

**'DOCK/  
CHEMICALS**

SEMICONDUCTORS DECISION

$C_{10}H_{10}Fe$

Fe- Precursor for MOVPE and CVD applications

**'Cp<sub>2</sub>Fe - BIS-CYCLOPENTADIENYL-IRON**

**SAFETY DATASHEET**

**'MO-III/V**

# Cp<sub>2</sub>Fe - BIS-CYCLOPENTADIENYL-IRON

## Bis-Cyclopentadienyl-Iron Cp<sub>2</sub>Fe

Revision Date: 20.01.2016

According to EC-Directive  
1907/2006/EC

MO-III/W

### 1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY

#### 1.1 Identification of the product

Product name: Bis-Cyclopentadienyl-Iron  
Acronym: Cp<sub>2</sub>Fe, (Ferrocene)

#### 1.2 Manufacturer / Supplier Information

Dockweiler Chemicals GmbH  
Emil-von-Behring-Str. 76, Postfach 1746, 35007 Marburg, Germany  
T +49 6421 39 -6380 | F -6381

#### Contact for Information

Dockweiler Chemicals GmbH  
T +49 6421 39 -6380 | F -63 81

#### 1.3 Emergency telephone no.: +49 178 433 74 34

In case of intoxication:  
Giftnotrufzentrale - Munich  
T +49 89 41 40 -2211 / -2240 | F +49 89 41 40 -2467  
In case of burn: local hospital and/or specialist near at hand

### 2. HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

Flammable Solids (Category 1)  
Acute toxicity, Oral (Category 4)  
Acute toxicity, Oral (Category 4)  
Acute toxicity, Inhalation (Category 4)  
Acute toxicity, Inhalation (Category 4)  
Reproductive toxicity (Category 2)  
Reproductive toxicity (Category 2)  
Specific target organ toxicity - repeated exposure, Inhalation (Category 2)  
Specific target organ toxicity - repeated exposure, Inhalation (Category 2)  
Chronic aquatic toxicity (Category 1)  
Chronic aquatic toxicity (Category 1)

### 2.2 Label elements

Labelling according to Regulation (EC) No.  
**272/2008**

GHS-Classification



Signal Word: **DANGER**

#### Hazard and Precautionary Statements:

H228: Flammable Solid  
H302: Harmful if swallowed  
H332: Harmful if inhaled  
H361: Suspected of damaging fertility or the unborn child.  
H373: May cause damage to organs through prolonged or repeated exposure if inhaled.  
H410: Very toxic to aquatic life with long lasting effects.

**DOCK/  
CHEMICALS**  
SEMICONDUCTORS DECISION

**SAFETY DATASHEET**

#### Dockweiler Chemicals GmbH

Emil-von-Behring-Strasse 76 35041 Marburg Germany  
T +49 6421 396 -380 | F +49 6421 396 -381  
sales@dockchemicals.com

www.dockchemicals.com

# Cp<sub>2</sub>Fe - BIS-CYCLOPENTADIENYL-IRON

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

P370 + P378 In case of fire: Use dry powder or dry sand to extinguish.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1 Substances

Acronym:	Cp <sub>2</sub> Fe (purity 100% w/w)
CAS-No.:	102-54-5
EG-Index-No.:	203-093-3
EC-No.:	n.r.
ELINCS-No.:	n.r.
Molar mass (g/mol):	186.03
Molecular formula:	C <sub>10</sub> H <sub>10</sub> Fe
Dangerous ingredients:	none

## 4. FIRST AID MEASURES

### 4.1 Description of first aid measures

#### General advice

Consult a physician immediately.

#### Skin contact

Immediately flush affected areas with large quantities of water and wash it with soap and water. Remove contaminated clothing at once.

#### Eyes

Flush contaminated eyes with large quantities of water for at least 15 minutes. Hold eyelids open to ensure complete flushing. Summon eye specialist.

#### Inhalation

Move exposed personnel to an uncontaminated area. Apply fresh air. If breathing is difficult, give oxygen. If breathing has stopped, apply artificial respiration.

#### Ingestion

Induce vomiting. Never give anything to mouth to an unconscious person. Have the conscious and alert person drink 1 to 2 glasses (approx. 400 mL) of water to dilute.

## 5. FIRE-FIGHTING MEASURES

### 5.1 Extinguishing media

Use Water, Sand, Carbondioxide, foam or powder.

### 5.2 Hazards decomposition / combustion products

Development of hazardous combustion gases or vapours possible in the event of fire. The following may develop in event of fire: Ironoxides, Carbon monoxide.

### 5.3 Advice for firefighters

Do not stay in dangerous zone without suitable chemical protection clothes and self-contained breathing apparatus. Prevent fire-fighting water from entering surface water or ground water.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personnel Precautions

Evacuate area. Use appropriate protective equipment. Purge equipment with inert gas before attempting repairs. Ensure adequate ventilation. Avoid inhalation of vapors/aerosols or dust. Avoid substance contact.

### 6.2 Environmental Precautions

Do not allow product to enter sewerage system. For fire-fighting measures see section 5.

