# Material Safety Data Sheet

## 1 Identification of the substance/mixture and of the company/undertaking

**Product identifier**

**Product name:** Cobalt(II) chloride hexahydrate

**Stock number:** A16346, L14465

**CAS Number:** 7791-13-1

**EINECS Number:** 231-589-4

**Index number:** 027-004-00-5

**Relevant identified uses of the substance or mixture and uses advised against.**

**Sector of Use SU24** Scientific research and development

**Details of the supplier of the safety data sheet**

**Manufacturer/Supplier:** Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

**Information Department:** Health, Safety and Environmental Department

**Emergency telephone number:**

During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

## 2 Hazards identification

**Classification of the substance or mixture**

### GHS08 Health hazard

- **H334** May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **H341** Suspected of causing genetic defects.
- **H350** May cause cancer.
- **H360** May damage fertility or the unborn child.

### GHS09 Environment

- **H400** Very toxic to aquatic life.
- **H410** Very toxic to aquatic life with long lasting effects.

### GHS07

- **H302** Harmful if swallowed.
- **H317** May cause an allergic skin reaction.

**Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

- **T; Toxic**
  - **R49-60:** May cause cancer by inhalation. May impair fertility.
- **Xn; Harmful**
  - **R22-68:** Harmful if swallowed. Possible risk of irreversible effects.
- **Xi; Irritant**
  - **R42/43:** May cause sensitization by inhalation and skin contact.
- **N; Dangerous for the environment**
  - **R50/53:** Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Material Safety Data Sheet
According to OSHA and ANSI

Printing date 06/01/2011 Reviewed on 10/18/2010

Product name: Cobalt(II) chloride hexahydrate

Label elements
Labelling according to EU guidelines:

Code letter and hazard designation of product:
T Toxic
N Dangerous for the environment

Risk phrases:
49 May cause cancer by inhalation.
60 May impair fertility
22 Also harmful if swallowed.
42/43 May cause sensitization by inhalation and skin contact.
68 Possible risk of irreversible effects.
50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Safety phrases:
53 Avoid exposure - obtain special instructions before use.
45 In case of accident or if you feel unwell, seek medical advice immediately.
60 This material and its container must be disposed of as hazardous waste.
61 Avoid release to the environment. Refer to special instructions/Safety data sheets

Hazard description:

WHMIS classification

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH 1 Health (acute effects) = 1
          Flammability = 0
          Reactivity = 1

FIRE 0

REACTIVITY 1

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients
Chemical characterization: Substances
(CAS#) Description:
Cobalt(II) chloride hexahydrate (CAS# 7791-13-1)
Identification number(s):
EINECS Number: 231-589-4
Index number: 027-004-00-5

4 First aid measures
Description of first aid measures
After inhalation
Supply fresh air and to be sure call for a doctor.
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Firefighting measures
Extinguishing media
Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.

Special hazards arising from the substance or mixture
In case of fire, the following can be released:

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Toxic metal oxide fume
Hydrogen chloride (HCl)

Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation

Environmental precautions:
Do not allow material to be released to the environment without proper governmental permits.

Methods and material for containment and cleaning up:
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Open and handle container with care.
Prevent formation of dust.

Information about protection against explosions and fires: The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage
Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:
Store away from oxidizing agents.
Store away from water/moisture.
Store away from strong bases.

Further information about storage conditions:
This product is hygroscopic.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Protect from humidity and water.

8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters
Components with limit values that require monitoring at the workplace:

Cobalt, elemental & inorganic compounds, as Co
mg/m3
ACGIH TLV 0.02; Confirmed animal carcinogen
Austria Carcinogen
Belgium TWA 0.05
Denmark TWA 0.05
Finland TWA 0.05 (skin)
Germany Carcinogen
Hungary TWA 0.1; 0.2-STEL
Japan OEL 0.05; 2B Carcinogen
Korea TLV 0.02; Confirmed animal carcinogen
Ireland TWA 0.1
Netherlands MAC-TGG 0.05
Norway TWA 0.05
Poland TWA 0.05; 0.2-STEL
Russia 0.5-STEL
Sweden NGV 0.05
Switzerland MAK-W 0.1; Carcinogen
United Kingdom TWA 0.1

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8 Physical and chemical properties

<table>
<thead>
<tr>
<th>Information on basic physical and chemical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>General information</td>
</tr>
<tr>
<td>Appearance</td>
</tr>
<tr>
<td>Form: Crystalline</td>
</tr>
<tr>
<td>Color: Red-purple</td>
</tr>
<tr>
<td>Odor: Odorless</td>
</tr>
<tr>
<td>Odour threshold: Not determined.</td>
</tr>
<tr>
<td>pH-value (50 g/l) at 20°C (68 °F): 4.9</td>
</tr>
<tr>
<td>Change in condition</td>
</tr>
<tr>
<td>Melting point/Melting range: 87°C (189 °F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range: Not determined</td>
</tr>
<tr>
<td>Sublimation temperature / start: Not determined</td>
</tr>
<tr>
<td>Flash point: Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gaseous) Not determined.</td>
</tr>
<tr>
<td>Ignition temperature: Not determined</td>
</tr>
<tr>
<td>Decomposition temperature: Not determined</td>
</tr>
<tr>
<td>Auto igniting: Not determined.</td>
</tr>
<tr>
<td>Danger of explosion: Product does not present an explosion hazard.</td>
</tr>
<tr>
<td>Explosion limits:</td>
</tr>
<tr>
<td>Lower: Not determined</td>
</tr>
<tr>
<td>Upper: Not determined</td>
</tr>
<tr>
<td>Vapor pressure: Not applicable.</td>
</tr>
<tr>
<td>Density at 20°C (68 °F): 1.924 g/cm³ (16.056 lbs/gal)</td>
</tr>
<tr>
<td>Relative density: Not determined.</td>
</tr>
<tr>
<td>Vapour density: Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate: Not applicable.</td>
</tr>
<tr>
<td>Solubility in / Miscibility with Water at 20°C (68 °F): 970 g/l</td>
</tr>
<tr>
<td>Segregation coefficient (n-octonol/water): Not determined.</td>
</tr>
<tr>
<td>Viscosity:</td>
</tr>
<tr>
<td>dynamic: Not applicable.</td>
</tr>
<tr>
<td>kinematic: Not applicable.</td>
</tr>
<tr>
<td>Other information No further relevant information available.</td>
</tr>
</tbody>
</table>

