

**MATERIAL SAFETY DATA SHEET  
FOR  
THORN SMITH LABORATORIES  
ANALYZED QUANTITATIVE UNKNOWN**

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Manganese Ore for Mn and O  
Catalog Number 80-1370

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Manufacturer: Auric Enterprises, Inc.  
d/b/a Thorn Smith Laboratories  
Address: 7755 Narrow Gauge Road  
Beulah, MI 49617  
Phone Number: 231-882-4672  
MSDS Number: TSL-014  
Date Prepared: April 8, 1980  
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**SECTION 1 - MATERIAL IDENTIFICATION AND INFORMATION**

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COMPONENTS - Chemical Name and Common Names  
(Hazardous Components 1% or greater; Carcinogens 0.1% or greater)

Manganese Dioxide

Formula: MN-02  
CAS No.: 1313-13-9  
OSHA PEL: 5 mg/m<sup>3</sup> OSHA ceiling, 1 mg/m<sup>3</sup> OSHA TWA (fume);  
3 mg/m<sup>3</sup> OSHA STEL (fume)  
ACGIH TLV: 5 mg/ m<sup>3</sup> ACGIH TWA (dust); 1 mg/m<sup>3</sup> ACGIH TWA  
(fume); 3 mg/m<sup>3</sup> ACGIH STEL (fume)  
Synonyms: Manganese oxide; manganese superoxide; manganese black; black  
manganese oxide; bog manganese; cement black; manganese binoxide;  
manganese peroxide; pyrolusite brown.  
Chemical Family: Metal

Sodium Sulfate

Formula: Na<sub>2</sub>SO<sub>4</sub>  
CAS Number: 7757-82-6  
OSHA PEL: According to our sources, exposure threshold levels have  
not been established. (N/E)  
ACGIH TLV: N/E  
OTHER LIMITS: N/A

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## SECTION 2 - PHYSICAL/CHEMICAL CHARACTERISTICS

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Boiling Point: N/A  
Specific Gravity: (H<sub>2</sub>O=1) 5.026 MN-02; 2.68 (Na<sub>2</sub>SO<sub>4</sub>)  
Vapor Pressure: (mm Hg and Temperature): N/A  
Melting Point: 535° C (995°F) MN-02 decomposes; 884° C (1623°F) (Na<sub>2</sub>SO<sub>4</sub>)  
Vapor Density (Air -1): N/A  
Evaporation Rate( -1): N/A  
Solubility in water: Insoluble (MN-02); Appreciable (>10%) (Na<sub>2</sub>SO<sub>4</sub>)  
Water Reactive: No  
Appearance and Odor: Black to brown-black powder or steel-gray lumps. (MN-02);  
White crystals to powder (Na<sub>2</sub>SO<sub>4</sub>). Odorless.

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## SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

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Flash Point and Method Used: N/A  
Auto-Ignition Temperature: N/A  
Flammability Limits in Air (% by Volume): N/A  
LEL: N/A UEL: N/A  
Extinguisher Media: Water only, no dry chemical, carbon dioxide or halon (MN-02).  
Special Fire Fighting Procedures: Move container from fire area if you can do it without risk. Apply cooling water to sides of container exposed to flames until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Flood with water. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing vapors or dusts. Evacuate to a radius of 2500 feet for uncontrollable fire. Fire fighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in the positive pressure mode.  
Unusual Fire and Explosion Hazards: Negligible fire hazard when exposed to heat or flame. Oxidizer: Oxidizers decompose, especially when heated, to yield oxygen or other gases which will increase the burning rate of combustible matter. Contact easily oxidizable, organic, or other combustible materials may result in ignition, violent combustion or explosion.  
Toxic gases produced: Sulfur dioxide (Na<sub>2</sub>SO<sub>4</sub>).

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## SECTION 4 - REACTIVITY HAZARD DATA

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STABILITY:  Stable  Unstable

Conditions to Avoid: Moisture (Na<sub>2</sub>SO<sub>4</sub>). Stable under ordinary conditions of storage and use.

Incompatibility (Materials to avoid): Aluminum, anilinium perchlorate, barium chlorate, calcium chlorate, calcium hydride, chlorates, chlorine trifluoride, diboron tetrafluoride, hydrochloric acid, hydrogen peroxide, hydrogen sulfide, hydroxylaminium chloride, hypophosphites, organic matter, permonosulfuric acid, phosphides, potassium azide, rubidium carbide, sodium peroxide, sulfides, sulfur (MN-02); Aluminum, magnesium, mineral acids, strong acids, strong bases (Na<sub>2</sub>SO<sub>4</sub>).

Hazardous Decomposition Products: Manganese sesquioxide and oxygen (MN-02); Oxides of sulfur (Na<sub>2</sub>SO<sub>4</sub>) may form when heated to decomposition.

