1 Identification
Product identifier
Product name: Manganese(II) nitrate, 50% w/w aqueous solution
Stock number: 33340
Relevant identified uses of the substance or mixture and uses advised against.
Identified use: SU24 Scientific research and development
Details of the supplier of the safety data sheet
Manufacturer/Supplier: Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com
Information Department: Health, Safety and Environmental Department
Emergency telephone number: During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification
Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)
- GHS03 Flame over circle
  Ox. Liq. 2 H272 May intensify fire; oxidizer.
- GHS08 Health hazard
  STOT RE 2 H373 May cause damage to the brain through prolonged or repeated exposure. Route of exposure: Inhalative.
- GHS05 Corrosion
  Skin Corr. 1C H314 Causes severe skin burns and eye damage.
- GHS07
  Acute Tox. 4 H302 Harmful if swallowed.
Hazard(s) not otherwise classified No information known.
Label elements
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms
- GHS03 GHS05 GHS07 GHS08
Signal word Danger
Hazard-determining components of labeling:
Manganese(II) nitrate
Hazard statements
H272 May intensify fire; oxidizer.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H373 May cause damage to the brain through prolonged or repeated exposure. Route of exposure: Inhalative.
Precautionary statements
P221 Take any precaution to avoid mixing with combustibles.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
WHMIS classification
D1B - Toxic material causing immediate and serious toxic effects
D2A - Very toxic material causing other toxic effects
E - Corrosive material
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
- Health (acute effects) = 3
- Flammability = 0
- Reactivity = 2
Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
(Contd. on page 2)
Product name: Manganese(II) nitrate, 50% w/w aqueous solution

3 Composition/information on ingredients

Chemical characterization: Mixtures

<table>
<thead>
<tr>
<th>Dangerous components:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10377-66-9 Manganese(II) nitrate Ox. Sol. 2, H272; C101 RE 2, H373; Skin Corr. 1C, H314; Eye Dam. 1, H318; Acute Tox. 4, H302</td>
</tr>
</tbody>
</table>

Additional information
Non-Hazardous Ingredients

| 7732-18-5 Water | 50.0% |

4 First-aid measures

Description of first aid measures

General information
Immediately remove any clothing soiled by the product.
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing
Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Causes serious eye damage.

Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents
Product is not flammable. Use fire-fighting measures that suit the surrounding fire.

For safety reasons unsuitable extinguishing agents
Halocarbon extinguisher

Special hazards arising from the substance or mixture
This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.
If this product is involved in a fire, the following can be released:
Nitrogen oxides (NOx)
Metal oxide fume

Advice for firefighters

Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.

Environmental precautions:
Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up:
Use neutralizing agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Absorb with liquid-binding material.

Prevention of secondary hazards:
Acts as an oxidizing agent on organic materials such as wood, paper and fats
Keep away from combustible material.

Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.

Information about protection against explosions and fires:
Substance/product can reduce the ignition temperature of flammable substances.
This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

Conditions for safe storage, including any incompatibilities

Storage
Requirements to be met by storerooms and receptacles:
No special requirements.

Information about storage in one common storage facility:
Store away from flammable substances.
Store away from reducing agents.
Do not store with organic materials.
Store away from metal powders.
Store away from strong bases.
Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

Specific end use(s)
No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>Component</th>
<th>Limit Value</th>
<th>Unit</th>
<th>PEL (USA)</th>
<th>REL (USA)</th>
<th>TLV (USA)</th>
<th>EL (Canada)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10377-66-9 Manganese(II) nitrate (50.0%)</td>
<td>Ceiling limit value: 5 mg/m³</td>
<td>as Mn</td>
<td>Short-term value: 3 mg/m³</td>
<td>Long-term value: 1 mg/m³</td>
<td>Long-term value: 0.02 mg/m³</td>
<td>Long-term value: 0.2 mg/m³</td>
</tr>
</tbody>
</table>

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Do not inhale dust / smoke / mist. Avoid contact with the eyes and skin. Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Recommended filter device for short term use:
Use a respirator with acid gas cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).

Protection of hands:
Imperious gloves
Check protective gloves prior to each use for their proper condition. The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection:
Tightly sealed goggles
Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General information

Appearance:
Form: Liquid
Color: Pink
Odor: Amine-like
Odor threshold: Not determined.

pH-value at 20 °C (68 °F): 1 (approx)

Change in condition:
Melting point/Melting range: Not determined
Boiling point/Boiling range: Not determined
Sublimation temperature/start: Not determined

Flammability (solid, gaseous): Not determined.
Ignition temperature: Not determined

Decomposition temperature: Not determined

Auto igniting: Product is not selfigniting.

Danger of explosion: Not determined.
Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure at 20 °C (68 °F): 23 hPa (17 mm Hg)
Density at 20 °C (68 °F): 1.54 g/cm³ (12.851 lbs/gal)
Relative density: Not determined.
Vapor density: Not determined.
Evaporation rate: Not determined.
Solubility in / Miscibility with Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined.
Viscosity: Dynamic: Not determined.
Kinematic: Not determined.

