



## MATERIAL SAFETY DATA SHEET

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### SECTION 1 - PRODUCT

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**Product Name:** Manganese (Mn)  
**Formula:** Mn, FeMn, Mn<sub>4</sub>N  
**Synonyms:** Medium and Low Carbon Ferromanganese,  
Standard Ferromanganese  
**Manufacturer's Name:** Miller and Company LLC  
**Address:** 9700 W. Higgins Road  
Suite 1000  
Rosemont, IL 60018  
**Phone:** 874-696-2400  
**Emergency Phone:** Chemtrec 800-262-8200  
**Prepared by:** H. F. Linebarger  
**Date:** January 13, 2009

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### SECTION 2 - PHYSICAL DATA

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**Appearance and Odor:** Silvery metallic, brown or black when surface oxidized. No odor.  
**Solubility:** Product is insoluble in water  
**Reactivity:** Manganese metal and alloys may react slightly with water (Section 6).  
**Specific Gravity:** (Approx): 3.9 to 7.4 (Mn<sub>4</sub>N Sp. gr. is 2.9)  
**Melting Point-Range:** 1070°C to 1245°C  
**Other:** Manganese metal and alloys may nitride at temperatures above 400

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### SECTION 3 - TLV DATA ON PRINCIPAL ALLOY INGREDIENTS

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<u>Typical Analysis (Wt % Range)</u>	
Manganese	75 - 100%
Iron	1 - 15%

TLV (mg/m<sup>3</sup>): No TLV's exist for Manganese alloys; TLV's may be applicable to constituent elements.

Ceiling 5 mg/m<sup>3</sup> as Manganese (OSHA)  
10 mg/m<sup>3</sup> as Fe<sub>2</sub>O<sub>2</sub> (OSHA)

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#### SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

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**Combustibility:** Based on combustibility tests, these alloys are classified as active. When suspended in air, they can readily ignite, propagate flame, and generate some pressure or a mild explosion. Lump material is not combustible.

**Extinguishing Media:** Class D fire: Use dry chemicals, dry sand, or CO<sub>2</sub> to smother fire. Fire may also be isolated and allowed to burn itself out. Do not disturb burning metal while extinguishing the fire. Nitrogen blanket will not extinguish a Mn metal and alloys fire.

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#### SECTION 5 – HEALTH – HAZARD DATA

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##### First Aid Procedures:

Inhalation: Remove from dusty area to fresh air.  
Skin Contact: No hazard associated with skin contact.  
Eye Contact: Flush with water to be sure that no particles remain in the eye.

##### Effects of Overexposure:

**Acute:** Dusts in high concentrations can cause irritation of the eyes and throat. Manganese fume fever is characterized by cold-like symptoms. No residual injury is expected from acute overexposure.

**Chronic:** Central nervous system disorders may develop in isolated cases. No physical disorders are expected. Chronic effects usually require three years of overexposure to develop. No residual injury is expected from handling lump or coarse material.

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#### SECTION 6 – REACTIVITY DATA

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**Stability:** Stable in all sizes.  
**Materials to Avoid:** Moisture, acids.  
**Conditions to Avoid:** Exposure to moisture during extended storage. Ventilation should be supplied for areas of extended storage. Avoid generation of airborne dusts.

**Hazardous Reaction/Decomposition Products:** Small amounts of phosphine, arsine and hydrogen may occasionally evolve after contact with moisture.

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## SECTION 7 – SPILL, LEAK, OR DISPOSAL INFORMATION

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**Steps to be Taken in Case of Spills:** Avoid the use of compressed air to maneuver spills or leaks of fine material associated with spills or leaks of coarse or lump material. Keep wet material separated from dry material.

**Waste Disposal or Repack Information:** Avoid repacking wet material in sealed container. Dispose of in accordance with applicable federal, state, and local regulations.

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## SECTION 8 – EMPLOYEE PROTECTION INFORMATION

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**Respiratory Protection:**

In dusty areas, use NIOSH- approved Schedule 21C respirator.

**Eye Protection:**

Subject to safety rules. Recommended wearing Safety goggles.

**Ventilation:**

To control exposure to below ceiling of 5 mg/m<sup>3</sup> as Mn.

**Other Clothing and Equipment:**

Protective gloves are recommended during handling. Lump material may have sharp edges. As with other dusts, avoid contamination of clothing.

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## SECTION 9 – ADDITIONAL INFORMATION

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**Handling/Storage:**

Minimize and control operations producing dust.

**Milling:**

Use of special precautions, such as inert atmosphere, is recommended when sizing to minus 100 mesh with more than 50% minus 200 mesh. Grinding wet material may be hazardous due to the possible of hydrogen evolution.

**Labeling:**

No special labels are required:

