SAFETY DATA SHEET

OB-151

Section 1. Identification

GHS product identifier : OB-151
Chemical name : Tricarbonyl(methylcyclopentadienyl)manganese
Other means of identification : Not available.

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 4
ACUTE TOXICITY (oral) - Category 3
ACUTE TOXICITY (dermal) - Category 3
ACUTE TOXICITY (inhalation) - Category 1
SKIN CORROSION/IRRITATION - Category 2
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
ASPIRATION HAZARD - Category 1
AQUATIC HAZARD (ACUTE) - Category 1
AQUATIC HAZARD (LONG-TERM) - Category 1

GHS label elements
Hazard pictograms :

Signal word : Danger
Hazard statements :
Combustible liquid.
Fatal in contact with skin or if inhaled.
Toxic if swallowed.
Causes skin irritation.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.
Causes damage to organs through prolonged or repeated exposure.
Very toxic to aquatic life with long lasting effects.
Section 2. Hazards identification

Precautionary statements

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Wear respiratory protection. Keep away from flames and hot surfaces. Do not smoke. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not get in eyes, on skin, or on clothing. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response: Collect spillage. Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN: Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or physician. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical attention.

Storage: Store locked up. Store in a well-ventilated place. Keep cool.

Disposal: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified: None known.

Section 3. Composition/information on ingredients

| Substance/mixture | : Mixture |
| Chemical name     | Tricarbonyl(methylcyclopentadienyl)manganese |
| Other means of identification | : Not available. |

CAS number/other identifiers

| CAS number | : Proprietary |
| Product code | : Not available. |

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>%</th>
<th>CAS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>30 - 60</td>
<td>12108-13-3</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy aromatic</td>
<td>30 - 60</td>
<td>64742-94-5</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>1 - 5</td>
<td>95-63-6</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>1 - 5</td>
<td>91-20-3</td>
</tr>
</tbody>
</table>

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Get medical attention.
Section 4. First aid measures

**Inhalation**
- Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

**Skin contact**
- Get medical attention immediately. Call a poison center or physician. Gently wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes.

**Ingestion**
- Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

**Most important symptoms/effects, acute and delayed**

**Potential acute health effects**
- **Eye contact**
  - Causes serious eye irritation.
- **Inhalation**
  - Fatal if inhaled.
- **Skin contact**
  - Fatal in contact with skin. Causes skin irritation.
- **Ingestion**
  - Toxic if swallowed. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.

**Over-exposure signs/symptoms**
- **Eye contact**
  - Adverse symptoms may include the following:
    - pain or irritation
    - watering
    - redness
- **Inhalation**
  - Adverse symptoms include the following:
    - pulmonary congestion,
    - edema and alveolar hemorrhage may be fatal
- **Skin contact**
  - Adverse symptoms may include the following:
    - irritation
    - redness
- **Ingestion**
  - Adverse symptoms may include the following:
    - nausea or vomiting

**Indication of immediate medical attention and special treatment needed, if necessary**
- **Notes to physician**
  - Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- **Specific treatments**
  - No specific treatment.
Section 4. First aid measures

**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

**Extinguishing media**

- **Suitable extinguishing media**: Use dry chemical, CO₂, water spray (fog) or foam.
- **Unsuitable extinguishing media**: Do not use water jet or water-based fire extinguishers.

**Specific hazards arising from the chemical**

- **Hazardous thermal decomposition products**: May be combustible at high temperature.
- **Decomposition products may include the following materials:**
  - carbon dioxide
  - carbon monoxide
  - metal oxide/oxides

**Special protective actions for fire-fighters**: No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters**: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

**Environmental precautions**

**Personal precautions, protective equipment and emergency procedures**

- **For non-emergency personnel**: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

- **For emergency responders**: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- **Environmental precautions**: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up
Section 6. Accidental release measures

**Spill**

- Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

**Precautions for safe handling**

**Protective measures**

- Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Advice on general occupational hygiene**

- Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures. Remove contaminated clothing and protective equipment before entering eating areas.