Solvent content:
Organic solvents: 0.0 %

Solids content: 50.0 %
Other information: No further relevant information available.

10 Stability and reactivity

Reactivity: May intensify fire; oxidizer.
Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions:
Water reacts violently with alkali metals. Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals. Reacts with reducing agents. Reacts with flammable substances.

Conditions to avoid: No further relevant information available.

Incompatible materials:
Flammable substances
Reducing agents
### 11 Toxicological information

**Information on toxicological effects**

| Acute toxicity: | Harmful if swallowed. Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach. |
| **LD/LC50 values that are relevant for classification:** | No data |
| **Skin irritation or corrosion:** | Causes severe skin burns. |
| **Eye irritation or corrosion:** | Causes serious eye damage. |
| **Sensitization:** | No sensitizing effects known. |
| **Germ cell mutagenicity:** | The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product. |
| **Carcinogenicity:** | EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available. ACGIH A4: Not classifiable as a human carcinogen: inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals. |
| **Reproductive toxicity:** | No effects known. |
| **Specific target organ system toxicity - repeated exposure:** | May cause damage to the brain through prolonged or repeated exposure. Route of exposure: Inhalative. |
| **Specific target organ system toxicity - single exposure:** | No effects known. |
| **Aspiration hazard:** | No effects known. |
| **Subacute to chronic toxicity:** | The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance. |

**Toxicological information**

- **Acute toxicity:** Harmful if swallowed. Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
- **LD/LC50 values that are relevant for classification:** No data
- **Skin irritation or corrosion:** Causes severe skin burns.
- **Eye irritation or corrosion:** Causes serious eye damage.
- **Sensitization:** No sensitizing effects known.
- **Germ cell mutagenicity:** The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.
- **Carcinogenicity:** EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available. ACGIH A4: Not classifiable as a human carcinogen: inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
- **Reproductive toxicity:** No effects known.
- **Specific target organ system toxicity - repeated exposure:** May cause damage to the brain through prolonged or repeated exposure. Route of exposure: Inhalative.
- **Specific target organ system toxicity - single exposure:** No effects known.
- **Aspiration hazard:** No effects known.
- **Subacute to chronic toxicity:** The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.

### 12 Ecological information

**Toxicity**

- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability:** No further relevant information available.
- **Bioaccumulative potential:** No further relevant information available.
- **Mobility in soil:** No further relevant information available.

**Ecotoxicity**

- **Ecotoxic effects:**
- **Remark:** Harmful to aquatic organisms
- **Additional ecological information:**
- **General notes:**
  - Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
  - May cause long lasting harmful effects to aquatic life.
  - Avoid transfer into the environment.
  - Harmful to aquatic organisms

**Results of PBT and vPvB assessment**

- **PBT:** Not applicable.
- **vPvB:** Not applicable.

**Other adverse effects**

- No further relevant information available.

### 13 Disposal considerations

**Waste treatment methods**

- **Recommendation:** Consult state, local or national regulations to ensure proper disposal.

**Uncleaned packagings:**

- **Recommendation:** Disposal must be made according to official regulations.

**Recommended cleansing agent:** Water, if necessary with cleansing agents.

### 14 Transport information

**UN-Number**

- DOT, IMDG, IATA: UN3093

**UN proper shipping name**

- **DOT:** Corrosive liquids, oxidizing, n.o.s. (Manganese nitrate)
- **IMDG, IATA:** CORROSIVE LIQUID, OXIDIZING, N.O.S. (MANGANESE NITRATE)

**Transport hazard class(es)**

| DOT | Class 8 Corrosive substances. |
| IMDG, IATA | 8+6.1 (CO1) Corrosive substances |

**Packing group**

- DOT, IMDG, IATA: II

**Environmental hazards:**

- Marine pollutant (IMDG): No
Safety Data Sheet
per OSHA HazCom 2012

Product name: Manganese(II) nitrate, 50% w/w aqueous solution

Special precautions for user
Warning: Corrosive substances

EMS Number: F-A-S-Q

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:
DOT
Marine Pollutant (DOT): No
UN "Model Regulation": UN3093, Corrosive liquids, oxidizing, n.o.s. (Manganese nitrate), 8 (6.1), II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS03 GHS05 GHS07 GHS08

Signal word Danger

Hazard-determining components of labeling:
Manganese(II) nitrate

Hazard statements
H272 May intensify fire; oxidizer.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause damage to the brain through prolonged or repeated exposure. Route of exposure: Inhalative.

Precautionary statements
P221 Take any precaution to avoid mixing with combustibles.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P204 Keep container tightly closed.
P205 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

GHS01 GHS02

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)

10377-66-9 Manganese(II) nitrate 50.0%

California Proposition 65
Prop 65 - Chemicals known to cause cancer
None of the ingredients are listed.

Prop 65 - Developmental toxicity
None of the ingredients are listed.

Prop 65 - Developmental toxicity, female
None of the ingredients are listed.

Prop 65 - Developmental toxicity, male
None of the ingredients are listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.
None of the ingredients are listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 for the manufacturing, placing on the market and use must be observed.
None of the ingredients is listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use)
None of the ingredients is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/24/2015 / -

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)