9 Stability and reactivity

Reactivity

Chemical stability

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
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Product name: Cobalt(II) chloride hexahydrate

Possibility of hazardous reactions
No dangerous reactions known

Incompatible materials:
Water/moisture
Bases
Oxidizing agents

Hazardous decomposition products: Toxic metal oxide fume

11 Toxicological information

Information on toxicological effects

Acute toxicity:

<table>
<thead>
<tr>
<th>LD50/ LC50 values that are relevant for classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50 &gt;766 mg/kg (rat) (RTECS)</td>
</tr>
<tr>
<td>Dermal LD50 &gt;2 gm/kg (rat) (RTECS)</td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.

Sensitization:
Sensitization possible through inhalation.
Sensitization possible through skin contact.

Other information (about experimental toxicology):
Reproductive effects have been observed on tests with laboratory animals.
Mutagenic effects have been observed on tests with bacteria.

Subacute to chronic toxicity:
Cobalt is an experimental neoplastigen and tumorigen. It is an experimental carcinogen of the connective tissue and lungs. Cobalt metal and inorganic compounds are classified as an animal carcinogen by the ACGIH. Ingestion may cause burning in the mouth, esophagus, and stomach. Inhalation of ducts and fumes may cause irritation of the respiratory tract and labored breathing and coughing. Sensitization, nausea, flushing of the face and ringing in the ears is also possible. Chronic ingestion may result in pericardial effusion, polycardial effusion, cardiac failure, vomiting, convulsions and thyroid enlargement.

Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
Behavioral - tremor.
Gastrointestinal - hypermotility, diarrhea.
Nutritional and Gross Metabolic - weight loss or decreased weight gain.
Cardiac - other changes.
Skin and Appendages - dermatitis, other (after systemic exposure).
Liver - other changes.
Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases.
Reproductive - Paternal Effects - testes, epididymis, sperm duct.
Reproductive - Paternal Effects - other effects on male.
Reproductive - Paternal Effects - prostate, seminal vesicle, Cowper's gland, accessory glands.
Reproductive - Paternal Effects - spermatogenesis (including genetic material, sperm morphology, motility, and count).
Reproductive - Fertility - male fertility index (e.g. # males impregnating females per # males exposed to fertile nonpregnant females)
Reproductive - Specific Developmental Abnormalities - musculoskeletal system.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.
ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

12 Ecological information

Toxicity
Acquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Behavior in environmental systems:
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
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Reviewed on 10/18/2010

Product name: Cobalt(II) chloride hexahydrate

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Ecotoxicological effects:
Remark: Very toxic for aquatic organisms
Additional ecological information:
General notes:
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
Very toxic for aquatic organisms

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation: Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

DOT regulations:

Hazard class: 9
Identification number: UN3077
Packing group: III
Proper shipping name (technical name): ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) chloride hexahydrate)
Label: 9
Remarks: Special marking with the symbol (fish and tree).

Land transport ADR/RID (cross-border)

ADR/RID class: 9 (M7) Miscellaneous dangerous substances and articles
Danger code (Kemler): 90
UN-Number: 3077
Packaging group: III
Special marking: Symbol (fish and tree)
UN proper shipping name: 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) chloride hexahydrate)

Maritime transport IMDG:

IMDG Class: 9
UN Number: 3077
Label: 9
Packaging group: III
Marine pollutant: Yes (P)
Remarks: Symbol (fish and tree)

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Product name: Cobalt(II) chloride hexahydrate

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) chloride hexahydrate)

Air transport ICAO-TI and IATA-DGR:

<table>
<thead>
<tr>
<th>ICAO/IATA Class</th>
<th>UN/ID Number</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>3077</td>
<td>9</td>
</tr>
</tbody>
</table>

Special marking: Symbol (fish and tree)

Packaging group: III

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) chloride hexahydrate)

UN "Model Regulation": UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9, III

Special precautions for user: Warning: Miscellaneous dangerous substances and articles

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Product related hazard informations:

Hazard symbols:

T Toxic
N Dangerous for the environment

Risk phrases:

49 May cause cancer by inhalation.
60 May impair fertility
22 Also harmful if swallowed.
42/43 May cause sensitization by inhalation and skin contact.
68 Possible risk of irreversible effects.
50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Safety phrases:

53 Avoid exposure - obtain special instructions before use.
45 In case of accident or if you feel unwell, seek medical advice immediately.
60 This material and its container must be disposed of as hazardous waste.
61 Avoid release to the environment. Refer to special instructions/Safety data sheets

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
This product contains a product listed by the European Chemicals Agency (ECHA) as a Substance of Very High Concern (SVHC). Information concerning SVHC can be found in Annex XIV of the REACH regulation.

Information about limitation of use:

For use only by technically qualified individuals.
This product contains cobalt and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact:
Zachariah C. Holt
Global EHS Manager

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According to OSHA and ANSI

Product name: Cobalt(II) chloride hexahydrate

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
P: Marine Pollutant
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent