



QuantumSphere, Inc.
2905 Tech Center Drive
Santa Ana, CA 92705
(714) 545-6266 – phone
(714) 545-6265 - fax

Material Safety Data Sheet

QSI-Nano[®] Manganese / Manganese Oxide Powder

1. Product and Company Identification

PRODUCT NAME: QSI-Nano[®] Manganese / Manganese Dioxide Powder
SYNONYMS: Mn / Mn₃O₄

MANUFACTURER: QuantumSphere, Inc.
ADDRESS: 2905 Tech Center Drive
Santa Ana, CA 92705

EMERGENCY PHONE
(CHEMTREC): (800) 424-9300
OTHER CALLS: (714) 545-6266
FAX: (714) 545-6265

2. Composition/Information on Ingredients

| Ingredient | CAS No | Percent | Hazardous |
|-----------------|-----------|----------|-----------|
| Manganese | 7439-96-5 | 0 – 100% | Yes |
| Manganese-Oxide | 1317-35-7 | 0 – 100% | Yes |

CHEMICAL NAME: Manganese / Manganese Oxide
CHEMICAL FAMILY: Metal / Metal Oxide
CHEMICAL FORMULA: Mn / Mn₃O₄

3. Hazards Identification

Emergency Overview

Flammable solid. Harmful if swallowed. Avoid breathing vapor or dust. Use adequate ventilation. Avoid contact with eyes, skin, or clothes. Wash thoroughly after handling. Keep closed.

Potential Acute Health Effects

Inhalation: Inhalation of this powder is considered to be the primary route of exposure. It may cause irritation of the respiratory tract and mucous membranes. Inhalation of this powder may cause metal fume fever.

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

Skin: May cause irritation, moderately toxic by subcutaneous route.

Eye: May cause irritation.

Potential Chronic Health Effects

Inhalation: Chronic inhalation of manganese dust particles for a period of a few months may cause pulmonary pneumonitis.

Ingestion: No chronic health effects recorded.

Skin: May cause dermatitis.

Eye: Irritant dust may cause conjunctivitis damage.

Safety Data**HMIS Ratings:**

Health=3, Flammability=3, Reactivity=2

Lab Protective Equip:

Safety Goggles; Lab coat; Protective Neoprene or Nitrile Gloves; Approved NIOSH/MSHA Respirator

4. First Aid Measures

Ingestion: If conscious, give water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

Inhalation: Breathing difficulty, caused by inhalation of dust or fume requires removal to fresh air. If breathing has stopped, perform artificial respiration and seek medical assistance immediately.

Skin Contact: Skin cuts and abrasions can be treated by standard first aid. Skin contamination with dust or powder can be removed with soap and water. If irritation persists, obtain medical assistance.

Eye Contact: Dust or powder should be flushed from the eyes with running water for 15 minutes. If irritation persists, obtain medical assistance.

5. Fire Fighting Measures

Flash Point: Very flammable as a dry powder

Pyrophoric/Autoignition: Does not occur

Explosion: Can burn or ignite

Fire Extinguishing Media: Use sand, do not use water to extinguish fire

Fire Fighting Procedure: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and clothing.

6. Accidental Release Measures

Spill Response: Evacuate area. Wear self-contained breathing apparatus and protective clothing. Allow only qualified personnel to handle the spill. Because it is a non-renewable resource, this material should be reclaimed when possible.

Disposal Considerations: Because it is a non-renewable resource, this material should be reclaimed when possible. When reclaiming is not feasible and disposal is the only alternative, then it should be done in accordance with all applicable Federal, State, and local regulations.

7. Handling and Storage**Handling:**

Avoid contact with skin and eyes. Avoid breathing dust. Use only with adequate ventilation. Always use Neoprene or Nitrile protective gloves and safety glasses. NIOSH certified respirators are recommended

and will be useful for protecting workers from nanoparticles inhalation when opening/emptying containers or processing this material. Do not eat or drink in work area. Wash with soap and water after exposure to any dust. Keep away from incompatibles such as acetylene, ammonia, and strong oxidizers.

Storage:

This material should be stored in a container tightly closed. Keep container in a cool, well-ventilated area. Do not store adjacent to acids or bases.

