SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name: Iron(II) chloride tetrahydrate
Product Number: 220299
Brand: SIGALD
CAS-No.: 13478-10-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO  63103
UNITED STATES
Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H302 Harmful if swallowed.
H318 Causes serious eye damage.
Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear eye protection/ face protection.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms: Ferrous chloride

Formula: \( \text{Cl}_2 \text{Fe} \cdot 4\text{H}_2\text{O} \)
Molecular weight: 198.81 g/mol
CAS-No.: 13478-10-9
EC-No.: 231-843-4

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferrous chloride tetrahydrate</td>
<td>Acute Tox. 4; Eye Dam. 1; H302, H318</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures
No data available

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
No data available
5.2 **Special hazards arising from the substance or mixture**
Hydrogen chloride gas
Iron oxides
Not combustible.

5.3 **Advice for firefighters**
No data available

5.4 **Further information**
No data available

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**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**
For personal protection see section 8.

6.2 **Environmental precautions**
No data available

6.3 **Methods and materials for containment and cleaning up**
No data available

6.4 **Reference to other sections**
For disposal see section 13.

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**SECTION 7: Handling and storage**

7.1 **Precautions for safe handling**
For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 **Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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**SECTION 8: Exposure controls/personal protection**

8.1 **Control parameters**

**Ingredients with workplace control parameters**
Contains no substances with occupational exposure limit values.

8.2 **Exposure controls**

**Personal protective equipment**

**Skin protection**
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: 480 min  
Material tested: KCL 741 Dermatril® L  

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Splash contact  
Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: 480 min  
Material tested: KCL 741 Dermatril® L  

**Respiratory protection**  
required when dusts are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**  
Prevent product from entering drains.

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
</table>
| **Appearance** | Form: Fine crystals and fragments  
Color: light green |
| **Odor** | No data available |
| **Odor Threshold** | No data available |
| **pH** | 2.5 at 100 g/l at 20 °C (68 °F)  
0.1 at 590 g/l at ca.22 °C (ca.72 °F) |
| **Melting point/freezing point** | Melting point: 105 - 110 °C (221 - 230 °F) - Elimination of water of crystallization |
| **Initial boiling point and boiling range** | 1,023 °C  
1,873 °F |
| **Flash point** | ()does not flash |
| **Evaporation rate** | No data available |
| **Flammability (solid, gas)** | The product is not flammable. |
| **Upper/lower flammability or explosive limits** | No data available |
| **Vapor pressure** | 13.3 hPa at 693 °C (1279 °F) |
| **Vapor density** | No data available |
| **Relative density** | No data available |
| **Water solubility** | ca.650 g/l at 25 °C (77 °F) - solubleca.1,600 g/l at 10 °C (50 °F) |
9.2 Other safety information

Solubility in other solvents
- Acetone at 20 °C (68 °F) - soluble
- Alcohol at 20 °C (68 °F) - soluble
- Benzene at 20 °C (68 °F) - slightly soluble
- Diethyl ether at 20 °C (68 °F) - practically insoluble

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
Violent reactions possible with:
- Alkali metals

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Metals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
- LD50 Oral - Rat - female - 500 mg/kg (OECD Test Guideline 423)
- LC50 Inhalation - Rat - male - 5 min - 8.3 mg/l
Remarks: (ECHA)
- LD50 Dermal - Rat - male and female - > 2,000 mg/kg (OECD Test Guideline 402)
No data available
**Skin corrosion/irritation**  
Skin - Rabbit  
Result: No skin irritation - 4 h  
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**  
Eyes - Rabbit  
Result: Irreversible effects on the eye  
(OECD Test Guideline 405)  
Remarks: (anhydrous substance)

**Respiratory or skin sensitization**  
Maximization Test - Guinea pig  
Result: negative  
(OECD Test Guideline 406)

**Germ cell mutagenicity**  
Test Type: Ames test  
Test system: Escherichia coli/Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: (anhydrous substance)

Test Type: In vitro mammalian cell gene mutation test  
Test system: mouse lymphoma cells  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 476  
Result: negative

Test Type: In vivo micronucleus test  
Species: Mouse  
Cell type: Bone marrow  
Application Route: Intraperitoneal injection  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: (anhydrous substance)

**Carcinogenicity**  
IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**  
No data available

**Specific target organ toxicity - single exposure**  
No data available
Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information
Repeated dose toxicity - Rat - male and female - Oral - NOAEL (No observed adverse effect level) - 125 mg/kg
Repeated dose toxicity - Rabbit - male - Inhalation - 2 Months
Remarks: (ECHA)
RTECS: NO5600000

Overdose of iron compounds may have a corrosive effect on the gastrointestinal mucosa and be followed by necrosis, perforation, and stricture formation. Several hours may elapse before symptoms that can include epigastric pain, diarrhea, vomiting, nausea, and hematemesis occur. After apparent recovery a person may experience metabolic acidosis, convulsions, and coma hours or days later. Further complications may develop leading to acute liver necrosis that can result in death due to hepatic coma. Symptoms may be delayed. Effects due to ingestion may include: Epigastric pain, Diarrhea, Vomiting, Nausea, hematemesis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

The following applies to soluble iron compounds: nausea and vomiting after swallowing. The absorption of large quantities is followed by cardiovascular disorders. Toxic effect on liver and kidneys.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available
Toxicity to bacteria Remarks: (in analogy to similar products)
The value is given in analogy to the following substances:
aluminium(III) chloride, anhydrous
(Ferrous chloride tetrahydrate)

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available
12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
No data available

SECTION 14: Transport information

DOT (US)
NA-Number: 1759  Class: 8  Packing group: II
Proper shipping name: Ferrous chloride, solid (Ferrous chloride tetrahydrate)
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3260  Class: 8  Packing group: II  EMS-No: F-A, S-B
Proper shipping name: CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (Ferrous chloride tetrahydrate)

IATA
UN number: 3260  Class: 8  Packing group: II
Proper shipping name: Corrosive solid, acidic, inorganic, n.o.s. (Ferrous chloride tetrahydrate)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the