**Conditions for safe storage, including any incompatibilities**

- Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

**Control parameters**

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>ACGIH TLV (United States, 3/2012). Absorbed through skin. TWA: 0.2 mg/m³, (as Mn) 8 hours. NIOSH REL (United States, 1/2013). Absorbed through skin. TWA: 0.2 mg/m³, (as Mn) 10 hours. OSHA PEL (United States, 6/2010). CEIL: 5 mg/m³, (as Mn)</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>ACGIH TLV (United States, 3/2012). TWA: 123 mg/m³ 8 hours. TWA: 25 ppm 8 hours. NIOSH REL (United States, 1/2013). TWA: 125 mg/m³ 10 hours. TWA: 25 ppm 10 hours. OSHA PEL 1989 (United States, 3/1989).</td>
</tr>
</tbody>
</table>
## Section 8. Exposure controls/personal protection

| Naphthalene | TWA: 25 ppm 8 hours.  
|            | TWA: 125 mg/m³ 8 hours.  
|            | **ACGIH TLV (United States, 3/2012).** Absorbed through skin.  
|            | STEL: 79 mg/m³ 15 minutes.  
|            | STEL: 15 ppm 15 minutes.  
|            | TWA: 52 mg/m³ 8 hours.  
|            | TWA: 10 ppm 8 hours.  
|            | **NIOSH REL (United States, 1/2013).**  
|            | STEL: 75 mg/m³ 15 minutes.  
|            | STEL: 15 ppm 15 minutes.  
|            | TWA: 50 mg/m³ 10 hours.  
|            | TWA: 10 ppm 10 hours.  
|            | **OSHA PEL (United States, 6/2010).**  
|            | TWA: 50 mg/m³ 8 hours.  
|            | TWA: 10 ppm 8 hours.  

### Appropriate engineering controls
- Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### Environmental exposure controls
- Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

### Individual protection measures

#### Hygiene measures
- Wash hands, forearms and face thoroughly after handling chemical products, before eating, drinking, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location.

#### Eye/face protection
- Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

#### Skin protection

##### Hand protection
- Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

##### Body protection
- Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

##### Other skin protection
- Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

##### Respiratory protection
- Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### Appearance

#### Physical state
- Liquid.

#### Color
- Aromatic.

#### Odor
- Not available.

#### Odor threshold

Section 9. Physical and chemical properties

- pH: Not available.
- Melting point: Not available.
- Boiling point: Not available.
- Flash point: Closed cup: 62°C (143.6°F) [Pensky-Martens.]
- Burning time: Not applicable.
- Burning rate: Not applicable.
- Evaporation rate: Not available.
- Flammability (solid, gas): Not available.
- Lower and upper explosive (flammable) limits: Not available.
- Vapor pressure: Not available.
- Vapor density: Not available.
- Relative density: 1.15
- Solubility: Not available.
- Solubility in water: Not available.
- Partition coefficient: n-octanol/water: Not available.
- Auto-ignition temperature: Not available.
- Decomposition temperature: Not available.
- SADT: Not available.
- Viscosity: Kinematic (40°C (104°F)): 0.0144 cm²/s (1.44 cSt)

Section 10. Stability and reactivity

- Reactivity: No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability: The product is stable.
- Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials and alkalis.
- Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity
Section 11. Toxicological information

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>LC50 Inhalation Dusts and mists</td>
<td>Rat</td>
<td>247 mg/m³</td>
<td>1 hours</td>
</tr>
<tr>
<td></td>
<td>LC50 Inhalation Dusts and mists</td>
<td>Rat</td>
<td>76 mg/m³</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>140 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rat</td>
<td>665 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>8 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>18000 mg/m³</td>
<td>4 hours</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>LD50 Oral</td>
<td>Rabbit</td>
<td>&gt;20 g/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>490 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 100 mg</td>
<td>-</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy aromatic</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 500 µL</td>
<td>-</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>495 mg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 0.05 mL</td>
<td>-</td>
</tr>
</tbody>
</table>

**Irritation/Corrosion**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 100 mg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>24 hours 0.05 mL</td>
<td>-</td>
</tr>
</tbody>
</table>

**Sensitization**

There is no data available.

**Carcinogenicity**

**Classification**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>OSHA</th>
<th>IARC</th>
<th>NTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>-</td>
<td>2B</td>
<td>Reasonably anticipated to be a human carcinogen.</td>
</tr>
</tbody>
</table>

**Specific target organ toxicity (single exposure)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Respiratory tract irritation</td>
</tr>
</tbody>
</table>

**Specific target organ toxicity (repeated exposure)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Route of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>Category 1</td>
<td>Inhalation</td>
<td>lungs</td>
</tr>
</tbody>
</table>

**Aspiration hazard**

There is no data available.

**Information on the likely routes of exposure**

Routes of entry anticipated: Oral, Dermal, Inhalation.

**Potential acute health effects**

- **Eye contact**: Causes serious eye irritation.
- **Inhalation**: Fatal if inhaled.
- **Skin contact**: Fatal in contact with skin. Causes skin irritation.
- **Ingestion**: Toxic if swallowed. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.

**Symptoms related to the physical, chemical and toxicological characteristics**
Section 11. Toxicological information

Eye contact: Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation: Adverse symptoms include the following:
pulmonary congestion,
edema and alveolar hemorrhage may be fatal

Skin contact: Adverse symptoms may include the following:
irritation
redness

Ingestion: Adverse symptoms may include the following:
nausea or vomiting

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure
Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.

Long term exposure
Potential immediate effects: No known significant effects or critical hazards.
Potential delayed effects: No known significant effects or critical hazards.

Potential chronic health effects
General: Causes damage to organs through prolonged or repeated exposure.
Carcinogenicity: Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity: No known significant effects or critical hazards.
Teratogenicity: No known significant effects or critical hazards.
Developmental effects: No known significant effects or critical hazards.
Fertility effects: No known significant effects or critical hazards.

Numerical measures of toxicity
Acute toxicity estimates

<table>
<thead>
<tr>
<th>Route</th>
<th>ATE value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>123.3 mg/kg</td>
</tr>
<tr>
<td>Dermal</td>
<td>175 mg/kg</td>
</tr>
<tr>
<td>Inhalation (vapors)</td>
<td>0.08423 mg/L</td>
</tr>
</tbody>
</table>

Section 12. Ecological information

Toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>Acute LC50 4910 µg/l Marine water</td>
<td>Crustaceans - Elasmopus pectenicrus - Adult</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 22.4 mg/L Fresh water</td>
<td>Fish - Tilapia zillii</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 1600 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2350 µg/l Marine water</td>
<td>Crustaceans - Palaemonetes pugio</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 213 µg/l Fresh water</td>
<td>Fish - Melanotaenia fluviatilis - Larvae</td>
<td>96 hours</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>Acute LC50 4910 µg/l Marine water</td>
<td>Crustaceans - Elasmopus pectenicrus - Adult</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 22.4 mg/L Fresh water</td>
<td>Fish - Tilapia zillii</td>
<td>96 hours</td>
</tr>
<tr>
<td></td>
<td>Acute EC50 1600 µg/l Fresh water</td>
<td>Daphnia - Daphnia magna - Neonate</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 2350 µg/l Marine water</td>
<td>Crustaceans - Palaemonetes pugio</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 213 µg/l Fresh water</td>
<td>Fish - Melanotaenia fluviatilis - Larvae</td>
<td>96 hours</td>
</tr>
</tbody>
</table>
Section 12. Ecological information

Persistence and degradability

There is no data available.

Bioaccumulative potential

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogP_	ext{ow}</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl) manganese</td>
<td>3.4</td>
<td>-</td>
<td>low</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy aromatic</td>
<td>2.8 to 6.5</td>
<td>99 to 5780</td>
<td>high</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>3.63</td>
<td>243</td>
<td>low</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>3.4</td>
<td>36.5 to 168</td>
<td>low</td>
</tr>
</tbody>
</table>

Mobility in soil

- **Soil/water partition coefficient (K_	ext{oc})** :
  - There is no data available.

