MATERIAL SAFETY DATA SHEET

Date of Issue: 13 March 2000

Revision: 3
ID: cpmg

BIS(CYCLOPENTADIENYL)MAGNESIUM

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY.

Product Name
Bis(cyclopentadienyl)magnesium, Magnesocene

Formula
(C₅H₅)₂Mg

Company Identification
See footer.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation
Bis(cyclopentadienyl)magnesium

Components/Impurities
None

EC No.
Not available.

CAS No.
1284-72-6

3. HAZARDS IDENTIFICATION

Pyrophoric solid. Decomposes violently in water. Skin contact can cause severe burns. Fumes may cause skin and eye irritation. Avoid inhalation of fumes.

4. FIRST AID MEASURES

Prompt medical attention is required in all cases of exposure to Bis(cyclopentadienyl)magnesium and its by-products. Rescue personnel should be equipped with appropriate protective equipment (e.g. Self-contained breathing apparatus) to prevent unnecessary exposure and must be aware of the pyrophoric nature of Bis(cyclopentadienyl)magnesium.

Skin
Contact may cause severe burns. Fumes may cause irritation. Immediately flush affected areas with large quantities of water. Remove affected clothing as rapidly as possible only if not stuck to skin.

Eyes
Contact may cause severe burns. Fumes may cause irritation. Persons with potential exposure to Bis(cyclopentadienyl)magnesium should not wear contact lenses. Flush contaminated eyes with large quantities of water for at least 15 minutes. Hold eyelids open to ensure complete flushing.

Inhalation
May cause irritation. Move exposed personnel to an uncontaminated area quickly using self-contained breathing apparatus. If breathing is difficult, give oxygen. If breathing has stopped, apply artificial respiration. Medical assistance should be sought immediately. Keep victim warm and quiet.

5. FIRE-FIGHTING MEASURES

Extinguishing Media
Always use dry powder, soda ash or lime. Never use water, foam or halogenated compounds to fight fires involving organometallic materials. Without risk, stop flow of this compound to the fire. Without risk, and if safe to do so, move container(s) away from fire area.

Exposure Hazards
In a controlled fire any unreacted Bis(cyclopentadienyl)magnesium may re-ignite when contact with air or water is renewed.

Special Protective Equipment for Fire-Fighters
Self-contained breathing apparatus, face shield and safety goggles, safety shoes and fire resistant gloves.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Evacuate area. Use appropriate protective equipment. Purge equipment with inert gas before attempting repairs. Ensure adequate ventilation. If leak is in container call one of the emergency numbers as appropriate (See footer).

Environmental Precautions
Try to stop release, if safe to do so. For fire-fighting measures see Section 5.

Clean up methods
Contact Epichem for specific advice.

7. HANDLING AND STORAGE

Handling
Valve outlet seals must remain in place unless container is secured and valve outlet piped to use point. Use a check valve or trap to prevent hazardous back flow into the container. Any equipment used for Bis(cyclopentadienyl)magnesium service must be thoroughly cleaned and prepared to eliminate contamination and must be maintained in a leak-free state. All air and moisture in the system must be eliminated before use.

Storage
Protect containers from physical damage. Do not allow temperatures to exceed (125F)51C. Store away from flammable material.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Controls
OSHA or ACGIH:

<table>
<thead>
<tr>
<th>Code</th>
<th>Concentration</th>
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<tbody>
<tr>
<td>TLV(TWA)</td>
<td>10 mg/m³ (magnesium oxide fume)</td>
</tr>
<tr>
<td>PEL(TWA)</td>
<td>15 mg/m³ (magnesium oxide fume) (total particulate)</td>
</tr>
<tr>
<td>TLV(TWA)</td>
<td>75 ppm (203 mg/m³) (cyclopentadiene)</td>
</tr>
<tr>
<td>PEL(TWA)</td>
<td>75 ppm (200 mg/m³) (cyclopentadiene)</td>
</tr>
</tbody>
</table>

OES and MEL: None established.

Ensure adequate ventilation.

