Trade Name: Manganese Electrolytic Flakes

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1. Product identifier

Trade name: Manganese Electrolytic flakes
CAS Number: 7439-96-5
Other means of identification:
Electrolytic Manganese Metal
Manganese Metal
Metallic Manganese in Flake Form
Mn
Mn99.9

1.2. Recommended use and restrictions

Recommended Use:
Raw materials.
Industrial uses.
Restrictions on use:
No relevant information available.

1.3. Details of the supplier of the Safety Data Sheet

Manufacturer/Supplier name: MANGANESE METAL COMPANY
Address: PO Box 323, Nelspruit, South Africa, 1200
Telephone: (+2713) 759 4600
Fax: (+2713) 752 7657
Email: morne.ruiter@mmc.co.za
Website: http://www.mmc.co.za

1.4. Emergency telephone number(s)

Emergency: (013) 759 4600

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

The substance is not classified as hazardous according to the Globally Harmonized System (GHS).

2.2. Label elements

GHS label elements: Not regulated.
Hazard pictograms: Not regulated.
Signal word: Not regulated.
Hazard statements: Not regulated.
Precautionary statements: Not regulated
2.3. Other hazards

There are no other hazards not otherwise classified that have been identified.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS number</th>
<th>EC number</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGANESE</td>
<td>7439-96-5</td>
<td>231-105-1</td>
<td>&gt;99</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

4.1. Description of first aid measures

**After inhalation:**
Unlikely route of exposure.
Supply fresh air; consult doctor in case of complaints.

**After skin contact:**
Brush off loose particles from skin. Wash with soap and water or diphtherine.
If skin irritation is experienced, consult a doctor.

**After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water or diphtherine. If symptoms persist, consult a doctor.

**After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; immediately call for medical help.

**Most important symptoms and effects, both acute and delayed:**
Gastric or intestinal disorders when ingested. Nausea in case of ingestion.

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

5. FIREFIGHTING MEASURES

5.1. Extinguishing media

**Suitable extinguishing agents:**
Fire-extinguishing powder
Limestone powder
Dry sand.

**For safety reasons unsuitable extinguishing agents:**
Water.

5.2. Special hazards arising from the substance or mixture

Formation of toxic gases is possible during heating or in case of fire.
Safety Data Sheet
Manganese Electrolytic Flakes
acc. to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 regulations

Document owner: MMC Laboratory

Effective Date: 02 May 2017
Revision Date: 04/05/2018
Revision No: 2

Trade Name: Manganese Electrolytic Flakes

5.3. Advice for firefighters

   Protective equipment:
   Wear self-contained respiratory protective device. Wear fully protective suit.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

   Ensure adequate ventilation.
   Avoid formation of dust.
   Use personal protective equipment as required.

6.2. Environmental precautions

   Avoid release to the environment.
   Damp down dust with water spray.

6.3. Methods and material for containment and cleaning up

   Pick up mechanically.
   Send for recovery or disposal in suitable receptacles.

6.4. 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

7.1. Handling

   Precautions for safe handling:
   Any deposit of dust which cannot be avoided must be regularly removed.
   Do not dry clean dust covered objects and floors. Wash thoroughly with plenty of water. Use only in well ventilated areas.
   Information about protection against explosions and fires:
   No special measures required.

7.2. Conditions for safe storage, including any incompatibilities

   Storage
   Requirements to be met by storerooms and receptacles:
   Avoid storage near extreme heat, ignition sources or open flame.
   Protect from humidity and water.
   Information about storage in one common storage facility:
   Store away from foodstuffs.
   Store away from oxidizing agents
Further information about storage conditions: Keep containers tightly sealed.

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

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

8.1. Control parameters

Components with limit values that require monitoring at the workplace:

<table>
<thead>
<tr>
<th>7439-96-5 manganese</th>
</tr>
</thead>
</table>

**PEL (USA)**
- Ceiling limit value: 5 mg/m³ as Mn

**REL (USA)**
- Short-term value: 3 mg/m³
- Long-term value: 1 mg/m³ fume, as Mn

**TLV (USA)**
- Long-term value: 0.02* 0.1* mg/m³ as Mn; *respirable **inhalable fraction

**EL (Canada)**
- Long-term value: 0.2 mg/m³ as Mn; R

**EV (Canada)**
- Long-term value: 0.2 mg/m³ as manganese

**LMPE (Mexico)**
- Long-term value: 0.2 mg/m³ como Mn

8.2. 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.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid close or long-term contact with the skin.

**Engineering controls:** No relevant information available.

**Breathing equipment:**
Not required under normal conditions of use.
Wear appropriate NIOSH respirator when ventilation is inadequate and occupational exposure limits are exceeded.
For spills, respiratory protection may be advisable.
Use respiratory protection when grinding or cutting material.

**Protection of hands:**
Gloves are advised for repeated or prolonged contact.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