HAZARDOUS POLYMERIZATION: \_\_\_\_\_ May Occur     Will Not Occur

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## SECTION 5 - HEALTH HAZARD DATA

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### PRIMARY ROUTES OF ENTRY:

Inhalation     Ingestion     Skin Contact     Eye Contact  
\_\_\_\_\_ Not Hazardous

### CARCINOGEN LISTED IN:

\_\_\_\_\_ NTP    \_\_\_\_\_ OSHA    \_\_\_\_\_ IARC Monograph     Not Listed

### TOXICITY:

Manganese Dioxide: 45 mg/kg intravenous-rabbit LDLO; 422 mg/kg subcutaneous-mouse LD50; reproductive effects data (RTEC).

Sodium Sulfate: LD50 (oral-mouse) 5989 mg/kg.

### HEALTH HAZARDS - Acute:

Inhalation: See information on metal fume fever and manganese compounds.

Other effects of manganese compounds may include acute bronchitis, nasopharyngitis, and pneumonia. Reproductive effects have been reported in animals.

METAL FUME FEVER: Acute exposure: Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with sudden onset of thirst, and a sweet metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

May cause irritation to the upper respiratory tract (Na<sub>2</sub>SO<sub>4</sub>).

Ingestion: Abdominal pain, nausea (MN-02); May cause gastrointestinal irritation. (Na<sub>2</sub>SO<sub>4</sub>)

Skin Contact: May cause irritation with redness and pain.

Eye Contact: May cause redness, pain, tearing and irritation.

**HEALTH HAZARDS - Chronic:**

Inhalation: There is no form of chronic metal fume fever, however, repeated bouts with symptoms as described above are quite common. Resistance to the condition develops after a few days of exposure, but is quickly lost in 1-2 days (MN-02).

Skin Contact: Repeated and prolonged contact may cause dermatitis.

Eye Contact: Repeated and prolonged contact may cause conjunctivitis.

Signs and Symptoms of Exposure: See above.

Medical Conditions Generally Aggravated by Exposure: N/A

**EMERGENCY FIRST AID PROCEDURES -** Seek medical assistance for further treatment, observation and support if necessary.

Inhalation: If a person breathes in large amounts, move the exposed person to fresh air. Get medical attention.

Ingestion: Treat symptomatically and supportively. Get medical attention immediately.

Skin Contact: Remove contaminated clothing and shoes immediately. Wash effected area with soap or mild detergent and large amounts of water for at least 15 minutes or until no evidence of chemical remains. Get medical attention immediately.

Eye Contact: Immediately flush with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally, until no evidence of chemical remains. Get medical attention immediately.

**SARA TITLE III HAZARD CATEGORIES AND LISTS**

Acute: Yes    Chronic: Yes    Flammability: Yes    Pressure: No  
Reactivity: Yes

Extremely Hazardous Substance: No

CERCLA Hazardous Substance: No

SARA 313 Toxic Chemicals: Yes (Na<sub>2</sub>SO<sub>4</sub>) Contains Sodium Sulfate. Generic class removed from CFR 7-9-91.

TSCA Inventory: Yes

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**SECTION 6 - CONTROL AND PROTECTIVE MEASURES**

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Respiratory Protection (Specify Type): None required where adequate ventilation conditions exist. If airborne concentration is high, use appropriate respirator or dust mask.

Protective Gloves: Wear rubber gloves.

Eye Protection: Wear chemical safety goggles.

VENTILATION TO BE USED: Use adequate general or local exhaust ventilation to keep fume or dust levels as low as possible.

Local Exhaust  Mechanical (General)  Special  
 Other (Specify)

Other Protective Clothing and Equipment: Wear clean body-covering clothing.

Hygienic Work Practices: Avoid contact with eyes, skin, and clothing. Avoid breathing dust. Keep container closed when not in use. Use with adequate ventilation. Wash thoroughly after handling.

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## SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

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Steps to be taken if material is spilled or released: Wear suitable protective clothing. Carefully sweep up and remove.

Waste Disposal Methods: Dispose in accordance with all applicable local, state, and federal environmental regulations.

Precautions to be taken in handling and storage: Keep in a tightly closed container. Suitable for any general chemical storage area. Isolate from incompatibles. Protect against physical damage. Store in accordance with all applicable local, state and federal environmental regulations.

Other precautions and/or special hazards: Sodium Sulfate is hygroscopic.

NFPA Rating: Health: **2** Flammability: **0** Reactivity: **1**

HMIS Rating: No information available.

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## SECTION 8 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

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### Domestic (D.O.T.)

Proper Shipping Name: Chemicals, n.o.s. (Non-regulated)

### International (T.M.O.)

Proper Shipping Name: Chemicals, n.o.s. (Non-regulated)

### AIR (I.C.A.O.)

Proper Shipping Name: Chemicals, n.o.s. (Non-regulated)

Per section 172.101 of 49 CFR Chapter 1, this material is a mixture of a hazardous material and a non-hazardous material and can be shipped as a n.o.s. (non-hazardous). Actual mixture quantities are identified on the analysis sheet which accompanies every shipment.

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and assume no liability resulting from its use. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.