

## 1 Identification

### Product identifier

**Product name:** Dodecacarbonyltetracobalt

**Stock number:** 13055

**CAS Number:**

17786-31-1

**EC number:**

241-763-1

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

**Identified use:** SU24 Scientific research and development

### Details of the supplier of the safety data sheet

#### Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

**Information Department:** Health, Safety and Environmental Department

**Emergency telephone number:**

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

## 2 Hazard(s) identification

**Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)**



GHS02 Flame

Flam. Sol. 1 H228 Flammable solid.



GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.

Acute Tox. 3 H331 Toxic if inhaled.



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.



GHS07

Skin Sens. 1 H317 May cause an allergic skin reaction.

**Hazards not otherwise classified** No information known.

### Label elements

**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

#### Hazard pictograms



GHS02 GHS06 GHS08

### Signal word

Danger

#### Hazard statements

H228 Flammable solid.

H301+H331 Toxic if swallowed or if inhaled.

H317 May cause an allergic skin reaction.

H351 Suspected of causing cancer.

#### Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P280 Wear protective gloves / protective clothing.

P262 Do not get in eyes, on skin, or on clothing.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P309 IF exposed or if you feel unwell:

P310 Immediately call a POISON CENTER/doctor/...

#### WHMIS classification

B4 - Flammable solid

D1A - Very toxic material causing immediate and serious toxic effects

D2A - Very toxic material causing other toxic effects



### Classification system

**HMIS ratings (scale 0-4)**

**(Hazardous Materials Identification System)**

HEALTH 2 Health (acute effects) = 2

FIRE 3 Flammability = 3

REACTIVITY 2 Physical Hazard = 2

### Other hazards

**Results of PBT and vPvB assessment**

**PBT:** Not applicable.

**Product name:** **Dodecacarbonyltetracobalt**

**vPvB:** Not applicable.

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**3 Composition/information on ingredients**

**Chemical characterization:** Substances  
**CAS# Description:**  
17786-31-1 Dodecacarbonyltetracobalt  
**Identification number(s):**  
**EC number:** 241-763-1

**4 First-aid measures**

**Description of first aid measures**  
**General information**  
Immediately remove any clothing soiled by the product.  
Remove breathing apparatus only after contaminated clothing has been completely removed.  
In case of irregular breathing or respiratory arrest provide artificial respiration.  
**After inhalation**  
Supply fresh air. If required, provide artificial respiration. Keep patient warm.  
Seek immediate medical advice.  
**After skin contact**  
Immediately wash with water and soap and rinse thoroughly.  
Seek immediate medical advice.  
**After eye contact** Rinse opened eye for several minutes under running water. Then consult a doctor.  
**After swallowing** Do not induce vomiting; immediately call for medical help.  
**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, sand, extinguishing powder. Do not use water.  
**Special hazards arising from the substance or mixture**  
If this product is involved in a fire, the following can be released:  
Toxic metal oxide fume  
Carbon monoxide and carbon dioxide  
**Advice for firefighters**  
**Protective equipment:**  
Wear self-contained respirator.  
Wear fully protective impervious suit.

**6 Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**  
Wear protective equipment. Keep unprotected persons away.  
Ensure adequate ventilation  
Keep away from ignition sources  
**Environmental precautions:** Do not allow material to be released to the environment without proper governmental permits.  
**Methods and material for containment and cleaning up:**  
Keep away from ignition sources.  
Dispose of contaminated material as waste according to section 13.  
Ensure adequate ventilation.  
**Prevention of secondary hazards:** Keep away from ignition sources.  
**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**  
**Precautions for safe handling**  
Handle under dry protective gas.  
Keep container tightly sealed.  
Store in cool, dry place in tightly closed containers.  
Ensure good ventilation at the workplace.  
Open and handle container with care.  
**Information about protection against explosions and fires:** Protect against electrostatic charges.  
**Conditions for safe storage, including any incompatibilities**  
**Storage**  
**Requirements to be met by storerooms and receptacles:** Store in a cool location.  
**Information about storage in one common storage facility:**  
Store away from oxidizing agents.  
Store away from air.  
**Further information about storage conditions:**  
Store under dry inert gas.  
This product is air sensitive.  
Avoid contact with air/oxygen.  
Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.  
**Specific end use(s)** No further relevant information available.

