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

1.1 Product identifiers

Product name: Cobalt
Product Number: 266663
Brand: Aldrich
Index-No.: 027-001-00-9
CAS-No.: 7440-48-4

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
Eye irritation (Category 2A), H319
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 1A), H360
Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 3), H412
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 Statements**

- **H302**: Harmful if swallowed.
- **H317**: May cause an allergic skin reaction.
- **H319**: Causes serious eye irritation.
- **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.
- **H412**: Harmful to aquatic life with long lasting effects.

**Precautionary Statements**

- **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**: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **P308 + P313**: IF exposed or concerned: Get medical advice/ attention.
- **P333 + P313**: If skin irritation or rash occurs: Get medical advice/ attention.
- **P337 + P313**: If eye irritation persists: Get medical advice/ attention.
- **P342 + P311**: If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
- **P363**: Wash contaminated clothing before reuse.
- **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

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>Acute Tox. 4; Eye Irrit. 2A; Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1B; Repr. 1A; Aquatic Acute 3; Aquatic Chronic 3; H302, H319, H334, H317, H341, H350, H360, H402, H412</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. 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

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

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
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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>7440-48-4</td>
<td>TWA 0.05 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 0.05 mg/m³</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 0.1 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEL 0.02 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 0.005 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- Respiratory sensitization
- Suspected human carcinogen
- Dermal sensitization
- Respiratory sensitization
- Confirmed animal carcinogen with unknown relevance to humans

Aldrich - 266663

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada
### 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>Remarks</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>7440-48-4</td>
<td>Cobalt</td>
<td>15 µg/l</td>
<td>Urine</td>
<td>End of shift at end of workweek</td>
<td>ACGIH - Biological Exposure Indices (BEI)</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). Safety glasses

**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® 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 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® L

**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. 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.

---

**SECTION 9: Physical and chemical properties**

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

a) Appearance  
Form: Rods

b) Odor  
odorless

c) Odor Threshold  
Not applicable

d) pH  
No data available

e) Melting point/freezing point  
Melting point: 1,493 °C (2,719 °F) at 1,013 hPa

f) Initial boiling point and boiling range  
2,900 °C 5,252 °F - lit.

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  
8.9 g/mL at 25 °C (77 °F) - lit.  
Relative density  
No data available

n) Water solubility  
0.00294 g/l at 20 °C (68 °F) at 1,013 hPa - OECD Test Guideline 105

o) Partition coefficient: n-octanol/water  
Not applicable for inorganic substances

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
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

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 - male and female - 550 mg/kg
(OECD Test Guideline 425)
LC50 Inhalation - Rat - male and female - 4 h - < 0.05 mg/l - dust/mist

LC50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - in vitro test
Result: negative
(OECD Test Guideline 439)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: irritating
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada.

Result: positive

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

**Carcinogenicity**
Presumed to have carcinogenic potential for humans

- **IARC:** 2A - Group 2A: Probably carcinogenic to humans (Cobalt (solid))
  
- **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**
May damage fertility. Positive evidence from human epidemiological studies.

**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:** GF8750000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### SECTION 12: Ecological information

#### 12.1 Toxicity

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>NOEC - Danio rerio (zebra fish) - 100 mg/l - 96 h (OECD Test Guideline 203)</th>
<th>flow-through test LC50 - Chironomus sp. - 429 mg/l - 96 h Remarks: (in analogy to similar products)</th>
<th>ErC50 - Dunaliella tertiolecta (marine algae) - 71.31 mg/l - 96 h Remarks: (in analogy to similar products)</th>
<th>EC50 - activated sludge - 120 mg/l - 0.5 h (OECD Test Guideline 209)</th>
<th>NOEC - Pimephales promelas (fathead minnow) - 0.21 mg/l - 34 d (OECD Test Guideline 210) Remarks: (in analogy to similar products)</th>
</tr>
</thead>
</table>
12.2 Persistence and degradability
The methods for determining biodegradability 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 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

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:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>7440-48-4</td>
<td>1989-08-11</td>
</tr>
</tbody>
</table>

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

**Massachusetts Right To Know Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
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<td>1989-08-11</td>
</tr>
</tbody>
</table>

**Pennsylvania Right To Know Components**

<table>
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<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>7440-48-4</td>
<td>1989-08-11</td>
</tr>
</tbody>
</table>

**California Prop. 65 Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt (solid)</td>
<td>7440-48-4</td>
<td>2007-09-28</td>
</tr>
</tbody>
</table>

, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

---

**SECTION 16: Other information**

**Further information**
The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. 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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