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

1.1. Product identifier

Product form : Substance
Physical state : Solid
Substance name : COBALT CARBONYL
Product code : INCO030
Formula : Co(CO)8
Synonyms : DICOBALT OCTACARBONYL
Chemical family : COBALT CARBONYL

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

Use of the substance/mixture : Chemical intermediate
For research and industrial use only

1.3. Details of the supplier of the safety data sheet

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)
Flam. Sol. 2 H228
Acute Tox. 4 (Oral) H302
Carc. 2 H351
Repr. 2 H361
STOT RE 2 H373

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US) : 🎯🔥⚠️ kişi

Signal word (GHS-US) : Warning
Hazard statements (GHS-US) : H228 - Flammable solid
H302 - Harmful if swallowed
H351 - Suspected of causing cancer
H361 - Suspected of damaging fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P210 - Keep away from heat, open flames, sparks. - No smoking
P240 - Ground/bond container and receiving equipment
P241 - Use explosion-proof electrical equipment
P260 - Do not breathe dust
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P330 - Rinse mouth
P301+P312 - If swallowed: Call a doctor if you feel unwell
P308+P313 - If exposed or concerned: Get medical advice/attention
P370+P378 - In case of fire: Use water spray or fog, foam, carbon dioxide, dry chemical to extinguish
2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS-US)
No data available

SECTION 3: Composition/information on ingredients

3.1. Substance
Substance type: Multi-constituent
Name: COBALT CARBONYL
CAS No: 10210-68-1
EC no: 233-514-0

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt carbonyl</td>
<td>(CAS No) 10210-68-1</td>
<td>&gt; 90</td>
<td>Flam. Sol. 2, H228, Acute Tox. 4 (Oral), H302</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carc. 2, H351</td>
</tr>
<tr>
<td>Hexane</td>
<td>(CAS No) 110-54-3</td>
<td>1 - 5</td>
<td>Flam. Liqu. 2, H225, Skin Irrit. 2, H315, Eye Irrit. 2A, H319, Repr. 2, H361, STOT SE 3, H336, STOT RE 2, H373, Asp. Tox. 1, H304, Aquatic Acute 2, H401, Aquatic Chronic 2, H411</td>
</tr>
</tbody>
</table>

3.2. Mixture
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures
First-aid measures general: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.
First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
First-aid measures after skin contact: Wash with plenty of soap and water.
First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms/injuries after inhalation: May cause irritation to the respiratory tract.
Symptoms/injuries after skin contact: May cause skin irritation.
Symptoms/injuries after eye contact: May cause eye irritation.
Symptoms/injuries after ingestion: Harmful if swallowed. Swallowing a small quantity of this material will result in serious health hazard.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.2. Special hazards arising from the substance or mixture
Fire hazard: Flammable solid. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Advice for firefighters
Firefighting instructions: Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe dust.
SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Remove ignition sources. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment: Equip cleanup crew with proper protection.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up: Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Avoid contact with skin and eyes. Do not breathe dust. Provide local exhaust or general room ventilation to minimize exposure to dust. Use only non-sparking tools.

Hygiene measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures: Ground/bond container and receiving equipment.

Storage conditions: Keep container tightly closed. Store away from light in sealed containers <5°C.

Incompatible materials: Oxidizing agent.

Storage area: Store in a well-ventilated place. Store away from heat.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Compound</th>
<th>USA ACGIH ACGIH TWA (mg/m³)</th>
<th>USA NIOSH NIOSH REL (TWA) (mg/m³)</th>
<th>US IDLH US IDLH (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt carbonyl</td>
<td>0.1 mg/m³</td>
<td>0.1 mg/m³</td>
<td>1100 ppm (10% LEL)</td>
</tr>
<tr>
<td>Hexane (110-54-3)</td>
<td>50 ppm</td>
<td>180 mg/m³</td>
<td>500 ppm</td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Provide local exhaust or general room ventilation.

Personal protective equipment: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Avoid all unnecessary exposure.

Hand protection: Neoprene or nitrile rubber gloves.

Eye protection: Chemical goggles. Contact lenses should not be worn.

Skin and body protection: Wear suitable protective clothing.

Respiratory protection: NIOSH-certified dust and mist (teal cartridge) respirator.

