

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

1 Identification

- **Product name**
- **Trade name:** Iron pentacarbonyl, 99.5% (99.9+%-Fe)
- **Item number:** 26-2800
- **CAS Number:**
13463-40-6
- **EINECS Number:**
23-6
- **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. 1 H224 Extremely flammable liquid and vapor.



GHS06 Skull and crossbones

Acute Tox. 2 H300 Fatal if swallowed.

Acute Tox. 3 H311 Toxic in contact with skin.

Acute Tox. 1 H330 Fatal if inhaled.

- **Label elements**

- **GHS label elements**

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

- **Hazard pictograms**



GHS02 GHS06

- **Signal word** Danger

- **Hazard-determining components of labeling:**

pentacarbonyliron

- **Hazard statements**

H224 Extremely flammable liquid and vapor.

H300+H330 Fatal if swallowed or if inhaled.

H311 Toxic in contact with skin.

(Contd. on page 2)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 1)

Precautionary statements

- P231 Handle under inert gas.
- P235 Keep cool.
- P284 [In case of inadequate ventilation] wear respiratory protection.
- P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
- P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- 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.

Classification system:

NFPA ratings (scale 0 - 4)



HMIS-ratings (scale 0 - 4)



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**
13463-40-6 pentacarbonyliron
- Identification number(s)**
- EC number:** 23-6

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 have been completely removed.
- In case of irregular breathing or respiratory arrest provide artificial respiration.

After inhalation:

- Supply fresh air or oxygen; call for doctor.
- 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. 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.

(Contd. on page 3)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 2)

- **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.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
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:**

0.0055 ppm

· **PAC-2:**

0.060 ppm

· **PAC-3:**

0.18 ppm

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.
Keep respiratory protective device available.

(Contd. on page 4)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 3)

- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
Keep cool.
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.
Do not gas tight seal receptacle.
Store in cool, dry conditions in well sealed receptacles.
Protect from heat and direct sunlight.
- **Recommended storage temperature:** Store at temperatures not exceeding 4 °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:**

13463-40-6 pentacarbonyliron

REL	Short-term value: 0.45 mg/m ³ , 0.2 ppm Long-term value: 0.23 mg/m ³ , 0.1 ppm as Fe
TLV	Short-term value: 0.45 mg/m ³ , 0.2 ppm Long-term value: 0.23 mg/m ³ , 0.1 ppm

- **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.
Avoid contact with the eyes and skin.
- **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.

(Contd. on page 5)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 4)

· **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

· Form:	Liquid
· Color:	Orange
· Odor:	Acrid
· Odor threshold:	Not determined.

· **pH-value:** Not determined.

· **Change in condition**

· Melting point/Melting range:	Undetermined.
· Boiling point/Boiling range:	103 °C (217 °F)

· **Flash point:** Not applicable.

· **Flammability (solid, gaseous):** Not determined.

· **Ignition temperature:** 60 °C (140 °F)

· **Decomposition temperature:** Not determined.

· **Auto igniting:** Not determined.

· **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

· **Explosion limits:**

· Lower:	3.7 Vol %
· Upper:	12.5 Vol %

· **Vapor pressure at 20 °C (68 °F):** 40 hPa (30 mm Hg)

· **Density at 20 °C (68 °F):** 1.49 g/cm³ (12.43405 lbs/gal)

· **Relative density** Not determined.

· **Vapor density** Not determined.

· **Evaporation rate** Not determined.

· **Solubility in / Miscibility with**

· **Water:** Not miscible or difficult to mix.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**

· **Dynamic:** Not determined.

· **Kinematic:** Not determined.

· **Solvent content:**

· **Organic solvents:** 0.0 %

· **VOC content:** 0.0 g/l / 0.00 lb/gl

(Contd. on page 6)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 5)

· **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:**

· **LD/LC50 values that are relevant for classification:**

Oral	LD50	25 mg/kg (rat)
Inhalative	LC50/4 h	2190 mg/l (mouse)

13463-40-6 pentacarbonyliron

Oral	LD50	40 mg/kg (rat)
Dermal	LD50	240 mg/kg (rabbit)
Inhalative	LC50/4 h	0.04 mg/l (rat)

- **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)**

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.

(Contd. on page 7)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 6)



- **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** UN1994
- **UN proper shipping name**
- **DOT** Iron pentacarbonyl
- **IMDG, IATA** IRON PENTACARBONYL
- **Transport hazard class(es)**
- **DOT**



- **Class** 6.1 Toxic substances
- **Label** 6.1, 3

- **IMDG**



- **Class** 6.1 Toxic substances
- **Label** 6.1/3

- **IATA**



- **Class** 6.1 Toxic substances
- **Label** 6.1 (3)
- **Packing group**
- **DOT, IMDG, IATA** I

(Contd. on page 8)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 7)

· Environmental hazards:	
· Marine pollutant:	No
· Special precautions for user	Not applicable.
· Poison inhalation hazard:	Yes
· Danger code (Kemler):	663
· EMS Number:	F-E,S-D
· Stowage Category	D
· Stowage Code	SW2 Clear of living quarters.
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: Forbidden On cargo aircraft only: Forbidden
· IMDG	
· Limited quantities (LQ)	0
· Excepted quantities (EQ)	Code: E0 Not permitted as Excepted Quantity
· UN "Model Regulation":	UN 1994 IRON PENTACARBONYL, 6.1 (3), I

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**

Substance is listed.

· **Section 313 (Specific toxic chemical listings):**

Substance is listed.

· **TSCA (Toxic Substances Control Act):**

Substance is 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.

(Contd. on page 9)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 8)

· **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 GHS06

· **Signal word** *Danger*

· **Hazard-determining components of labeling:**

pentacarbonyliron

· **Hazard statements**

H224 *Extremely flammable liquid and vapor.*

H300+H330 *Fatal if swallowed or if inhaled.*

H311 *Toxic in contact with skin.*

· **Precautionary statements**

P231 *Handle under inert gas.*

P235 *Keep cool.*

P284 *[In case of inadequate ventilation] wear respiratory protection.*

P301+P310 *IF SWALLOWED: Immediately call a POISON CENTER/ doctor.*

P303+P361+P353 *If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.*

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

EINECS: European Inventory of Existing Commercial Chemical Substances

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)

LC50: Lethal concentration, 50 percent

(Contd. on page 10)

Safety Data Sheet
according to OSHA HCS

Printing date 07/17/2021

Reviewed on 07/17/2021

Trade name: Iron pentacarbonyl, 99.5% (99.9+%-Fe)

(Contd. of page 9)

LD50: Lethal dose, 50 percent
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. 1: Flammable liquids – Category 1
Acute Tox. 2: Acute toxicity – Category 2
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 1: Acute toxicity – Category 1

US