# Material Safety Data Sheet

## Section I

**Identity:**

**Common Name:** Manganese Mineral Ore  
**CAS Number:** None Established

**Manufacturer's Name:** American Minerals

**Address:** 301 Pigeon Point Road  
New Castle, DE 19720

**Emergency Telephone Number:** 302-652-3301

**Telephone Number for Information:** 302-652-3301

**Date Prepared:** 04-01-90

## Section II - Hazardous Ingredients

<table>
<thead>
<tr>
<th>Material</th>
<th>CAS Number</th>
<th>% Weight</th>
<th>Transitional OSHA PEL</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manganese dioxide* as Mn:</td>
<td>1313-13-9</td>
<td>69-84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust and Comp.</td>
<td></td>
<td></td>
<td>5 MG/M3 Ceiling</td>
<td>5 MG/M3 Ceiling</td>
<td>5 MG/M3</td>
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<td>5 MG/M3 Ceiling</td>
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<tr>
<td>Fume</td>
<td></td>
<td></td>
<td>1 MG/M3 Ceiling</td>
<td>3 MG/M3 STEL</td>
<td>1 MG/M3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 MG/M3 Ceiling</td>
<td>3 MG/M3 STEL</td>
<td>1 MG/M3</td>
</tr>
<tr>
<td>Iron oxide as Fe</td>
<td>1309-37-1</td>
<td>2-10</td>
<td>10 MG/M3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 MG/M3 for Iron oxide fume</td>
<td>5 MG/M3 for Iron oxide fume</td>
<td>5 MG/M3</td>
</tr>
<tr>
<td>Silicon dioxide as SiO₂ (Quartz)</td>
<td>14808-60-7</td>
<td>3-8</td>
<td>10 MG/M3 %SiO₂+2</td>
<td>0.1 MG/M3 Resp. Dust</td>
<td>0.1 MG/M3 Resp. Dust</td>
</tr>
</tbody>
</table>
Trace (<1.0%) amounts of calcium oxide, magnesium oxide, copper, lead and zinc exist in this product.

1 The transitional OSHA-PELs are the previous PELs. On January 19, 1989, OSHA published its amendments to the existing air contaminants standards which are contained in 29 CFR 1910.1000 Tables Z-1, Z-2, and Z-3. These new limits became effective on March 1, 1989, and are indicated as FINAL OSHA-PEL's. As defined by OSHA, a STEL (Short-Term Exposure Limit) is the employee's 15-minute, time-weighted average exposure which must not be exceeded at anytime during a workday.

*Note - SARA Title III - Section 313 - Toxic Chemical

EPA SARA Title III Hazard Categorization
As defined by 40 CFR 370, the product is categorized as both an "immediate (acute) health hazard" and a "delayed (chronic) health hazard".
SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: N/A
Vapor Pressure (mm Hg): N/A
Vapor Density (AIR = 1): N/A
Melting Point: N/A
Appearance and Odor: Black powder or granular material. No odor
Freezing Point: N/A
Specific Gravity: N/A
Evaporation Rate: N/A

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): N/A
Flammable Limits: N/A
Extinguishing Media: Dry chemical, salt or sand
Special Fire Fighting Procedures: N/A
LEL: N/A
UEL: N/A

Unusual Fire and Explosion Hazards: Manganese mineral ore should be kept away from heat and flammable materials. When heated above 1,000°F, manganese dioxide liberates oxygen which will support combustion.

SECTION V - REACTIVITY DATA

Stability: Unstable:
Stable: X
Conditions to avoid: See Incompatibility

Incompatibility: Manganese mineral ore is incompatible with chlorates, aluminum dirubidium acetylide, hydrogen sulfide, reducing substances, potassium azide, chlorine trifluoride, hydrogen peroxide, and sodium peroxide. If manganese mineral ore is processed further to release manganese metal, then the resulting manganese metal would be incompatible with aluminum, chlorine, fluorine, water, nitric acid, nitrogen dioxide, phosphorus, sulfur dioxide, rubidium acetylide, hydrogen sulfide and chlorine trifluoride. Manganese metal can also react with oxidizers and can generate hydrogen when in contact with water or steam.