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>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Crystals.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>341.95 g/mol</td>
</tr>
</tbody>
</table>
Color: Orange. Amber.
Odor: No data available
Odor threshold: No data available
Refractive index: No data available
pH: No data available
Relative evaporation rate (butyl acetate=1): No data available
Melting point: 51 - 52 °C decomposes
Freezing point: No data available
Boiling point: 45 °C sublimes
Flash point: No data available
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Flammability (solid, gas): Flammable solid
Vapor pressure: < 0.1 mm Hg @ 20˚C
Relative vapor density at 20 °C: < 1
Relative density: 1.73
VOC content: < 10 %
Solubility: Reacts with water.
Log Pow: No data available
Log Kow: No data available
Viscosity, kinematic: No data available
Viscosity, dynamic: No data available
Explosive properties: No data available
Oxidizing properties: No data available
Explosive limits: No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable when stored in the dark in sealed containers.

10.3. Possibility of hazardous reactions
Decomposes at temperatures exceeding 50°C. Material decomposes slowly in contact with moist air or with water liberating carbon monoxide.

10.4. Conditions to avoid
Heat. Sparks. Open flame.

10.5. Incompatible materials
Oxidizing agent.

10.6. Hazardous decomposition products
Cobalt (Co). Carbon monoxide. cobalt oxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity: Oral: Harmful if swallowed.

<table>
<thead>
<tr>
<th>COBALT CARBONYL (10210-68-1)</th>
<th>ATE US (oral)</th>
<th>837.778 mg/kg body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt carbonyl (10210-68-1)</td>
<td>ATE US (oral)</td>
<td>754.000 mg/kg body weight</td>
</tr>
<tr>
<td>Hexane (110-54-3)</td>
<td>LD50 dermal rabbit</td>
<td>3000 mg/kg</td>
</tr>
<tr>
<td></td>
<td>LC50 inhalation rat (ppm)</td>
<td>48000 ppm/4h</td>
</tr>
<tr>
<td></td>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td></td>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td></td>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
</tbody>
</table>
**COBALT CARBONYL**

<table>
<thead>
<tr>
<th>Safety Data Sheet</th>
</tr>
</thead>
</table>

**Cobalt carbonyl (10210-68-1)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Classification/Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Suspected of causing cancer.</td>
</tr>
</tbody>
</table>

**Cobalt carbonyl (10210-68-1)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Classification/Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC group</td>
<td>2B - Possibly carcinogenic to humans</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Suspected of damaging fertility or the unborn child.</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>May cause damage to organs through prolonged or repeated exposure.</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Symptoms/injuries after inhalation</td>
<td>May cause irritation to the respiratory tract.</td>
</tr>
<tr>
<td>Symptoms/injuries after skin contact</td>
<td>May cause skin irritation.</td>
</tr>
<tr>
<td>Symptoms/injuries after eye contact</td>
<td>May cause eye irritation.</td>
</tr>
<tr>
<td>Symptoms/injuries after ingestion</td>
<td>Harmful if swallowed. Swallowing a small quantity of this material will result in serious health hazard.</td>
</tr>
</tbody>
</table>

**SECTION 12: Ecological information**

**12.1.  Toxicity**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Classification/Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexane (110-54-3)</td>
<td>LC50 fish 1 2.1 - 2.98 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])</td>
</tr>
</tbody>
</table>

**12.2.  Persistence and degradability**

No additional information available

**12.3.  Bioaccumulative potential**

No additional information available

**12.4.  Mobility in soil**

No additional information available

**12.5.  Other adverse effects**

<table>
<thead>
<tr>
<th>Other adverse effects</th>
<th>Classification/Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>This substance may be hazardous to the environment.</td>
<td></td>
</tr>
<tr>
<td>No additional information available</td>
<td></td>
</tr>
<tr>
<td>No known ecological damage caused by this product.</td>
<td></td>
</tr>
</tbody>
</table>

**SECTION 13: Disposal considerations**

**13.1.  Waste treatment methods**

| Waste disposal recommendations | Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility. |
| Ecology - waste materials      | Avoid release to the environment.                          |

**SECTION 14: Transport information**

**14.1. UN number**

<table>
<thead>
<tr>
<th>UN-No.</th>
<th>UN1325</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT no.</td>
<td>UN1325</td>
</tr>
</tbody>
</table>