**8 Exposure controls/personal protection**

**Additional information about design of technical systems:**  
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.  
**Control parameters**  
**Components with limit values that require monitoring at the workplace:**

Cobalt, elemental & inorganic compounds, as Co  
mg/m<sup>3</sup>  
ACGIH TLV 0.02; Confirmed animal carcinogen  
Austria Carcinogen

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USA

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Belgium TWA 0.05  
Denmark TWA 0.05  
Finland TWA 0.05 (skin)  
Germany Carcinogen  
Hungary TWA 0.1; 0.2-STEL  
Japan OEL 0.05; 2B-Carcinogen  
Korea TLV 0.02; Confirmed animal carcinogen  
Netherlands MAC-TGG 0.05  
Norway TWA 0.05  
Poland TWA 0.05; 0.2-STEL  
Russia 0.5-STEL  
Sweden NGV 0.05  
Switzerland MAK-W 0.1; Carcinogen  
United Kingdom TWA 0.1  
USA PEL 0.1 (dust and fume)

**Additional information:** No data

**Exposure controls**

**Personal protective equipment**

**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Maintain an ergonomically appropriate working environment.

**Breathing equipment:** Use self-contained respiratory protective device in emergency situations.

**Protection of hands:**

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

**Eye protection:** Safety glasses

**Body protection:** Protective work clothing.

**9 Physical and chemical properties**

**Information on basic physical and chemical properties**

**General Information**

**Appearance:**

**Form:** Crystalline

**Color:** Black

**Odor:** Not determined

**Odor threshold:** Not determined.

**pH-value:** Not applicable.

**Change in condition**

**Melting point/Melting range:** ca 60 °C (ca 140 °F) (dec)

**Boiling point/Boiling range:** Not determined

**Sublimation temperature / start:** Not determined

**Flash point:** Not applicable

**Flammability (solid, gaseous)** Highly flammable.

**Ignition temperature:** Not determined

**Decomposition temperature:** Not determined

**Auto igniting:** Not determined.

**Danger of explosion:** Not determined.

**Explosion limits:**

**Lower:** Not determined

**Upper:** Not determined

**Vapor pressure:** Not applicable.

**Density at 20 °C (68 °F):** 2.09 g/cm<sup>3</sup> (17.441 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.

**Other information** No further relevant information available.

**10 Stability and reactivity**

**Reactivity** No information known.

**Chemical stability** Stable under recommended storage conditions.

**Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.

**Possibility of hazardous reactions** No dangerous reactions known

**Conditions to avoid** No further relevant information available.

**Incompatible materials:**

Oxidizing agents

Air

**Hazardous decomposition products:**

Toxic metal oxide fume

Carbon monoxide

Carbon monoxide and carbon dioxide

**11 Toxicological information**

**Information on toxicological effects**

**Acute toxicity:**

Toxic if inhaled.

Toxic if swallowed.





**LD/LC50 values that are relevant for classification:** No data

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USA

Product name: <b>Dodecacarbonyltetracobalt</b>	
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<p><b>Skin irritation or corrosion:</b> May cause irritation <b>Eye irritation or corrosion:</b> May cause irritation <b>Sensitization:</b> May cause an allergic skin reaction. <b>Germ cell mutagenicity:</b> No effects known. <b>Carcinogenicity:</b> Suspected of causing cancer. IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals. ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure. <b>Reproductive toxicity:</b> No effects known. <b>Specific target organ system toxicity - repeated exposure:</b> No effects known. <b>Specific target organ system toxicity - single exposure:</b> No effects known. <b>Aspiration hazard:</b> No effects known. <b>Subacute to chronic toxicity:</b> Cobalt is an experimental neoplastigen and tumorigen. It is an experimental carcinogen of the connective tissue and lungs. Cobalt metal and inorganic compounds are classified as an animal carcinogen by the ACGIH. Ingestion may cause burning in the mouth, esophagus, and stomach. Inhalation of dusts and fumes may cause irritation of the respiratory tract and labored breathing and coughing. Sensitization, nausea, flushing of the face and ringing in the ears is also possible. Chronic ingestion may result in pericardial effusion, polycardial effusion, polycythemia, cardiac failure, vomiting, convulsions and thyroid enlargement. Carbonyl compounds are toxic due to decomposition yielding carbon monoxide. Symptoms include asphyxia, headache, mental confusion, dizziness, impairment of vision and hearing, and fainting. High exposures can result in unconsciousness and death due to the inability of hemoglobin to carry oxygen to the tissues. <b>Subacute to chronic toxicity:</b> No effects known. <b>Additional toxicological information:</b> To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.</p>	

