Material Safety Data Sheet

Section 1 - Product and Company Information

Product Name: Manganese
Product Number: M5626
Brand: Sigma Chemical
Company: Sigma-Aldrich
Street Address: 3001 Spicero Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 600-325-5832
Fax: 600-325-8052

Emergency Phone: 314-776-8055

Section 2 - Composition/Information on Ingredient

Substance Name: 2-METHYL-1,4-NAPHTHOQUINONE
CAS #: 58-27-5
SARA 313: No
EC No: 200-372-6

Formula: C11H8O2
Synonyms: 1,4-Dihydro-1,4-dioxo-2-methyl-naphtalene, Hemodal, Juvana, Kanone, Kappasan, Kapparin, Karon, Karon, Kato-G, Kaycol, Kaykol, Kaykuine, Kipco, Kipo, oil solution, Kiotone, Kioo, Koklo, Kthombyl, K-vitan, Memodal, Manadon, Manadiona, Menaphthion, Menaphthone, Menaphrone, Menaphrine 0, Menaphryn, Methyl-1,4-naphthoquinone (Czech), 2-Methyl-1,4-naphththalamidine, 2-Methyl-1,4-naphthoquinone (German), 2-Methyl-1,4-naphthoquinone, 2-Methyl-1,4-naphthoquinone, Mitamone, Menone, MNO 1,4-Naphthalamidine, 2-Methyl- (GC), NSC 4170, Panosane, Prokayvit, Synkyn, Thylloquinone, USAF EK6185, Vitamin K0, Vitamin K2, Vitamin K3

Section 3 - Hazards Identification

Emergency Overview
Toxic (USA) Harmful (EU), Harmful if swallowed. Irritating to eyes, respiratory system and skin. Readily absorbed through skin. Possible enhancer. Target organ(s): Blood, Liver.

HMTS Rating
Health: 2
Flammability: 0
Reactivity: 1

NFPA Rating
Health: 2
Flammability: 0
Reactivity: 1

Section 4 - First Aid Measures

Inhalation Exposure
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Dermal Exposure
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Eye Exposure
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

Autoignition Temp: N/A
Extinguishing Media
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

Firefighting Protective Equipment
Protective equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s)
Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill
Evacuate area.

Procedure(s) of Personal Protection(s)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

Methods for Cleaning Up
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling
User Exposure
Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

Storage
Suitable: Keep tightly closed.

Special Requirements
Light sensitive.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safeguards and eye bath. Mechanical exhaust required.

Personal Protective Equipment
Respiratory
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where possible, use non-purifying respirators that are appropriate use a dust mask type N95 (US) or type F1 (EN 143) respirator.

Sigma Chemical - M5626
Page 2
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Section 9 - Physical/Chemical Properties

Appearance

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Color</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Yellow</td>
<td>Powder</td>
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</table>

Molecular Weight: 172.18 AMU

pH: N/A

BP/VP Range: N/A

Flash Point: -102 °C

Freezing Point: N/A

Vapor Pressure: N/A

Vapor Density: N/A

Saturated Vapor Conc.: N/A

SG/Density: N/A

Bulk Density: N/A

Odor Threshold: N/A

Volatile: N/A

VOC Content: N/A

Water Content: N/A

Solvent Content: N/A

Evaporation Rate: N/A

Viscosity: N/A

Partition Coefficient: N/A

Decomposition Temp.: N/A

Flash Point °F: N/A

Flash Point °C: N/A

Explosion Limits: N/A

Flammability: N/A

Autoignition Temp.: N/A

Solubility: N/A

N/A = not available

Section 10 - Stability and Reactivity

Stability

Stable

Conditions of Instability

Stable

May discolor on exposure to light

Materials to Avoid

Strong oxidizing agents

Hazardous Decomposition Products

Carbon monoxide, Carbon dioxide

Sigma Chemical - M6925

Page 3

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Section 11 - Toxicological Information

Route of Exposure

Skin Contact: Causes skin irritation.

Skin Absorption: Readily absorbed through skin.

Eye Contact: Causes eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: Harmful if swallowed.

Sensitization

Sensitization: Possible sensitizer.

Target Organ(s) or System(s)

Blood, Liver, Kidneys.

Signs and Symptoms of Exposure

The chemical, physical, and toxicological properties of this product have not been thoroughly investigated.

RTECS Number: QL9100000

Toxicity Data

Intraperitoneal - Rat: 78 MG/KG (LD50)

Oral - Mouse: 500 mg/kg (LD50)

Intraperitoneal - Mouse: 50 MG/KG (LD50)

Subcutaneous - Mouse: 138 MG/KG (LD50)

Chronic Exposure - Carcinogen

Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Mouse - Skin: 1610 MG/KG 27W

Result: Tumorigenic Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other. Tumors.

Malignant Tumors at site or application.

Mouse - Skin: 8400 MG/KG 21W

Result: Tumorigenic Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other. Tumors.

IARC Carcinogen List

Rating: Group 3

Chronic Exposure - Teratogen

Species: Rat

Dose: 3 G/KG

Route of Application: Oral

Exposure Time: 1-20D PREG

Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse

Dose: 20 MG/KG

Route of Application: Intravenous

Exposure Time: 6D PREG

Result: Specific Developmental Abnormalities: Central nervous system.

Specific Developmental Abnormalities: Musculoskeletal system.

Sigma Chemical - M5625

Page 4

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Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material. Dispose of or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be nonhazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Additional Classification
Symbol of Danger: Xn
Indication of Danger: Harmful
Risk Statements: R: 22/35/37/38, H: 30
Harmful if swallowed, irritating to eyes, respiratory system and skin.
Safety Statements: S: 26, 36
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice/Wear suitable protective clothing.

US Classification and Label Text
Indication of Danger: Toxic (USA) Harmful (EU).
Risk Statements: Harmful if swallowed, irritating to eyes, respiratory system and skin.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice/Wear suitable protective clothing.

United States Regulatory Information
SARA Listed: No

TSCA Inventory Item: Yes

Canada Regulatory Information
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CFIR, and the MSDS contains all the information required by the CFIR.