1 Identification

- Product name
  - Trade name: Tetracobalt dodecacarbonyl, min. 98%
  - Item number: 27-1950
  - CAS Number: 17786-31-1
- Details of the supplier of the safety data sheet
  - Manufacturer/Supplier: Strem Chemicals, Inc.
    7 Mulliken Way
    NEWBURYPORT, MA 01950
    USA
    info@strem.com
  - Information department: Technical Department
  - Emergency telephone number:
    EMERGENCY: CHEMTREC: + 1 (800) 424-9300
    During normal opening times: +1 (978) 499-1600

2 Hazard(s) identification

- Classification of the substance or mixture
  - GHS02 Flame
    Flam. Sol. 1  H228  Flammable solid.
  - GHS08 Health hazard
    Carc. 2  H351  Suspected of causing cancer.
- Label elements
- GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
- Hazard pictograms
  - GHS02
  - GHS08

- Signal word Danger
- Hazard-determining components of labeling:
  Tetracobalt dodecacarbonyl, min. 98%
- Hazard statements
  H228 Flammable solid.
  H351 Suspected of causing cancer.
- Precautionary statements
  P231  Handle under inert gas.
  P235  Keep cool.
  P301+P310  IF SWALLOWED: Immediately call a POISON CENTER/doctor.
  P305+P351+P338  If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

(Contd. on page 2)
Safety Data Sheet
according to OSHA HCS

Trade name: Tetracobalt dodecacarbonyl, min. 98%

· Classification system:
· NFPA ratings (scale 0 - 4)
  Health = 0
  Fire = 2
  Reactivity = 0

· HMIS-ratings (scale 0 - 4)
  Health = *0
  Fire = 0
  Reactivity = 0

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

3 Composition/information on ingredients

· Chemical characterization: Substances
· CAS No. Description
  17786-31-1 Tetracobalt dodecacarbonyl, min. 98%

4 First-aid measures

· Description of first aid measures
· General information: Immediately remove any clothing soiled by the product.
· After inhalation: Supply fresh air; consult doctor in case of complaints.
· After skin contact: Immediately rinse with water.
· After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
· After swallowing: If symptoms persist consult doctor.
· Information for doctor:
  · Most important symptoms and effects, both acute and delayed No further relevant information available.
  · Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents: Use fire fighting measures that suit the environment.
· Special hazards arising from the substance or mixture No further relevant information available.
· Advice for firefighters
· Protective equipment: No special measures required.
6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
  Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions**: No special measures required.
- **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.
- **Protective Action Criteria for Chemicals**
  - **PAC-1**: Substance is not listed.
  - **PAC-2**: Substance is not listed.
  - **PAC-3**: Substance is not listed.

7 Handling and storage

- **Handling**: Handle under inert gas.
- **Precautions for safe handling**
  Ensure good ventilation/exhaustion at the workplace.
  Open and handle receptacle with care.
- **Information about protection against explosions and fires**:
  Keep ignition sources away - Do not smoke.
  Protect against electrostatic charges.
  Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage**:
  Keep cool.
  Store contents under inert gas.
- **Requirements to be met by storerooms and receptacles**: No special requirements.
- **Information about storage in one common storage facility**: Not required.
- **Further information about storage conditions**: Keep receptacle tightly sealed.
- **Recommended storage temperature**: Store at temperatures not exceeding -18 °C. Keep cool.
- **Specific end use(s) No further relevant information available.**

8 Exposure controls/personal protection

- **Additional information about design of technical systems**: No further data; see item 7.
- **Control parameters**
- **Components with limit values that require monitoring at the workplace**: Not required.
- **Additional information**: The lists that were valid during the creation were used as basis.
44.1.1 • Exposure controls
  • Personal protective equipment:
  • General protective and hygienic measures:
    Keep away from foodstuffs, beverages and feed.
    Immediately remove all soiled and contaminated clothing.
    Wash hands before breaks and at the end of work.
    Store protective clothing separately.
  • Breathing equipment: A NIOSH approved respirator in accordance with 29 CFR 1910.134.
  • Protection of hands:
    Protective gloves
    The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
    Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
    Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
  • Material of gloves
    The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
  • Penetration time of glove material
    The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
  • Eye protection: Safety glasses

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**9 Physical and chemical properties**

- Information on basic physical and chemical properties
  - General Information
    - Appearance:
      - Form: Crystalline
      - Color: Black
    - Odor: Odorless
    - Odor threshold: Not determined.
  - pH-value: Not applicable.
- Change in condition
  - Melting point/Melting range: 60 °C (140 °F)
  - Boiling point/Boiling range: Undetermined.
- Flash point: Not applicable.
- Flammability (solid, gaseous): Flammable.
- Ignition temperature:
  - Decomposition temperature: Not determined.
  - Auto igniting: Not determined.
  - Danger of explosion: Not determined.
- Explosion limits:
  - Lower: Not determined.
44.1.1

Upper:

- Vapor pressure: Not determined.
- Density at 20 °C (68 °F): 2.09 g/cm³ (17.44105 lbs/gal)
- Relative density: Not determined.
- Vapor density: Not applicable.
- Evaporation rate: Not applicable.

- Solubility in / Miscibility with Water: Insoluble.
- Partition coefficient (n-octanol/water): Not determined.

- Viscosity:
  - Dynamic: Not applicable.
  - Kinematic: Not applicable.
- Solvent content:
  - Organic solvents: 0.0 %
  - VOC content: 0.0 g/l / 0.00 lb/gl

- Solids content: 100.0 %
- Other information: No further relevant information available.

