1 Identification

· Product name
· Trade name: (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA
· Item number: 27-0770
· CAS Number: 56792-69-9
· 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. Liq. 2  H225  Highly flammable liquid and vapor.

  GHS07
  Skin Irrit. 2  H315  Causes skin irritation.
  Eye Irrit. 2A  H319  Causes serious eye irritation.
  STOT SE 3  H335  May cause respiratory irritation.

· Label elements
· GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
· Hazard pictograms

  GHS02  GHS07

· Signal word Danger
· Hazard-determining components of labeling:
  (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98%
· Hazard statements
  H225  Highly flammable liquid and vapor.
  H315  Causes skin irritation.
  H319  Causes serious eye irritation.
  H335  May cause respiratory irritation.

(Contd. on page 2)
4 First-aid measures

- **Description of first aid measures**
- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. If symptoms persist, 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

- **Extinquishing media**
- **Suitable extinguishing agents:**
  CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

(Contd. on page 3)
6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Wear protective equipment. Keep unprotected persons away.
- Environmental precautions: Prevent seepage into sewage system, workpits and cellars.
- Methods and material for containment and cleaning up:
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  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.
  Prevent formation of aerosols.
- Information about protection against explosions and fires:
  Keep ignition sources away - Do not smoke.
  Protect against electrostatic charges.
- Conditions for safe storage, including any incompatibilities
- Storage: Store contents under inert gas.
- Requirements to be met by storerooms and receptacles: Store in a cool location.
- Information about storage in one common storage facility: Not required.
- Further information about storage conditions:
  Keep receptacle tightly sealed.
  Store in cool, dry conditions in well sealed receptacles.
- 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.
  Avoid contact with the eyes and skin.

· 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:
  Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties
· General Information
· Appearance:
  Form: Liquid
  Color: Dark red
· Odor: undistinguishable
· Odor threshold: Not determined.
· pH-value: Not determined.

· Change in condition
  Melting point/Melting range: Undetermined.
  Boiling point/Boiling range: Undetermined.

· Flash point: Not applicable.
**Trade name:** (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flammability (solid, gaseous):</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Ignition temperature:</strong></td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Auto igniting:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Danger of explosion:</strong></td>
<td>Product is not explosive. However, formation of explosive air/vapor mixtures are possible.</td>
</tr>
<tr>
<td><strong>Explosion limits:</strong></td>
<td></td>
</tr>
<tr>
<td>Lower:</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Upper:</td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Vapor pressure:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Density:</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Solubility in / Miscibility with Water:</strong></td>
<td>Not miscible or difficult to mix.</td>
</tr>
<tr>
<td><strong>Partition coefficient (n-octanol/water):</strong></td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Viscosity:</strong></td>
<td></td>
</tr>
<tr>
<td>Dynamic:</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Kinematic:</td>
<td>Not determined.</td>
</tr>
<tr>
<td><strong>Solvent content:</strong></td>
<td>0.0 % Organic solvents:</td>
</tr>
<tr>
<td>VOC content:</td>
<td>0.0 g/l / 0.00 lb/gl</td>
</tr>
<tr>
<td><strong>Other information</strong></td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

**10 Stability and reactivity**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reactivity No further relevant information available.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chemical stability</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Thermal decomposition / conditions to be avoided:</strong> No decomposition if used according to specifications.</td>
<td></td>
</tr>
<tr>
<td><strong>Possibility of hazardous reactions</strong></td>
<td>No dangerous reactions known.</td>
</tr>
<tr>
<td><strong>Conditions to avoid</strong></td>
<td>No further relevant information available.</td>
</tr>
<tr>
<td><strong>Incompatible materials</strong></td>
<td>No further relevant information available.</td>
</tr>
<tr>
<td><strong>Hazardous decomposition products:</strong></td>
<td>No dangerous decomposition products known.</td>
</tr>
</tbody>
</table>

**11 Toxicological information**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information on toxicological effects</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Acute toxicity:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Primary irritant effect:</strong></td>
<td></td>
</tr>
<tr>
<td>on the skin:</td>
<td>Irritant to skin and mucous membranes.</td>
</tr>
<tr>
<td>on the eye:</td>
<td>Irritating effect.</td>
</tr>
<tr>
<td><strong>Sensitization:</strong></td>
<td>No sensitizing effects known.</td>
</tr>
</tbody>
</table>
Trade name: (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA

- Additional toxicological information:
  - Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    Substance is not listed.
  - 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.
  - 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, IMDG, IATA UN1993

- UN proper shipping name
  - DOT Flammable liquids, n.o.s.
  - IMDG, IATA FLAMMABLE LIQUID, N.O.S.

- Transport hazard class(es)
  - DOT
    - Class 3 Flammable liquids
## Safety Data Sheet

### Trade name: (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA

### 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 not 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.
Trade name: (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA

· 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.

· GHS label elements
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
  · Hazard pictograms
    ![GHS02](image1) ![GHS07](image2)

· Signal word Danger

· Hazard-determining components of labeling:
  (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98%

· Hazard statements
  H225 Highly flammable liquid and vapor.
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.
  H335 May cause respiratory irritation.

· Precautionary statements
  P231 Handle under inert gas.
  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.
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  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 12/18/2017 /
· 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

(Contd. on page 9)
Trade name: (3,3-Dimethyl-1-butyne)dicobalt hexacarbonyl, 98% CCTBA

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
vPvB: 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. Liq. 2: Flammable liquids – Category 2
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3