SAFETY DATA SHEET

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

1.1 Product identifiers

Product name: Cobalt(II) chloride hexahydrate
Product Number: 202185
Brand: SIGALD
Index-No.: 027-004-00-5
CAS-No.: 7791-13-1

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.
Address: 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
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity, Inhalation (Category 1B), H350
Reproductive toxicity (Category 1B), H360
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410
2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard statement(s)
- H302 Harmful if swallowed.
- H317 May cause an allergic skin reaction.
- H318 Causes serious eye damage.
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H341 Suspected of causing genetic defects.
- H350 May cause cancer by inhalation.
- H360 May damage fertility or the unborn child.
- H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P261 Avoid breathing dust.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P272 Contaminated work clothing must not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P285 In case of inadequate ventilation wear respiratory protection.
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
- P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
- P304 + P341 IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
- 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.
- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
- P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
- P363 Wash contaminated clothing before reuse.
- P391 Collect spillage.
- P405 Store locked up.
- 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: Cobaltous chloride

<table>
<thead>
<tr>
<th>Formula</th>
<th>Cl₂Co · 6H₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular weight</td>
<td>237.93 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>7791-13-1</td>
</tr>
<tr>
<td>EC-No.</td>
<td>231-589-4</td>
</tr>
<tr>
<td>Index-No.</td>
<td>027-004-00-5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt dichloride hexahydrate</td>
<td>Acute Tox. 4; Eye Dam. 1; Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1B; Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H302, H318, H334, H317, H341, H350, H360, H400, H410 Concentration limits: &gt;= 0.01 %: Carc. 1B, H350;</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

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

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.
SECTION 5: Firefighting measures

5.1 Extinguishing media
- Suitable extinguishing media
  Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media
  For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
- Hydrogen chloride gas
- Cobalt/cobalt oxides
- Not combustible.
  Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
- Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
- Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
- Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
  For personal protection see section 8.

6.2 Environmental precautions
- Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
- Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

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

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Advice on safe handling
  Work under hood. Do not inhale substance/mixture.
**Hygiene measures**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

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

**Storage conditions**
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

**Storage class**
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

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**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt dichloride hexahydrate</td>
<td>7791-13-1</td>
<td>TWA</td>
<td>0.02 mg/m3</td>
<td>USA, ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td>Dermal Sensitization</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Respiratory sensitization</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Confirmed animal carcinogen with unknown relevance to humans</td>
</tr>
</tbody>
</table>

**Biological occupational exposure limits**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt dichloride hexahydrate</td>
<td>7791-13-1</td>
<td>Cobalt</td>
<td>15 µg/l</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of shift at end of workweek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cobalt</td>
<td></td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of shift at end of workweek</td>
</tr>
</tbody>
</table>

8.2 **Exposure controls**

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
Personal protective equipment

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

**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 EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

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

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 EN 16523-1 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®

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P3
The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented. 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**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

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

a) Appearance
   Form: powder
   Color: blue

b) Odor
   No data available
c) Odor Threshold  No data available

d) pH  No data available

e) Melting point/freezing point  Melting point: 737 °C (1359 °F)

f) Initial boiling point and boiling range  1,049 °C, 1,920 °F at 1,013 hPa

g) Flash point  (Not applicable)

h) Evaporation rate  No data available

i) Flammability (solid, gas)  The product is not flammable.

j) Upper/lower flammability or explosive limits  No data available

k) Vapor pressure  No data available

l) Vapor density  No data available

m) Density  3.36 g/cm3 at 25 °C (77 °F)

   Relative density  No data available

n) Water solubility  soluble

o) Partition coefficient: n-octanol/water  log Pow: 0.85 - (Lit.), Bioaccumulation is not expected.

p) Autoignition temperature  No data available

q) Decomposition temperature  No data available

r) Viscosity  No data available

s) Explosive properties  No data available

t) Oxidizing properties  none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
Risk of explosion with:
Alkali metals
10.4 **Conditions to avoid**
Exposure to moisture.
no information available

10.5 **Incompatible materials**
No data available

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

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**SECTION 11: Toxicological information**

11.1 **Information on toxicological effects**

**Acute toxicity**
LD50 Oral - Rat - male and female - 537 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rat - > 2,000 mg/kg
Remarks: (RTECS)
The value is given in analogy to the following substances: Tricobalt tetraoxide

**Skin corrosion/irritation**
No data available

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Irreversible effects on the eye
(OECD Test Guideline 405)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: Cobalt(II) chloride

**Respiratory or skin sensitization**
May cause allergic respiratory and skin reactions Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2) The value is given in analogy to the following substances:

**Germ cell mutagenicity**
Suspected of causing genetic defects.

**Carcinogenicity**
May cause cancer by inhalation.
IARC: 2A - Group 2A: Probably carcinogenic to humans (Cobalt dichloride hexahydrate)
NTP: RAHC - Reasonably anticipated to be a human carcinogen (Cobalt dichloride hexahydrate)
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**
May damage the unborn child.
May damage fertility.

**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

RTECS: GG0200000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Symptoms of an acute cobalt intoxication: diarrhoea, loss of appetite, drop in body temperature, drop in blood pressure. Toxic effect on kidneys (proteinuria, anuria), heart, and pancreas.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (Chronic toxicity)
flow-through test NOEC - Pimephales promelas (fathead minnow) - 0.21 mg/l
Remarks: (ECHA)
The value is given in analogy to the following substances: Cobalt(II) chloride

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
Remarks: (ECHA)
The value is given in analogy to the following substances: Cobalt(II) chloride (Cobalt dichloride hexahydrate)

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 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted
12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
UN number: 3077  Class: 9  Packing group: III  EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt dichloride hexahydrate)
Marine pollutant: yes
Marine pollutant: no

IATA
UN number: 3077  Class: 9  Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Cobalt dichloride hexahydrate)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids. Packages smaller than or equal to 5 kg / L, not dangerous goods of Class 9

SECTION 15: Regulatory information

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

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:
Cobalt dichloride hexahydrate

CAS-No. 7791-13-1
Revision Date 2015-07-08

**SARA 311/312 Hazards**
Acute Health Hazard, Chronic Health Hazard

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

**Pennsylvania Right To Know Components**
Cobalt dichloride hexahydrate
CAS-No. 7791-13-1
Revision Date 2015-07-08

**SECTION 16: Other information**

**Further information**
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. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.13 Revision Date: 10/14/2023 Print Date: 12/16/2023