Other adverse effects :

- No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods :

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS #</th>
<th>Status</th>
<th>Reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>Listed</td>
<td>U165</td>
</tr>
</tbody>
</table>

Section 14. Transport information

<table>
<thead>
<tr>
<th>UN number</th>
<th>DOT Classification</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN3281</td>
<td>METAL CARBONYLS, LIQUID, N.O.S. (Tricarbonyl(methylcyclopentadienyl) manganese) RQ</td>
<td>METAL CARBONYLS, LIQUID, N.O.S. (Tricarbonyl(methylcyclopentadienyl) manganese) Marine pollutant (1,2,4-Trimethylbenzene, Naphthalene)</td>
<td>METAL CARBONYLS, LIQUID, N.O.S. (Tricarbonyl(methylcyclopentadienyl) manganese) Marine pollutant (1,2,4-Trimethylbenzene, Naphthalene)</td>
</tr>
</tbody>
</table>
Section 14. Transport information

<table>
<thead>
<tr>
<th>Transport hazard class(es)</th>
<th>6.1</th>
<th>6.1</th>
<th>6.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
<tr>
<td>Additional information</td>
<td>Reportable quantity 2040.8 lbs / 926.53 kg [212.84 gal / 805.68 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.</td>
<td>The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg. Emergency schedules (EmS) F-A, S-A</td>
<td>The environmentally hazardous substance mark may appear if required by other transportation regulations.</td>
</tr>
</tbody>
</table>

Special precautions for user: Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.

Section 15. Regulatory information

U.S. Federal regulations: TSCA 8(a) PAIR: Naphthalene TSCA 8(a) CDR Exempt/Partial exemption: Not determined United States inventory (TSCA 8b): All components are listed or exempted Clean Water Act (CWA) 307: Naphthalene Clean Water Act (CWA) 311: Naphthalene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs): Listed Clean Air Act Section 602 Class I Substances: Not listed Clean Air Act Section 602 Class II Substances: Not listed DEA List I Chemicals (Precursor Chemicals): Not listed DEA List II Chemicals (Essential Chemicals): Not listed

SARA 302/304 Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>EHS</th>
<th>SARA 302 TPQ (lbs)</th>
<th>SARA 304 RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>30 - 60</td>
<td>Yes.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Section 15. Regulatory information

SARA 304 RQ : Not applicable.

SARA 311/312
Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>%</th>
<th>Fire hazard</th>
<th>Sudden release of pressure</th>
<th>Reactive</th>
<th>Immediate (acute) health hazard</th>
<th>Delayed (chronic) health hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>60 - 100</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
<tr>
<td>Solvent naphtha (petroleum), heavy aromatic</td>
<td>30 - 60</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>1 - 5</td>
<td>Yes.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>1 - 5</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
<td>Yes.</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

SARA 313

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tricarbonyl(methylcyclopentadienyl)manganese</td>
<td>12108-13-3</td>
<td>30 - 60</td>
</tr>
<tr>
<td>1,2,4-Trimethylbenzene</td>
<td>95-63-6</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>1 - 5</td>
</tr>
</tbody>
</table>

SARA 304 RQ notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: Tricarbonyl(methylcyclopentadienyl)manganese; 1, 2,4-Trimethylbenzene; Naphthalene

New York : The following components are listed: Tricarbonyl(methylcyclopentadienyl)manganese; Naphthalene

New Jersey : The following components are listed: Tricarbonyl(methylcyclopentadienyl)manganese; 1, 2,4-Trimethylbenzene; Naphthalene

Pennsylvania : The following components are listed: Tricarbonyl(methylcyclopentadienyl)manganese; 1, 2,4-Trimethylbenzene; Naphthalene

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Cancer</th>
<th>Reproductive</th>
<th>No significant risk level</th>
<th>Maximum acceptable dosage level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>Yes.</td>
<td>No.</td>
<td>Yes.</td>
<td>No.</td>
</tr>
</tbody>
</table>

International regulations

International lists : Australia inventory (AICS): Not determined.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.
Section 15. Regulatory information

Chemical Weapons Convention List Schedule I Chemicals
Chemical Weapons Convention List Schedule II Chemicals
Chemical Weapons Convention List Schedule III Chemicals

Section 16. Other information

Hazardous Material Information System (U.S.A.)
Health : 2  Flammability : 2  Physical hazards : 0
Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)
Health : 2  Flammability : 2  Instability : 0
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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History
Date of issue mm/dd/yyyy : 09/15/2013
Date of previous issue : 04/15/2013
Version : 2
Revised Section(s) : 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16
Prepared by : KMK Regulatory Services Inc.
Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations

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Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.