1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1. Product Identifier

Trade name: Manganomanganic Oxide
CAS Number: 7439-96-5
Other means of identification:
Manganese Oxide,
MMC Manganomanganic Oxide
MM12

1.2. Recommended use and restrictions

Recommended Use:
Laboratory Applications, Industrial use.
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: (+27) 759 4600
Fax: (+27) 752 7657
Email: morne.ruiters@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

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA
GHS Classification(s) Specific Target Organ Systemic Toxicity (Repeated Exposure): Category 2

2.2. Label elements

Signal word
Warning
GHS label elements
The substance is classified and labeled according to the Globally Harmonized System (GHS).
Hazard pictograms:

Signal word: Warning
Hazard statements:
H373 May cause damage to organs through prolonged or repeated exposure
Precautionary statements:
P260 Do not breathe dust/fumes/gas/mist/vapour/spray
Response statement(s)
P314 Get medical advice/attention if you feel unwell
DISPOSE Statement(s)
Dispose of contents/container in accordance with relevant regulations

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 (11) oxide</td>
<td>1344-43-0</td>
<td>215-695-8</td>
<td>71.1-71.9%</td>
</tr>
<tr>
<td>NON HAZARDOUS INGREDIENTS</td>
<td>not available</td>
<td>not available</td>
<td>remainder %</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

4.1. Description of first aid measures

After inhalation:
Supply fresh air; consult doctor in case of complaints.
Provide oxygen treatment if affected person has difficulty breathing.

After skin contact:
Remove contaminated clothing
Brush off loose particles from skin. Wash with soap and water until told to stop by a doctor.
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 diphoterine. If symptoms persist, consult a doctor.

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

Most important symptoms and effects, both acute and delayed:
Coughing
Breathing difficulty
Slight irritant effect on eyes.
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:*
- Use an extinguishing agent suitable for surrounding fire
- Fire-extinguishing powder
- Limestone powder
- Dry sand.

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

5.2. **Special hazards arising from the substance or mixture**

Non-flammable, May evolve manganese oxides when heated to decomposition.

5.3. **Advice for firefighters**

Treat as per requirements for surrounding fires. Evacuate area and contact emergency services.

Remain upwind and notify those on the downwind side of hazard. Use waterfog to cool intact contain and nearby storage. Wear full protective equipment including self-Contained breathing Apparatus (SCBA)

**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**

Wear personal Protective equipment (PPE) as detailed in section 8 of the SDS.

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 of 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:
Dust can combine with air to form an explosive mixture.

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:
The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit. At this time, the remaining constituent has no known exposure limits.

<table>
<thead>
<tr>
<th>Component</th>
<th>PEL (USA)</th>
<th>REL (USA)</th>
<th>TLV (USA)</th>
<th>EL (Canada)</th>
<th>EV (Canada)</th>
<th>LMPE (Mexico)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ceiling limit value: 5 mg/m³ as Mn</td>
<td>Short-term value: 3 mg/m³</td>
<td>Long-term value: 1 mg/m³</td>
<td>Long-term value: 0.2 mg/m³ as Mn; R</td>
<td>Long-term value: 0.2 mg/m³ as manganese</td>
<td>Long-term value: 0.2 mg/m³ como Mn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fume, as Mn</td>
<td></td>
<td>*respirable **inhalable fraction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Creating strength.
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.
Do not inhale dust / smoke / mist.
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.

Risk management measures No special requirements.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Powder</td>
</tr>
<tr>
<td>Form</td>
<td>Orange to brown</td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>Not determined.</td>
</tr>
<tr>
<td>pH-value</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Melting point/Melting range</td>
<td>1245-1246 °C (2273-2275 °F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range</td>
<td>2061-2097 °C (3742-3807 °F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammability (solid, gaseous)</td>
<td>May form combustible dust concentrations in air.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Danger of explosion</td>
<td>May form combustible dust concentrations in air.</td>
</tr>
<tr>
<td>Explosion limits</td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Upper</td>
<td>Not determined.</td>
</tr>
</tbody>
</table>
Trade Name: ManganoManganic Oxide

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidizing properties:</td>
<td>Non-oxidizing</td>
</tr>
<tr>
<td>Vapor pressure at 955 °C (1751 °F):</td>
<td>1 Pa</td>
</tr>
<tr>
<td>Density:</td>
<td></td>
</tr>
<tr>
<td>Relative density:</td>
<td>4.5 g/cm³ (60.084 lbs/gal)</td>
</tr>
<tr>
<td>Vapor density:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Solubility in / Miscibility with Water:</td>
<td>Insoluble.</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water):</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Dynamic:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Kinematic:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Other Information</td>
<td>No relevant information available.</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.

May form combustible dust concentrations in air.

10.2. Possibility of hazardous reactions

Reacts with strong acids and oxidizing agents.

Reacts with strong alkali.

Risk of dust explosion if enriched with fine dust in the presence of air.

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
LD50
Oral 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. Inhalation. Eye contact. Skin contact.
Repeated dose toxicity: Long term inhalation of product dust may be harmful.
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.
Safety Data Sheet
ManganoManganic Oxide
acc. to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 regulations

Document owner: MMC Laboratory

Effective Date: 02 May 2017
Revision Date: 17/08/2017
Revision No: 1

Trade Name: ManganoManganic Oxide

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

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

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.
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)
- 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>
</tbody>
</table>