1 Identification of substance and company

Product name: Manganese Metal, Powder
Product code: 11118, 12328, 15630
Relevant use and restrictions on use: Research and product development
Manufacturer/Supplier: Noah Technologies Corporation
1 Noah Park
San Antonio, Texas 78249-3419
Phone: 210-691-2000
Fax: 210-691-2600
Web site: www.noahtech.com

Emergency information:
CHEMTREC
800-424-9300

2 Hazards identification

Pictogram(s):

Signal word(s):
Danger

Hazard statements:
H260 - In contact with water releases flammable gases which may ignite spontaneously
H412 - Harmful to aquatic life with long lasting effects

Precautionary statements:
P223 - Keep away from any possible contact with water, because of violent reaction and possible flash fire
P231+232 - Handle under inert gas. Protect from moisture.
P273 - Avoid release to the environment
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P335+334 - Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370+378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction
P402+404 - Store in a dry place. Store in a closed container.
P501 - Dispose of contents/ container to an approved waste disposal plant

GHS Classification:
Substances and mixtures, which in contact with water, emit flammable gases - 1
Acute aquatic toxicity - 3
Chronic aquatic toxicity - 3

Hazards not otherwise classified:
None

Flammable Solid - 1

HMIS ratings (scale 0-4):
Health hazard: 1
Flammability: 3
Physical hazard: 2

3 Composition/Information on ingredients

Chemical name: Manganese Metal, Powder
CAS number: 7439-96-5
EC number: 231-105-1
Formula: Mn
Synonyms: None known

4 First aid measures

After inhalation: Move victim to fresh air. If not breathing, give artificial respiration. Get medical attention.
After skin contact: Flush with water and then wash thoroughly with soap or mild detergent and water. For symptoms of exposure, consult a physician.
After eye contact: Flush eyes with plenty of water for at least 15 minutes, lifting the upper and lower eyelids occasionally. Get medical attention if irritation develops.
After ingestion: Never give anything by mouth to an unconscious person. Rinse mouth and give large quantities of water to drink. Get medical attention.
Information for doctor: Show this safety data sheet to the doctor in attendance
Symptoms/effects; acute and delayed: Respiratory irritation, chills, nausea
Immediate medical attention and special treatment needed: No data available

5 Fire-fighting measures
Suitable and unsuitable extinguishing agents: Class D fire extinguisher, CO2 extinguisher, foam, dry chemical or other inert extinguishing material. Do NOT use water.
Special hazards caused by the material, its products of combustion or resulting gases: Oxides of manganese
Special fire fighting procedures: Wear self-contained breathing apparatus. Always wear full fire fighting equipment / clothing in fire situations.
Unusual fire and explosion hazard: Moderate fire and explosion hazard in the form of dust when exposed to flame. Manganese powder with a particle size range of < 74 microns is classified as moderately explosive in a dust cloud by the US Bureau of Mines, Report R16516. May explode if heated in carbon dioxide. Emits toxic fumes under fire conditions.

6 Accidental release measures
Person-related safety precautions: Use personal protective equipment. Avoid formation of dust and aerosols. Ensure adequate ventilation.
Measures for environmental protection: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Measures for cleaning/collecting: Avoid dusting. Sweep or scoop up and remove. Place in suitable container for proper disposal.
Additional information: See Section 7 for information on safe handling. See Section 8 for information on personal protective equipment. See Section 13 for information on disposal. See Section 15 for regulatory information.

7 Handling and storage
Information for safe handling: Avoid contact with skin and eyes. Provide adequate ventilation. Keep away from sources of ignition. Use non-sparking tools. Handle under dry inert gas.
Information about protection against explosions and fires: Dust explosion hazard. Oxygen concentration less than 15% prevents ignition. May explode if heated in carbon dioxide. Emits toxic fumes under fire conditions.
Storage requirements to be met by storerooms and containers: Keep container closed. Keep away from heat, sparks and open flames. Store in a cool, dry place. Store away from acids, alkali and other incompatible materials.
Incompatibility (avoid contact with): Strong acids. Strong oxidizers. Strong bases. Avoid water, steam, halogens, fluorine, hydrogen peroxide, bromine pentafluoride, nitryl fluoride, nitric acid, ammonium nitrate, NOx and SOx.
Further information about storage conditions: Ignition sources, open flames, sparks, contact with incompatibles.