<b>12 Ecological information</b>	
<p><b>Toxicity</b> <b>Aquatic toxicity:</b> No further relevant information available. <b>Persistence and degradability</b> No further relevant information available. <b>Bioaccumulative potential</b> No further relevant information available. <b>Mobility in soil</b> No further relevant information available. <b>Additional ecological information:</b> <b>General notes:</b> Do not allow product to reach ground water, water course or sewage system. Do not allow material to be released to the environment without proper governmental permits. Danger to drinking water if even small quantities leak into the ground. Avoid transfer into the environment. <b>Results of PBT and vPvB assessment</b> <b>PBT:</b> Not applicable. <b>vPvB:</b> Not applicable. <b>Other adverse effects</b> No further relevant information available.</p>	

<b>13 Disposal considerations</b>	
<p><b>Waste treatment methods</b> <b>Recommendation</b> Consult state, local or national regulations to ensure proper disposal. <b>Uncleaned packagings:</b> <b>Recommendation:</b> Disposal must be made according to official regulations.</p>	

<b>14 Transport information</b>	
UN-Number DOT, IMDG, IATA	UN3179
UN proper shipping name DOT IMDG, IATA	Flammable solid, toxic, inorganic, n.o.s. (Dodecacarbonyltetracobalt) FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. (Dodecacarbonyltetracobalt)
Transport hazard class(es) DOT  	4.1 Flammable solids, self-reactive substances and solid desensitised explosives. 4.1+6.1 4.1 (FT2) Flammable solids, self-reactive substances and solid desensitised explosives 4.1+6.1
Class Label Class  Label IMDG, IATA  	4.1 Flammable solids, self-reactive substances and solid desensitised explosives. 4.1+6.1
Packing group DOT, IMDG, IATA	II
Environmental hazards:	Not applicable.
Special precautions for user	Warning: Flammable solids, self-reactive substances and solid desensitised explosives
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information:	
DOT Marine Pollutant (DOT):	No
UN "Model Regulation":	UN3179, Flammable solid, toxic, inorganic, n.o.s. (Dodecacarbonyltetracobalt), 4.1 (6.1), II

Product name: **Dodecacarbonyltetracobalt**

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15 Regulatory information

**Safety, health and environmental regulations/legislation specific for the substance or mixture**  
**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)  
**Hazard pictograms**



GHS02 GHS06 GHS08

**Signal word** Danger  
**Hazard statements**  
H228 Flammable solid.  
H301+H331 Toxic if swallowed or if inhaled.  
H317 May cause an allergic skin reaction.  
H351 Suspected of causing cancer.  
**Precautionary statements**  
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P280 Wear protective gloves / protective clothing.  
P262 Do not get in eyes, on skin, or on clothing.  
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P309 IF exposed or if you feel unwell:  
P310 Immediately call a POISON CENTER/doctor/...

**National regulations**  
This product is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of this product is restricted to research and development only. This product must be used by or directly under the supervision of a technically qualified individual as defined by TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.

**SARA Section 313 (specific toxic chemical listings)**

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**California Proposition 65**  
**Prop 65 - Chemicals known to cause cancer** Substance is not listed.  
**Prop 65 - Developmental toxicity** Substance is not listed.  
**Prop 65 - Developmental toxicity, female** Substance is not listed.  
**Prop 65 - Developmental toxicity, male** Substance is not listed.  
**Information about limitation of use:**  
For use only by technically qualified individuals.  
This product contains cobalt and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.  
**Other regulations, limitations and prohibitive regulations**  
**Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.** Substance is not listed.  
**The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.**  
Substance is not listed.  
**Annex XIV of the REACH Regulations (requiring Authorisation for use)** Substance is not listed.  
**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

**Department issuing SDS:** Global Marketing Department  
**Date of preparation / last revision** 11/24/2015 / -  
**Abbreviations and acronyms:**  
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)  
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)  
ICAO: International Civil Aviation Organization  
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)  
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  
EINECS: European Inventory of Existing Commercial Chemical Substances  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
HMIS: Hazardous Materials Identification System (USA)  
WHMIS: Workplace Hazardous Materials Information System (Canada)  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
vPvB: very Persistent and very Bioaccumulative  
ACGIH: American Conference of Governmental Industrial Hygienists (USA)  
OSHA: Occupational Safety and Health Administration (USA)  
NTP: National Toxicology Program (USA)  
IARC: International Agency for Research on Cancer  
EPA: Environmental Protection Agency (USA)