**14.2. UN proper shipping name**

<table>
<thead>
<tr>
<th>Proper Shipping Name (DOT)</th>
<th>Flammable solids, organic, n.o.s. (COBALT CARBONYL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Classes (DOT)</td>
<td>4.1 - Class 4.1 - Flammable Solid 49 CFR 173.124</td>
</tr>
<tr>
<td>Hazard labels (DOT)</td>
<td>4.1 - Flammable solid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOT Symbols</th>
<th>G - Identifies PSN requiring a technical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing group (DOT)</td>
<td>III - Minor Danger</td>
</tr>
<tr>
<td>DOT Packaging Exceptions (49 CFR 173.xxx)</td>
<td>151</td>
</tr>
<tr>
<td>DOT Packaging Non Bulk (49 CFR 173.xxx)</td>
<td>213</td>
</tr>
<tr>
<td>DOT Packaging Bulk (49 CFR 173.xxx)</td>
<td>240</td>
</tr>
</tbody>
</table>
COBALT CARBONYL
Safety Data Sheet

14.3. Additional information
Other information : No supplementary information available.

Transport by sea
DOT Vessel Stowage Location : B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

Air transport
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 25 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 100 kg

SECTION 15: Regulatory information
15.1. US Federal regulations
Cobalt carbonyl (10210-68-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on the United States SARA Section 302
SARA Section 302 Threshold Planning Quantity (TPQ) ≤ 10000

Hexane (110-54-3)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on United States SARA Section 313
SARA Section 313 - Emission Reporting 1.0 %

15.2. International regulations
Cobalt carbonyl (10210-68-1)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List)
Listed on IECS (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)

Hexane (110-54-3)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List)
Listed on IECS (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Japanese Pollutant Release and Transfer Register Law (PRTR Law)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations
COBALT CARBONYL(10210-68-1)
U.S. - California - Proposition 65 - Carcinogens List No
U.S. - California - Proposition 65 - Developmental Toxicity No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male No

Cobalt carbonyl (10210-68-1)
U.S. - California - Proposition 65 - Carcinogens List
U.S. - California - Proposition 65 - Developmental Toxicity
U.S. - California - Proposition 65 - Reproductive Toxicity - Female
U.S. - California - Proposition 65 - Reproductive Toxicity - Male
No significance risk level (NSRL)
COBALT CARBONYL
Safety Data Sheet

SECTION 16: Other information

Abbreviations and acronyms

- Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development.

Full text of H-phrases:

| Acute Tox. 4 (Oral) | Acute toxicity (oral) Category 4 |
| Aquatic Acute 2 | Hazardous to the aquatic environment - Acute Hazard Category 2 |
| Aquatic Chronic 2 | Hazardous to the aquatic environment - Chronic Hazard Category 2 |
| Asp. Tox. 1 | Aspiration hazard Category 1 |
| Carc. 2 | Carcinogenicity Category 2 |
| Eye Irrit. 2A | Serious eye damage/eye irritation Category 2A |
| Flam. Liq. 2 | Flammable liquids Category 2 |
| Flam. Sol. 2 | Flammable solids Category 2 |
| Repr. 2 | Reproductive toxicity Category 2 |
| Skin Irrit. 2 | Skin corrosion/irritation Category 2 |
| STOT RE 2 | Specific target organ toxicity (repeated exposure) Category 2 |
| STOT SE 3 | Specific target organ toxicity (single exposure) Category 3 |
| H225 | Highly flammable liquid and vapor |
| H228 | Flammable solid |
| H302 | Harmful if swallowed |
| H304 | May be fatal if swallowed and enters airways |
| H315 | Causes skin irritation |
| H319 | Causes serious eye irritation |
| H336 | May cause drowsiness or dizziness |
| H351 | Suspected of causing cancer |
| H361 | Suspected of damaging fertility or the unborn child |
| H373 | May cause damage to organs through prolonged or repeated exposure |
| H401 | Toxic to aquatic life |
| H411 | Toxic to aquatic life with long lasting effects |

HMIS III Rating

- Health: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
- Flammability: 3 Serious Hazard
- Physical: 1 Slight Hazard

Prepared by safety and environmental affairs.

Date of issue: 04/01/2015
Version: 1.0

SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
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