent disability).

Ingestion: No chronic effects recorded.

Skin: No chronic effects recorded.

Eye: No chronic effects recorded.

Routes of Entry: Inhalation

Target Organs: May affect the central nervous system, kidneys, respiratory system and liver.

Medical Conditions Generally Aggravated By Exposure: It has been recorded that when exposed to manganese dust and fumes, there is a higher incidence of upper respiratory infection and pneumonia compared to general population.

Carcinogenicity: NTP: No **IARC:** No **OSHA:** No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove victim to fresh air; keep warm and quiet; give oxygen if breathing is difficult and seek

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medical attention immediately.

INGESTION: Give 1-2 glasses of water or milk and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing; brush material off skin; wash affected area with soap and water. Seek medical attention.

EYE: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: None

Incompatibility (Material to Avoid): Easily oxidized materials and reducing agents.

Hazardous Decomposition Products: Manganese oxide fume.

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

Waste Disposal Method: Dispose of in accordance with Local, State and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH approved dust respirator.

Ventilation: Use local exhaust to maintain concentration at or below the PEL, TLV. Mechanical exhaust is not recommended.

Eye Protection: Safety glasses

Protective Gloves: Rubber gloves

Other Protective Equipment: For long periods of exposure, wear protective clothing.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Avoid breathing dust and use adequate ventilation. Store away from oxidizers. Wash thoroughly after handling.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

TSCA Listed: Yes

Dot Regulations:

Hazard Class: None

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI shall not be held liable for any damage resulting from handling or from contact with the above product.

Issued By: S. Dierks

Revised/Verified: February 2012

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