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
    Flamm. 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.
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
  - Health = *0
  - FIRE
  - Fire = 0
  - REACTIVITY
  - 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:
  - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- 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.

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.
- 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.
  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:
  In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **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 dec °C (140 dec °F)
    - **Boiling point/Boiling range:** no data °C
  - **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.
    - **Upper:** Not determined.
  - **Vapor pressure:** no data hPa
  - **Density at 20 °C (68 °F):** 2.09 g/cm³ (17.441 lbs/gal)
  - **Relative density** Not determined.
  - **Vapor density** Not applicable.
  - **Evaporation rate** Not applicable.
Trade name: Tetracobalt dodecacarbonyl, min. 98%

- **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)**
    - 17786-31-1 Tetracobalt dodecacarbonyl, min. 98%
      - 2B
  - **NTP (National Toxicology Program)**
    - Substance is not listed.
  - **OSHA-Ca (Occupational Safety & Health Administration)**
    - 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.
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, IATA Flammable solid, inorganic, n.o.s. (Tetracobalt dodecacarbonyl, min. 98%)
  - IMDG FLAMMABLE SOLID, INORGANIC, N.O.S. (Tetracobalt dodecacarbonyl, min. 98%)

- Transport hazard class(es)
  - DOT
    - Class 4.1 Flammable solids, self-reactive substances and solid desensitised explosives
    - Label 4.1
  - IMDG, IATA
    - Class 4.1 Flammable solids, self-reactive substances and solid desensitised explosives
    - Label 4.1
    - Packing group
      - DOT, IMDG, IATA II
Trade name: Tetracobalt dodecacarbonyl, min. 98%

- Environmental hazards:
  - Marine pollutant: No
- Special precautions for user: Not applicable.
- EMS Number: F-A,S-G
- Stowage Category: B
- Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable.
- Transport/Additional information:
  - IMDG
    - Limited quantities (LQ): 1 kg
      Code: E2
      Maximum net quantity per inner packaging: 30 g
      Maximum net quantity per outer packaging: 500 g
  - UN "Model Regulation": UN 3178 FLAMMABLE SOLID, INORGANIC, N.O.S. (TETRACOBALT DODECACARBONYL, MIN. 98%), 4.1, II

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Sara
    - Section 355 (extremely hazardous substances):
      Substance is not listed.
    - Section 313 (Specific toxic chemical listings):
      Substance is listed.
    - TSCA (Toxic Substances Control Act):
      Substance is not listed.
    - Proposition 65
      - Chemicals known to cause cancer:
        Substance is not listed.
      - Chemicals known to cause reproductive toxicity for females:
        Substance is not listed.
      - Chemicals known to cause reproductive toxicity for males:
        Substance is not listed.
      - 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.
Trade name: Tetracobalt dodecacarbonyl, min. 98%

· 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 07/30/2016 / -
· 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)
  VOC: Volatile Organic Compounds (USA, EU)
  PBT: Persistent, Bioaccumulative and Toxic
  sPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  Flam. Sol. 1: Flammable solids, Hazard Category 1
  Carc. 2: Carcinogenicity, Hazard Category 2