8 Exposure controls/personal protection
Ventilation requirements: Local exhaust. Chemical fume hood. Glove box / bag.
Components with exposure limits that require monitoring: ACGIH TLV: 0.02 mg / m3 (Respirable); 0.1 mg / m3 (inhalable); Central Nervous System impairment
NIOSH IDLH: TWA 1.0 mg / m3; STEL 3.0 mg / m3
OSHA PEL: 5.0 mg / m3 (Ceiling)
General protective and hygienic measures: The usual precautionary measures for handling chemicals should be adhered to. Keep away from foodstuffs, beverages and food. Instantly remove any soiled and impregnated garments. Wash hands during breaks and at the end of the work. Avoid contact with the eyes and skin.
Personal protective equipment: Respiratory protection: Filter-dust, fume, mist
(Use only NIOSH or CEN approved Equipment) Hand protection: Handle with gloves: Neoprene / Natural rubber / Impervious. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with product.
Eye protection: Safety goggles
Skin protection: Protective work clothing sufficient to prevent contact.
Additional protective equipment: Emergency eyewash and safety shower.
Precautionary labeling: Do not get in eyes, on skin or on clothing. Do not breathe dust, vapor, mist or gas. Keep container closed. Keep away from heat, sparks and open flames. Store in tightly closed containers in a cool, dry place.
## 9 Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Powder / Granules</td>
</tr>
<tr>
<td>Color</td>
<td>Grey (may have a brown oxide coating)</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular Weight (Calculated)</td>
<td>54.938</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point/range</td>
<td>1244 °C</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>1962 °C</td>
</tr>
<tr>
<td>Sublimation temperature/start</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Flammable</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Danger of explosion</td>
<td>Dust explosion hazard</td>
</tr>
<tr>
<td>Lower</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure (mm Hg)</td>
<td>1 mmHg @ 1292 °C</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>7.44</td>
</tr>
<tr>
<td>Bulk density</td>
<td>No data available</td>
</tr>
<tr>
<td>Solubility in/Miscibility with water</td>
<td>Decomposes</td>
</tr>
<tr>
<td>Partition coefficient n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Other information</td>
<td>None</td>
</tr>
</tbody>
</table>

## 10 Stability and reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>No data available</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>Stable under recommended storage conditions</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Dust explosion hazard</td>
</tr>
<tr>
<td>Conditions to be avoided</td>
<td>Ignition sources. Open flames. Sparks. Contact with incompatibles.</td>
</tr>
<tr>
<td>Materials to be avoided</td>
<td>Strong acids. Strong oxidizers. Strong bases. Water, steam, halogens, phosphorus, fluorine, hydrogen peroxide, bromine pentafluoride, nitryl fluoride, nitric acid, ammonium nitrate, NOx and SOx</td>
</tr>
<tr>
<td>Dangerous reactions</td>
<td>May explode if heated in carbon dioxide. Contact with water / moisture causes production of hydrogen</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Oxides of manganese</td>
</tr>
</tbody>
</table>