8. Exposure Controls, Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust or fume, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Respiratory Protection Equipment:

Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures. Currently, there are no specific exposure limits for airborne exposures to engineered nanoparticles although occupational exposure limits exist for larger particles of similar chemical composition. The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure. Preliminary evidence shows that for respiration filtration media there is no deviation from the classical single-fiber theory for particulates as small as 2.5 nm in diameter. While this evidence needs confirmation, NIOSH certified respirators will be useful for protecting workers from nanoparticles inhalation when properly selected and fit tested as part of a complete respiratory protection program. Use NIOSH approved positive flow mask if dust becomes airborne. Try to avoid creating dust conditions.

Protective Gloves:

Use Neoprene or Nitrile protective gloves, to prevent irritation.

Eye and Face Protection:

Wear safety glasses or face shield and an approved respirator in operations that disperse fine particles into the air.

Other Protective Equipment:

To prevent repeated or prolonged skin contact, wear impervious clothing and boots. An eyewash fountain should be readily available in areas of use of handling.

Ventilation:

Use local exhaust ventilation directed towards the source of dust to keep airborne levels below recommended exposure limits.

9. Physical and Chemical Properties

| | |
|---------------------------------|---|
| Appearance: | Black powder with a particle range of 3 – 20 nanometers |
| Odor: | Odorless |
| Solubility: | Insoluble in water |
| Specific Gravity @ 25 °C | 6.93 g/cm ³ |
| Boiling Point: | 2670 °C |
| Melting Point: | 1850 °C |
| % Volatile by weight | Essentially Zero |
| % Volatile by volume | Essentially Zero |
| Vapor Density (Air=1): | Not Applicable |
| Vapor Pressure: | Not Applicable |
| Evaporation Rate: | Zero |

10. Stability and Reactivity

Chemical Stability: Stable

Hazardous Decomposition Products: None under proper use conditions

Hazardous Polymerization: Will not occur

Incompatibilities: Acetylene, ammonia, and strong oxidizers

Conditions to Avoid: Dust generation, excess heat, and incompatible materials

11. Toxicological Information

Primary Routes of Entry: Inhalation, Skin Contact, Eye, Ingestion

Human Effects and Symptoms of Exposure: Skin: May cause dermatitis; Eye: Will cause irritation

Medical Conditions Aggravated by Exposure: Individuals who may have had allergic reactions to metals or sensitivity, may encounter skin rash or dermatitis if skin comes in contact with product. Persons with impaired pulmonary functions may incur further impairment if inhaled.

Carcinogenicity:

CAS#7439-96-5: Not Listed By NTP, IARC, NIOSH, OSHA, or ACGIH

12. Ecological Information

Environmental: When used and/or disposed of as indicated, no adverse environmental effects are foreseen. If this material is dissolved, the soluble form can be highly detrimental should it escape into the environment.

Environmental Toxicity: No data available

Degradability: Not biodegradable

Mobility: Non-volatile/Insoluble in water

13. Disposal Considerations

Disposal should be made in accordance with Federal, State, and local regulations. Because it is a non-renewable resource, waste material is usually a candidate for recycling.

This material is NOT classified as a hazardous material by RCRA. Use only licensed transporters and permitted disposal facilities and conform to all laws.

14. Transport Information

| | US DOT | Canada TDG |
|----------------------|------------------------------|------------|
| Shipping Name | Metal Powder, Flammable, NOS | - |
| Hazard Class | 4.1 | - |
| UN Number | UN3089 | UN3089 |
| Packing Group | III | III |

15. Regulatory Information

SARA Title III:

No hazardous substances

European/International Regulations:

This product is on the European Inventory of Existing Commercial Chemical Substances

TSCA Status:

This product is manganese metal / manganese oxide powder

RCRA Status:

Not Applicable

OSHA Status:

Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

16. Other Information

Label Hazard Warning: DANGER! OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. HARMFUL IF SWALLOWED OR INHALED. MAY AFFECT LUNGS, CENTRAL NERVOUS SYSTEM, BLOOD AND KIDNEYS, MAY CAUSE IRRITATION TO EYES AND RESPIRATORY TRACT.

Label Precaution Information: Keep from contact with clothing and other combustible materials. Store in a tightly closed container. Remove and wash contaminated clothing promptly. Avoid contact with eyes. Wash thoroughly after handling. Avoid breathing dust. Use only with adequate ventilation.

Label First Aid: If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention. If swallowed, induce vomiting immediately as directed by medical personnel. In the case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

Product Use: Laboratory Reagent

Disclaimer:

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