Hazardous Decomposition or Byproducts: None. If further processing released manganese metal it would be possible that hydrogen could be generated when manganese metal contacted water or steam.
Manganese Mineral Ore

Hazardous Polymerization:

May Occur: None
Will Not Occur: X
Conditions to Avoid: None

SECTION VI-HEALTH AND HAZARD DATA

Route(s) of Entry: Inhalation: Yes Skin: No Ingestion: No Other: None

Health Hazards:
Although free or elemental manganese is not present in this ore, a discussion of the components of the ore is provided as information relating to potential future use of the ore.

Acute:
Manganese ore does not exert any significant acute effects however if further processing releases manganese metal or metallic iron, the possibility of metal fume fever exists.

Barium oxide dust may cause skin and nasal irritation

High concentrations of ore dust can result in irritation of the eyes

Chronic:
Manganese ore exposure has been associated with pneumonia and manganese poisoning. Poisoning has been reported to occur after a period of 6 months to 24 years after exposure to the ore. Elemental manganese fume and dusts, when in high concentrations, may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections. Some studies have indicated a correlation between manganese exposure and bronchial asthma. Concentrations averaging 210 MG/M3 have been associated with pneumonia.

Iron oxide fume or dust exposures, when excessive, may result in development of a benign pneumoconiosis, called siderosis, which is observable as an x-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Silicon dioxide or crystalline silica (quartz) is an acute irritant dust. The prolonged inhalation of excessive levels of dusts containing free silica may result in the development of the disabling pulmonary fibrosis known as silicosis. Silicosis is a disease characterized by generalized fibrotic changes and the development of miliary nodules in both lungs, and clinically by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis and characteristic x-ray findings. It has been concluded from toxicological and epidemiological studies that silicon dioxide should be classified as a carcinogen.
Aluminum fume and dust exposures have been associated with lung disease but the effects are complicated due to other simultaneous exposures to silica and iron oxide.

Barium exerts a physiological effect on muscle tissue such as bronchial, skeletal, intestinal, arterial and especially heart muscle. Barium has been observed to effect the neural tissue and the hematopoietic system.

Carcinogenicity: NTP: Yes IARC Monographs: Yes OSHA Reg.: No
Crystalline silica is considered by NTP as reasonably anticipated to be a carcinogen and by IARC as an animal carcinogen and limited human carcinogen.

Signs and Symptoms of Exposure:
Exposure to metal fumes and dusts may cause metal fume fever. Excessive manganese exposure may cause emotional disturbances, weakness and sleepiness.

Medical Conditions Generally Aggravated by Exposure:
Excessive dust exposures may aggravate impaired respiratory systems.

Emergency and First Aid Procedures:
Inhalation: If acute overexposure to dusts or fumes occurs, remove victim from the adverse environment and seek medical attention. Give artificial respiration if victim has stopped breathing.
Eye Contact: Should eye contact occur flush with large amounts of water. Seek prompt medical attention.
Skin Contact: If dust gets on the skin, wash the contaminated area with soap and water.
Ingestion: Ingestion is not a probable source of exposure to the dust or fume. If particles are ingested, give 1-2 glasses of water or milk. Induce vomiting only if the victim is fully conscious and has not convulsed. Seek prompt medical attention.

SECTION VII-PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled:
If there is a spill of ore, clean up using methods which avoid dust generation such as dry or wet vacuuming. Compressed air should not be used to clean up spills. During cleanup, skin and eye contact and inhalation of dust should be avoided as much as practical. Provide local exhaust or dilution ventilation as required. Collect material in appropriately labeled containers.

Waste Disposal Method:
Dispose of in accordance with applicable regulations.

Precautions to be Taken in Handling and Storing:
Store in a cool, dry, well-ventilated area. Do not store near strong acids or flammable materials.

Other Precautions: N/A
Respiratory Protection:
When engineering controls are not sufficient to control overexposure, appropriate NIOSH approved respirators should be used, such as half-mask air-purifying respirators. A competent health professional should be consulted for respirator selection.

Ventilation: Local Exhaust: As needed, to control dust and fume.  
Mechanical (General): As needed, to control dust and fume.  
Special and Other: N/A

Protective Gloves:  
As needed, to protect against physical hazards

Eye Protection:  
Safety glasses with side shields are recommended when there is a reasonable probability of injury during handling.

Other Protective Clothing or Equipment: N/A

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