### 6.3 Methods for cleaning up

Take up dry or with liquid-absorbent material. Forward for disposal. Clean up affected areas. Contact Dockweiler Chemicals GmbH for specific advice.

# Cp<sub>2</sub>Fe - BIS-CYCLOPENTADIENYL-IRON

## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe 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-Iron 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. Keep away from sources of ignition. Take measures to prevent electrostatic charging.

### 7.2 Conditions for safe storage, including any storage

Protect container from physical damage. Do not allow temperatures to exceed 100 °C (212°F). Store away from flammable materials.

## 8. LIMITATION AND MONITORING OF EXPOSURE AND PERSONAL PROTECTION

### 8.1 Exposure Controls

OSHA or ACGIH: 75 ppm (Cyclopentadiene)  
OES and MEL: long-term exposure limit 10 mg/m<sup>3</sup> (8-hour TWA reference period), short term exposure limit 20 mg/m<sup>3</sup> (15 minutes reference period) Ensure adequate ventilation

#### Personal Protection

Self-contained breathing apparatus, fire resistant gloves, face shield and safety goggles, safety shoes and fire resistant garments. Safety shower and eyewash.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Colour: orange-yellow  
State: solid  
Odour: aromatic  
pH-Value: n.a.  
Viscosity (mPa\*s; 20°C): n.a.  
Density (g/ccm; 20°C) solid 1.49  
Boiling Point (1013 mbar): 249°C / 480°F  
Melting Point: 172-174°C / 341-345°F  
Flashpoint: 27°C / 81°F  
Flammability: The substance or mixture is a flammable solid with the category 1.

Auto-Ignition Temperature: n.a.

Partition coefficient: n-octanol/water: log Pow: 2,66 - The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modelling.

Explosion-Limit Vol %: n.a.  
Vapor Pressure (20°C): 0.005 mbar  
Solubility in Water (20°C): 0,0001g/l slightly soluble  
Solubility in aliphatic Hydrocarbons & alcohols (20°C): soluble

## 10. STABILITY AND REACTIVITY

### 10.1 Conditions to avoid

Heating above 100°C.

### 10.3 Materials to avoid

Avoid oxidisers, strong acids, alkali-metals, alkaline earth- metals, aluminium powder.

### 10.3 Hazardous Decomposition Products

Irritant dusts of Ironoxides, and fumes of Carbon dioxide, Carbon monoxide, Cyclopentadienes or hydrocarbons.

## 11. TOXICOLOGICAL INFORMATION

#### Acute toxicity:

LD50 (oral, rat) 1320 mg/Kg

#### Subacute to chronic toxicity:

no data available

#### Further toxicological information:

After swallowing no description of toxic symptoms. The product should be handled with care usual when dealing with chemicals. The product is listed on TSCA inventory.

## 12. ECOLOGICAL INFORMATION

Biologic Degradation  
Biodegradation: 60% / 28d

Ecotoxic Effects  
Daphnia Toxicity: Daphnia EC50 (2.7 mg/L)  
Daphnia Magna NOEC: <0.002 mg/L  
21d  
Algal Toxicity: alga EC50 (2.8 mg/L)  
Fish Toxicity: L.idus LC (4.5 mg/L) 31d

Toxic for aquatic organisms. May cause long-term adverse effects in the aquatic environment.

#### Further Ecologic Data

No specific data available. Do not allow to enter waters, waste water or soil.

# Cp<sub>2</sub>Fe - BIS-CYCLOPENTADIENYL-IRON

## 13. WASTE DISPOSAL CONSIDERATIONS

Regional and national regulations should be followed during waste disposal. Contact Dockweiler Chemicals GmbH representatives for waste disposal of unused quantities and regeneration of refilling containers.

## 14. TRANSPORT INFORMATION

### ADR/RID 2015

GGVS/GGVE-class: 4.1  
ADR/RID-class: 4.1  
UN-no: 1325  
Packaging group: II

### IMDG ARNDT. 37-14

IMDG/GGVSee-class: 4.1  
UN-no: 1325  
Packaging group: II  
EmS: F-A, S-G  
Shipping Name: FLAMMABLE SOLID,  
ORGANIC, N.O.S.  
Bis-(Cyclopentadienyl)-Iron  
Special Provision: 274,915

### ICAO/IATA 2015

ICAO/IATA-class: 4.1  
UN-no: 1325  
Packaging Group: II  
PAX-PIN: 445  
CAO-PIN: 448

## 15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No.1907/2006.

## 16. OTHER INFORMATION

DATE: 20.01.2016

Ensure operators understand the flammable, harmful and toxic for aquatic organism's nature of this product. Before using this product it is recommended that a risk assessment and safety study be carried out.

The above mentioned information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Dockweiler Chemicals GmbH shall not be held liable for any damage resulting from handling or from contact with the above product.

**DOCK/  
CHEMICALS**  
SEMICONDUCTORS DECISION

**SAFETY DATASHEET**

### Dockweiler Chemicals GmbH

Emil-von-Behring-Strasse 76 35041 Marburg Germany  
T +49 6421 396 -380 | F +49 6421 396 -381  
sales@dockchemicals.com

www.dockchemicals.com