**Eye protection:** Follow relevant national guidelines concerning the use of protective eyewear.

**Body protection:** Not required under normal conditions of use. Protection may be required for spills.

**Limitation and supervision of exposure into the environment** No special requirements.

**Risk management measures** No special requirements.

9. **PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance:</strong></td>
<td>Solid material</td>
</tr>
<tr>
<td><strong>Form:</strong></td>
<td>Flakes</td>
</tr>
<tr>
<td><strong>Colour:</strong></td>
<td>Silver-grey and/or dull brown</td>
</tr>
<tr>
<td><strong>Odour:</strong></td>
<td>Nearly odourless</td>
</tr>
<tr>
<td><strong>Odour Threshold:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>pH-value:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Melting point/Melting range:</strong></td>
<td>1245-1246 °C (2273-2275 °F)</td>
</tr>
<tr>
<td><strong>Boiling point/Boiling range:</strong></td>
<td>2061-2097 °C (3742-3807 °F)</td>
</tr>
<tr>
<td><strong>Flash point:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Flammability (solid, gaseous):</strong></td>
<td>Solid product is not flammable.</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Decomposition temperature:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Danger of explosion:</strong></td>
<td>Product does not present an explosion hazard.</td>
</tr>
<tr>
<td><strong>Explosion limits</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lower:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Upper:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Oxidizing properties:</strong></td>
<td>Non-oxidizing</td>
</tr>
<tr>
<td><strong>Vapor pressure at 955 °C (1751 °F):</strong></td>
<td>1 Pa</td>
</tr>
<tr>
<td><strong>Density:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Relative density:</strong></td>
<td>7.2 g/cm³ (60.084 lbs/gal)</td>
</tr>
<tr>
<td><strong>Vapor density:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Evaporation rate:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Solubility in / Miscibility with Water:</strong></td>
<td>Insoluble.</td>
</tr>
<tr>
<td><strong>Partition coefficient (n-octanol/water):</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td></td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

10.1. Reactivity

No relevant information available.

Chemical stability: Stable under normal temperatures and pressures.

Thermal decomposition / conditions to be avoided:
No decomposition if used and stored according to specifications.

10.2. Possibility of hazardous reactions

Reacts with strong acids and oxidizing agents.
Reacts with strong alkali.

10.3. Conditions to avoid

Moisture.
Prevent formation of dust.

10.4. Incompatible materials

Oxidizers, strong bases, strong acids

10.5. Hazardous decomposition products

Under fire conditions only: Toxic metal oxide smoke

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity:
LD/LC50 values that are relevant for classification:
7439-96-5 manganese
Ora LD50 9000 mg/kg (rat)

Primary irritant effect:
On the skin: Slight irritant effect on skin and mucous membranes.
On the eye: Slight irritant effect on eyes.

Sensitization: Based on available data, the classification criteria are not met.

IARC (International Agency for Research on Cancer):
Substance is not listed.

NTP (National Toxicology Program):
Substance is not listed.

OSHA-Ca (Occupational Safety & Health Administration):
Substance is not listed.

Probable route(s) of exposure:
Ingestion. Eye contact. Skin contact.

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)
Germ cell mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT-single exposure: Based on available data, the classification criteria are not met.
STOT-repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

Aquatic toxicity No relevant information available.

12.2. Persistence and degradability

Inorganic product, is not eliminable from water by means of biological cleaning processes.

12.3. Bioaccumulative potential:

No relevant information available.

12.4. Mobility in soil:

No relevant information available.

12.5. Additional ecological information

General notes: Avoid release to the environment.

12.6. Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

12.7. Other adverse effects

No relevant information available.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Recommendation:
Contact waste processors for recycling information. The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and
federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

13.2. Uncleaned packagings

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

14. TRANSPORT INFORMATION

| UN-Number | DOT, ADR, IMDG, IATA | Not regulated. |
| UN proper shipping name | DOT, ADR, IMDG, IATA | Not regulated. |
| Transport hazard class(es) | DOT, ADR, IMDG, IATA | Not regulated. |
| Class | | |
| Packing group | DOT, ADR, IMDG, IATA | Not regulated. |
| Environmental hazards | | |
| Marine pollutant: | No | |
| Special precautions for user | | Not applicable. |
| Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code | | Not applicable. |

15. REGULATORY INFORMATION

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

**United States (USA)**

**SARA**

- **Section 302 (extremely hazardous substances):**
  - Substance is not listed
- **Section 355 (extremely hazardous substances):**
  - Substance is not listed.
- **Section 313 (Specific toxic chemical listings):**
  - Substance is listed.
- **TSCA (Toxic Substances Control Act)**
  - Substance is listed.
- **Proposition 65 (California)**
  - Chemicals known to cause cancer:
    - Substance is not listed.
Trade Name: Manganese Electrolytic Flakes

Chemicals known to cause reproductive toxicity for females:
Substance is not listed.

Chemicals known to cause reproductive toxicity for males:
Substance is not listed.

Chemicals known to cause developmental toxicity:
Substance is not listed.

Carcinogenic categories

EPA (Environmental Protection Agency):

IARC (International Agency for Research on Cancer):
Substance is not listed.

NIOSH-Ca (National Institute for Occupational Safety and Health):
Substance is not listed.

Canadian Domestic Substances List (DSL):
Substance is listed.

16. OTHER INFORMATION
This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Date of preparation / last revision 02/05/2017 / - 17-08-2017

Abbreviations and acronyms:
ADR: 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
CAS: Chemical Abstracts Service (division of the American Chemical Society) LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
LDLo: Lowest Lethal Dose Observed

Sources
Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org) Patty’s Industrial Hygiene,
Trade Name: Manganese Electrolytic Flakes

Safety Data Sheets, Individual Manufacturers

SDS PREPARED BY:
MANGANESE METAL COMPANY
P O BOX 323
MBOMBELA
1200
TEL NUMBER (013) 7594600
WEBSITE: WWW.MMC.CO.ZA
## 17. AMENDMENT HISTORY

The following information documents the last changes

<table>
<thead>
<tr>
<th>Date</th>
<th>Revised by</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 August 2017</td>
<td>S Kampers Parsley Studios</td>
<td>Changed MMC logo and the document format, no changes to the actual content of the document was made.</td>
</tr>
<tr>
<td>04 May 2018</td>
<td>Twice Mnisi</td>
<td>Section 9 of the MSDS: added dull brown on Manganese flake color</td>
</tr>
</tbody>
</table>