

# SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Aug 10, 2017

Revision Date: Aug 10, 2017

## 1. Identification

### 1.1 GHS Product identifier

Product name ferrocene

### 1.2 Other means of identification

Product number -

Other names Di(cyclopentadienyl)iron

### 1.3 Recommended use of the chemical and restrictions on use

Identified uses For industry use only.

Uses advised against no data available

### 1.4 Supplier's details

### 1.5 Emergency phone number

Emergency phone number -

Service hours Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

## 2. Hazard identification

### 2.1 Classification of the substance or mixture

Flammable solids, Category 1

Acute toxicity - Oral, Category 4

Acute toxicity - Inhalation, Category 4

Reproductive toxicity, Category 1B

Specific target organ toxicity – repeated exposure, Category 2

Hazardous to the aquatic environment, long-term (Chronic) - Category

Chronic 1

## 2.2 GHS label elements, including precautionary statements



**Pictogram(s)**



**Signal word**

Danger

**Hazard statement(s)**

H228 Flammable solid

H302+H332 Harmful if swallowed or if inhaled

H361 Suspected of damaging fertility or the unborn child

H373 May cause damage to organs through prolonged or repeated exposure

H410 Very toxic to aquatic life with long lasting effects

**Precautionary statement(s)**

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

P240 Ground and bond container and receiving equipment.

**Prevention**

P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.

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

P264 Wash ... thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P261 Avoid breathing  
dust/fume/gas/mist/vapours/spray.

P271 Use only outdoors or in a well-ventilated  
area.

P201 Obtain special instructions before use.

P202 Do not handle until all safety  
precautions have been read and understood.

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

P273 Avoid release to the environment.

P370+P378 In case of fire: Use ... to  
extinguish.

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

P330 Rinse mouth.

P304+P340 IF INHALED: Remove person to  
fresh air and keep comfortable for breathing.

P312 Call a POISON CENTER/doctor/...if you  
feel unwell.

P308+P313 IF exposed or concerned: Get  
medical advice/ attention.

P314 Get medical advice/attention if you feel  
unwell.

P391 Collect spillage.

**Response**

**Storage**

P405 Store locked up.

**Disposal**

P501 Dispose of contents/container to ...

**2.3 Other hazards which do not result in classification**

none

**3.Composition/information on ingredients**

**3.1 Substances**

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
ferrocene	ferrocene	102-54-5	none	100%

## **4. First-aid measures**

### **4.1 Description of necessary first-aid measures**

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest.

In case of skin contact

Rinse and then wash skin with water and soap.

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth.

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

Exposure Routes: inhalation, ingestion, skin and/or eye contact Symptoms:

Possible irritation eyes, skin, respiratory system Target Organs: Eyes, skin, respiratory system, liver, blood, reproductive system (NIOSH, 2016)

### **4.3 Indication of immediate medical attention and special treatment needed, if necessary**

Basic treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary.

Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for shock and treat if necessary ... . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. /Iron and related compounds/

## **5. Fire-fighting measures**

### **5.1 Extinguishing media**

Suitable extinguishing media

Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher.

### **5.2 Specific hazards arising from the chemical**

Flash point data for this chemical are not available. It is probably combustible.

### **5.3 Special protective actions for fire-fighters**

Wear self-contained breathing apparatus for firefighting if necessary.

## **6. Accidental release measures**

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

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

## **6.2 Environmental precautions**

Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Personal protection: particulate filter respirator adapted to the airborne concentration of the substance.

## **6.3 Methods and materials for containment and cleaning up**

Pick up and arrange disposal. Sweep up and shovel. Keep in suitable, closed containers for disposal.

## **7. Handling and storage**

### **7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

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

Separated from strong oxidants.

## **8. Exposure controls/personal protection**

### **8.1 Control parameters**

Occupational Exposure limit values

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 10 mg/cu m (total particulate); 5 mg/cu m (respirable fraction).

Biological limit values

no data available

### **8.2 Appropriate engineering controls**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

### **8.3 Individual protection measures, such as personal protective equipment (PPE)**

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

### **9. Physical and chemical properties**

<b>Physical state</b>	yellow to orange powder
<b>Colour</b>	Orange, crystalline solid
<b>Odour</b>	Camphor-like
<b>Melting point/ freezing point</b>	101°C(lit.)
<b>Boiling point or initial boiling point and boiling range</b>	249°C(lit.)
<b>Flammability</b>	Combustible Solid Combustible.
<b>Lower and upper explosion limit / flammability limit</b>	no data available
<b>Flash point</b>	113°C(lit.)
<b>Auto-ignition temperature</b>	no data available
<b>Decomposition temperature</b>	no data available
<b>pH</b>	no data available
<b>Kinematic viscosity</b>	no data available
<b>Solubility</b>	In water: practically insoluble
<b>Partition coefficient n-octanol/water (log value)</b>	no data available

Vapour pressure 0.03 mm Hg ( 40 °C)

Density and/or relative density 1.49

Relative vapour density no data available

Particle characteristics no data available

## 10. Stability and reactivity

### 10.1 Reactivity

no data available

### 10.2 Chemical stability

Unusually stable

### 10.3 Possibility of hazardous reactions

FIRE HAZARD: Moderate FERROCENE reacts violently with tetranitromethane. . Contact of tetranitromethane with ferrocene under various conditions leads to violent explosion, [Trans. Met. Chem., 1979, 4, 207-208].

### 10.4 Conditions to avoid

no data available

### 10.5 Incompatible materials

Reacts violently with /Ammonium perchlorate/.

### 10.6 Hazardous decomposition products

When heated to decomposition it emits acrid smoke and irritating fumes.

## 11. Toxicological information

Acute toxicity

- Oral: LD50 Mouse oral approx 600 mg/kg
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

no data available  
STOT-repeated exposure

no data available  
Aspiration hazard

no data available

## **12. Ecological information**

### **12.1 Toxicity**

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

### **12.2 Persistence and degradability**

no data available

### **12.3 Bioaccumulative potential**

no data available

### **12.4 Mobility in soil**

no data available

### **12.5 Other adverse effects**

no data available

## **13. Disposal considerations**

### **13.1 Disposal methods**

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill.

Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

## **14. Transport information**

### **14.1 UN Number**

ADR/RID: UN1325IMDG: UN1325IATA: UN1325

### **14.2 UN Proper Shipping Name**

ADR/RID: FLAMMABLE SOLID, ORGANIC, N.O.S.



IMDG: FLAMMABLE SOLID, ORGANIC, N.O.S.

IATA: FLAMMABLE SOLID, ORGANIC, N.O.S.

#### 14.3 Transport hazard class(es)

ADR/RID: 4.1IMDG: 4.1IATA: 4.1

#### 14.4 Packing group, if applicable

ADR/RID: IIIIMDG: IIIIATA: II

#### 14.5 Environmental hazards

ADR/RID: yesIMDG: yesIATA: yes

#### 14.6 Special precautions for user

no data available

#### 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

### 15.Regulatory information

#### 15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
ferrocene	ferrocene	102-54-5	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

#### 16.Other information

## Information on revision

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### Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

### References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

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Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.