10 Stability and reactivity

- Reactivity: No further relevant information available.
- Chemical stability
- Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
- Possibility of hazardous reactions: No dangerous reactions known.
- Conditions to avoid: No further relevant information available.
- Incompatible materials: No further relevant information available.
- Hazardous decomposition products: No dangerous decomposition products known.

11 Toxicological information

- Information on toxicological effects
- Acute toxicity:
  - Primary irritant effect:
    - on the skin: No irritant effect.
    - on the eye: No irritating effect.
  - Sensitization: No sensitizing effects known.
- Additional toxicological information:
- Carcinogenic categories
  - IARC (International Agency for Research on Cancer) 2B
  - NTP (National Toxicology Program) Substance is not listed.
12 Ecological information

- Toxicity
  - Aquatic 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.
- Additional ecological information:
  - General notes: Not known to be hazardous to water.
  - 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: Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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

14 Transport information

- UN-Number
  - DOT NA3178
  - IMDG, IATA UN3178

- UN proper shipping name
  - DOT Flammable solid, inorganic, n.o.s. (Tetracobalt dodecacarbonyl, min. 98%)
  - IMDG, IATA FLAMMABLE SOLID, INORGANIC, N.O.S. (Tetracobalt dodecacarbonyl, min. 98%)

- Transport hazard class(es)
  - DOT 4.1 Flammable solids, self-reactive substances and solid desensitized explosives
**Trade name:** Tetracobalt dodecacarbonyl, min. 98%

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<thead>
<tr>
<th>· Label</th>
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| · IMDG, IATA |
| --- | --- |

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<tr>
<th>· Packing group</th>
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<th>· DOT, IMDG, IATA</th>
<th>II</th>
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<tr>
<th>· Environmental hazards:</th>
<th>No</th>
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<tr>
<th>· Marine pollutant:</th>
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<tr>
<th>· Special precautions for user</th>
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<th>· EMS Number:</th>
<th>F-A-S-G</th>
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<tr>
<th>· Stowage Category</th>
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<tr>
<th>· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</th>
<th>Not applicable.</th>
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<th>· Transport/Additional information:</th>
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<thead>
<tr>
<th>· IMDG</th>
<th></th>
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<table>
<thead>
<tr>
<th>· Limited quantities (LQ)</th>
<th>1 kg</th>
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<tr>
<th>· Excepted quantities (EQ)</th>
<th>Code: E2</th>
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<tr>
<th>Maximum net quantity per inner packaging:</th>
<th>30 g</th>
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<tr>
<th>Maximum net quantity per outer packaging:</th>
<th>500 g</th>
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<tr>
<th>· UN &quot;Model Regulation&quot;:</th>
<th>UN 3178 FLAMMABLE SOLID, INORGANIC, N.O.S. (TETRACOBALT DODECACARBONYL, MIN. 98%), 4.1, II</th>
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### 15 Regulatory information

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

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<tr>
<th>· Sara</th>
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<tr>
<th>· Section 355 (extremely hazardous substances):</th>
<th>Substance is not listed.</th>
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<tr>
<th>· Section 313 (Specific toxic chemical listings):</th>
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<tr>
<th>· TSCA (Toxic Substances Control Act):</th>
<th>Substance is not listed.</th>
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<tr>
<th>· Proposition 65</th>
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<tr>
<th>· Chemicals known to cause cancer:</th>
<th>Substance is not listed.</th>
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<tr>
<th>· Chemicals known to cause reproductive toxicity for females:</th>
<th>Substance is not listed.</th>
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<table>
<thead>
<tr>
<th>· Chemicals known to cause reproductive toxicity for males:</th>
<th>Substance is not listed.</th>
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</thead>
</table>
Trade name: Tetracobalt dodecacarbonyl, min. 98%

- **Chemicals known to cause developmental toxicity:**
  Substance is not listed.

- **Carcinogenic categories**
  - **EPA (Environmental Protection Agency)**
    Substance is not listed.
  - **TLV (Threshold Limit Value established by ACGIH)**
    Substance is not listed.
  - **NIOSH-Ca (National Institute for Occupational Safety and Health)**
    Substance is not listed.

- **GHS label elements**
  The substance is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**
  - GHS02
  - GHS08

- **Signal word** Danger

- **Hazard-determining components of labeling:**
  Tetracobalt dodecacarbonyl, min. 98%

- **Hazard statements**
  - H228 Flammable solid.
  - H351 Suspected of causing cancer.

- **Precautionary statements**
  - P231 Handle under inert gas.
  - P235 Keep cool.
  - P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
  - P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - P422 Store contents under inert gas.
  - P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing SDS:** Technical Department.
- **Contact:** Technical Director
- **Date of preparation / last revision** 07/17/2021 / -

**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)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- ACGIH: American Conference of Governmental Industrial Hygienists
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- NFPA: National Fire Protection Association (USA)
- HMIS: Hazardous Materials Identification System (USA)
<table>
<thead>
<tr>
<th>Trade name: Tetracobalt dodecarbonyl, min. 98%</th>
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<tbody>
<tr>
<td>VOC: Volatile Organic Compounds (USA, EU)</td>
</tr>
<tr>
<td>PBT: Persistent, Bioaccumulative and Toxic</td>
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<tr>
<td>vPvB: very Persistent and very Bioaccumulative</td>
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<tr>
<td>NIOSH: National Institute for Occupational Safety</td>
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<tr>
<td>OSHA: Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>TLV: Threshold Limit Value</td>
</tr>
<tr>
<td>PEL: Permissible Exposure Limit</td>
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<tr>
<td>REL: Recommended Exposure Limit</td>
</tr>
<tr>
<td>Flam. Sol. 1: Flammable solids – Category 1</td>
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<tr>
<td>Carc. 2: Carcinogenicity – Category 2</td>
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(Contd. of page 8)