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

1.1. Product identifier

Product form: Substance
Physical state: Liquid
Substance name: COBALT TRICARBONYL NITROSYL
Product code: INCO032
Formula: C3CoNO4
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 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)
Acute Tox. 3 (Oral) H301

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US): GHS06

Signal word (GHS-US): Danger
Hazard statements (GHS-US): H301 - Toxic if swallowed
Precautionary statements (GHS-US): P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P330 - Rinse mouth
P301+P310 - If swallowed: Immediately call a doctor
P405 - Store locked up
P501 - Dispose of contents/container to licensed waste disposal facility

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: Mono-constituent
Name: COBALT TRICARBONYL NITROSYL
CAS No: 14096-82-3
EC no: 237-945-5
COBALT TRICARBONYL NITROSYL
Safety Data Sheet

Name | Product identifier | % | Classification (GHS-US)
--- | --- | --- | ---
Cobalt tricarbonyl nitrosyl | (CAS No) 14096-82-3 | 90 - 100 | Acute Tox. 3 (Oral), H301

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: Toxic 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: 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 all eye and skin contact and do not breathe vapor and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

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: Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal.

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 all eye and skin contact and do not breathe vapor and mist. Provide good ventilation in process area to prevent accumulation of vapors.
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.
COBALT TRICARBONYL NITROSYL  
Safety Data Sheet

7.2. Conditions for safe storage, including any incompatibilities

<table>
<thead>
<tr>
<th>Storage conditions</th>
<th>Keep container tightly closed. Store away from light in sealed containers &lt;5°C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incompatible materials</td>
<td>Oxidizing agent.</td>
</tr>
<tr>
<td>Storage area</td>
<td>Store in a well-ventilated place. Store away from heat.</td>
</tr>
</tbody>
</table>

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Cobalt tricarbonyl nitrosyl (14096-82-3)</th>
<th>USA ACGIH</th>
<th>ACGIH TWA (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.1 mg/m³ as Co</td>
</tr>
</tbody>
</table>

8.2. Exposure controls

- Appropriate engineering controls: Handle in an enclosing hood with exhaust 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: Where exposure through inhalation may occur from use, respiratory protection equipment is recommended.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Liquid</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>172.97 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>Deep, Red.</td>
</tr>
<tr>
<td>Odor</td>
<td>Musty</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>-1 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>50 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>91 mm Hg @ 20°C</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.47</td>
</tr>
<tr>
<td>VOC content</td>
<td>&gt; 95 %</td>
</tr>
<tr>
<td>Solubility</td>
<td>Reacts with water.</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

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 65°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  

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

<table>
<thead>
<tr>
<th>Cobalt tricarbonyl nitrosyl (14096-82-3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ATE US (oral)</td>
<td>100.000 mg/kg body weight</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Not classified  
Serious eye damage/irritation: Not classified  
Respiratory or skin sensitization: Not classified  
Germ cell mutagenicity: Not classified  
Carcinogenicity: Not classified  
Reproductive toxicity: Not classified  
Specific target organ toxicity (single exposure): Not classified  
Specific target organ toxicity (repeated exposure): Not classified  
Aspiration hazard: Not classified  
Potential Adverse human health effects and symptoms: While no toxicity data is available, it is reasonable to assume that the carbonyl will generate carbon monoxide which complexes with hemoglobin.  
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: Toxic if swallowed. Swallowing a small quantity of this material will result in serious health hazard.  
Reason for classification: Expert judgment

12.1. Toxicity  
No additional information available.

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  
Other adverse effects: This substance may be hazardous to the environment.  
Effect on ozone layer: No additional information available.  
Effect on the global warming: No known ecological damage caused by this product.

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.
COBALT TRICARBONYL NITROSYL
Safety Data Sheet

SECTION 14: Transport information

14.1. UN number
UN-No.(DOT) : 3281
DOT NA no. : UN3281

14.2. UN proper shipping name
Proper Shipping Name (DOT) : Metal carbonyls, liquid, n.o.s.
(COBALT TRICARBONYL NITROSYL)
Hazard labels (DOT) : 6.1 - Poison

DOT Symbols : G - Identifies PSN requiring a technical name
Packing group (DOT) : II - Medium Danger
DOT Packaging Exceptions (49 CFR 173.xxx) : 153
DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 243

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.

DOT Vessel Stowage Other : 40 - Stow “clear of living quarters”

Air transport
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

SECTION 15: Regulatory information

15.1. US Federal regulations
COBALT TRICARBONYL NITROSYL (14096-82-3)

TSCA Exemption/Exclusion

CAUTION: This material is supplied for research and development purposes subject to the R&D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a "technically qualified individual" as defined by 40 CFR 720.3(ee). The use of this material for "commercial purposes" as defined by 40 CFR 720.3(r) is not permitted in the United States.

Cobalt tricarbonyl nitrosyl (14096-82-3)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations
Cobalt tricarbonyl nitrosyl (14096-82-3)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Korean ECL (Existing Chemicals List)

15.3. US State regulations
COBALT TRICARBONYL NITROSYL (14096-82-3)

<table>
<thead>
<tr>
<th>State</th>
<th>Regulation</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. - California - Proposition 65 - Carcinogens List</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
## COBALT TRICARBONYL NITROSYL

### Safety Data Sheet

#### Cobalt tricarbonyl nitrosyl (14096-82-3)

<table>
<thead>
<tr>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>U.S. - California - Proposition 65 - Developmental Toxicity</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</th>
<th>No significance risk level (NSRL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No significance risk level</td>
</tr>
</tbody>
</table>

### 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:**

<table>
<thead>
<tr>
<th>Acute Tox. 3 (Oral)</th>
<th>Acute toxicity (oral) Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>H301</td>
<td>Toxic if swallowed</td>
</tr>
</tbody>
</table>

**HMIS III Rating**

- **Health**: 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures
- **Flammability**: 2 Moderate Hazard
- **Physical**: 1 Slight Hazard

Prepared by safety and environmental affairs.

**Date of issue**: 04/01/2015  **Revision date**: 08/28/2015  **Version**: 2.0

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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