Personal Protection
Self-contained breathing apparatus, rubber gloves, face shield and safety goggles, safety shoes and fire-resistant garments. Safety shower and eyewash.
9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: 150°C @ 0.1 mmHg
Vapour Pressure: $\log_{10}P(\text{mmHg})@25^\circ C=0.04 \text{ mmHg}$
$\quad \quad \quad @60^\circ C=0.75 \text{ mmHg}$
Melting Point: (349°F) 176°C
Molecular Weight: 154.49 grams
Solubility in water: Reacts violently.
Appearance: White solid which is pyrophoric.

10. STABILITY AND REACTIVITY

Conditions to avoid
Reacts pyrophorically in air.
Note: Bis(cyclopentadienyl)magnesium is stable indefinitely in an inert atmosphere at room temperature.

Materials to avoid
Avoid oxidizers, water and air

Hazardous Decomposition Products
Cyclopentadiene, Magnesium oxides, CO, CO₂

11. TOXICOLOGICAL INFORMATION

Magnesium compounds are generally of low toxicity. However, Cyclopentadiene is a severe irritant to human tissue and is toxic.

Bis(cyclopentadienyl)magnesium is not listed in the IARC, NTP, or OSHA Subpart Z as a carcinogen or potential carcinogen.

This product is manufactured/distributed in compliance with all provisions of the Toxic Substance Control Act, 15 U.S.C.

12. ECOLOGICAL INFORMATION

This product does not contain any Class I or Class II ozone depleting chemicals.

13. DISPOSAL CONSIDERATIONS

Regional and National regulations should be followed during waste disposal. Contact an Epichem representative for disposal of container and any unused quantities.

14. TRANSPORT INFORMATION

UN No: 2846
CLASS: 4.2
PG I
ECCN#: 3C003
IMDG Code: 4255
Shipping Name: Pyrophoric solid, organic, n.o.s.
(Bis(cyclopentadienyl)Magnesium)

15. REGULATORY INFORMATION

Classification
Highly Flammable, Corrosive

Risk and Safety Phrases
R14: Reacts violently with water.
R17: Spontaneously flammable in air.
R34: Causes burns.
S16: Keep away from sources of ignition – No smoking.
S43a: In case of fire use dry powder or lime - Never use water.
S45: In case of accident or if you feel unwell seek medical advice immediately. (Show label where possible)

16. OTHER INFORMATION

Ensure operators understand the pyrophoric nature of the product. Before using this product, it is recommended that a risk assessment and safety study be carried out. Further information on the use of this product can be obtained from the Technical Product Manager at the nearest Epichem facility.

SAFETY NOTICE: In Order to provide our customers with the highest quality material and maintain our high standards of safety, the surface temperature of the bubbler will be monitored during the transportation of our products. We would like to monitor the surface temperature of the bubbler using a Tempilabel. Tempilabel is a temperature-monitoring strip ranging from 120°F to 150°F (49°C to 66°C) which will indicate the temperature during shipment. The strip will turn black at one of the four ratings shown if the temperature is reached (normally a silver centre). If the temperature monitor is changed, please notify an Epichem representative immediately and we will assist you in the proper measures to be taken. We ask for your co-operation in our efforts of quality assurance and safety. If you have any questions or comments, please contact an Epichem representative. We thank you for your co-operation. Your assistance is greatly appreciated.

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Since the Company shall have no control of the use of the product described herein, the company assumes no liability for loss or damage incurred from the proper or improper use of such product.

EPICHEM LIMITED
POWER ROAD, BROMBOROUGH
WIRRAL, MERSEYSIDE, CH62 3QF, U.K.
Tel: 44 (0) 151 334 2774
Fax: 44 (0) 151 334 6422

EPICHEM INCORPORATED
26 WARD HILL AVE, PO BOX 8230
HAVERHILL, MA, 01835, USA
Tel: 1 508 374 5200
Fax: 1 508 374 6474

24 Hour Emergency Contact Numbers:
Europe: 44 151 334 2774    United States: Chemtrec: (800) 424 9300
Other International Countries: Chemtrec (703) 527 3887