## 11 Toxicological information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD/LC50 values that are relevant for classification:</td>
<td>oral-rat LD_{50}: 9,000 mg/kg</td>
</tr>
<tr>
<td>Irritation or corrosion of skin</td>
<td>skin-rabbit 24H:mild</td>
</tr>
<tr>
<td>Irritation or corrosion of eyes</td>
<td>eyes-rabbit 24H:mild</td>
</tr>
<tr>
<td>Primary irritant or corrosive effect:</td>
<td>Mild</td>
</tr>
<tr>
<td>on the skin</td>
<td>Mild</td>
</tr>
<tr>
<td>on the eye</td>
<td>Mild</td>
</tr>
<tr>
<td>Sensitization</td>
<td>No data available</td>
</tr>
<tr>
<td>Potential health effects:</td>
<td>Inhalation may cause metal fume fever, chills, nausea and body aches</td>
</tr>
<tr>
<td>Ingestion</td>
<td>No data available</td>
</tr>
<tr>
<td>Skin</td>
<td>No data available</td>
</tr>
<tr>
<td>Eyes</td>
<td>No data available</td>
</tr>
<tr>
<td>Signs and symptoms of exposure</td>
<td>May cause neurological disorders such as apathy, loss of appetite, drowsiness, speech difficulties, muscular twitching, spastic gait and other central nervous system effects resembling Parkinson's disease. Repeated inhalation may cause injury to the central nervous system and kidneys. May cause irritation to the skin and eyes. An experimental tumorigen. Human systemic effects by inhalation include degenerative brain changes, change in motor activity and muscle weakness. Mutagenic data. This product is a questionable carcinogen.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>IARC: No component of this product is identified as probable, possible or confirmed human carcinogen by IARC. ACGIH: No component of this product is identified as a carcinogen or potential carcinogen by ACGIH. NTP: No component of this product is identified as a known or anticipated carcinogen by NTP. OSHA: No component of this product is identified as a carcinogen or potential carcinogen by OSHA.</td>
</tr>
<tr>
<td>Additional information:</td>
<td>To the best of our knowledge the acute and chronic toxicity of this substance is not fully known</td>
</tr>
</tbody>
</table>

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12 Ecotoxicological information

Toxicity:

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: Daphnia magna EC50: 40 mg / L; 48H
Toxicity to algae: No data available
Persistence and degradability:
Biodegradability: No data available
Bioaccumulative potential: No data available
Bioaccumulation: No data available
Mobility in soil: No data available
Other adverse effects: No data available

13 Disposal considerations

Recommendation: Consult state, local or national regulation for proper disposal
Allow professional disposal company to handle waste
Must be specially treated under adherence to official regulations

Unclean packagings recommendation: Disposal must be made according to official regulations

14 Transport information

Land transport DOT

Proper shipping name: Metal powders, flammable, n.o.s.
DOT Hazard Class: 4.1
UN Identification number: UN3089
Label(s): Flammable Solid
Packing group: III
North American Emergency Response Guidebook No.: 170

Air transport ICAO-TI and IATA-DGR:

Proper shipping name: Metal powder, flammable, n.o.s.
DOT Hazard Class: 4.1
UN Identification number: UN3089
Label(s): Flammable Solid
Packing group: III
North American Emergency Response Guidebook No.: 170

UPS Ground / FedEx Ground

Proper shipping name: Metal powders, flammable, n.o.s.
DOT Hazard Class: 4.1
UN Identification number: UN3089
Label(s): Flammable Solid
Packing group: III
North American Emergency Response Guidebook No.: 170

UPS Air

Proper shipping name: Metal powders, flammable, n.o.s.
15 Regulatory information

SARA Section 302 Extremely Hazardous components and corresponding TPQs:
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA Section 311 / 312 hazards:
Reactivity Hazard, Chronic Health Hazard

SARA Section 313 components:
The following components are subject to reporting levels established by SARA Title III, Section 313:
- Manganese: CAS No. 7439-96-5 (Revision Date: 2007-07-01)

California Proposition 65 components:
This product does not contain any chemicals known to the State of California to cause birth defects or any other reproductive harm.

TSCA:
Product is listed on the TSCA Inventory

16 Other information
The above information is accurate to the best of our knowledge. However, since data, safety standards and government regulation are subject to change and the conditions of handling and use, or misuse are beyond our control. NOAH MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use.