

according to Regulation UK SI 2019/758 and UK SI 2020/1577 as amended

Creation Date 25-Jan-2011 Revision Date 22-Sep-2023 Revision Number 12

# SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1. Product identifier

Product Description: Iron pentacarbonyl

Cat No.: 187620000; 187620010; 187621000

Synonyms Pentacarbonyl iron
CAS No 13463-40-6
EC No 236-670-8
Molecular Formula C5 Fe O5

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

Recommended Use Laboratory chemicals.
Uses advised against No Information available

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

Company

UK entity/business name

Fisher Scientific UK Bishop Meadow Road,

Loughborough, Leicestershire LE11 5RG, United Kingdom

EU entity/business name

Thermo Fisher Scientific

Janssen Pharmaceuticalaan 3a, 2440 Geel, Belgium

**E-mail address** begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11 Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99 **CHEMTREC** Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

## **SECTION 2: HAZARDS IDENTIFICATION**

#### 2.1. Classification of the substance or mixture

CLP Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567

**Physical hazards** 

Flammable liquids Category 2 (H225)

**Health hazards** 

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Acute oral toxicityCategory 2 (H300)Acute dermal toxicityCategory 2 (H310)Acute Inhalation Toxicity - VaporsCategory 1 (H330)Specific target organ toxicity - (repeated exposure)Category 1 (H372)

**Environmental hazards** 

Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

#### 2.2. Label elements



## Signal Word

**Danger** 

## **Hazard Statements**

H225 - Highly flammable liquid and vapor

H372 - Causes damage to organs through prolonged or repeated exposure if inhaled

H300 + H310 + H330 - Fatal if swallowed, in contact with skin or if inhaled

## **Precautionary Statements**

P280 - Wear protective gloves/protective clothing/eye protection/face protection

P302 + P350 - IF ON SKIN: Gently wash with plenty of soap and water

P310 - Immediately call a POISON CENTER or doctor/physician

P330 - Rinse mouth

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

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

## 2.3. Other hazards

This product does not contain any known or suspected endocrine disruptors

## **SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

#### 3.1. Substances

Component	CAS No	EC No	Weight %	CLP Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567
Iron, pentacarbonyl-	13463-40-6	EEC No. 236-670-8	>95	Flam. Liq. 2 (H225) Acute Tox. 2 (H300) Acute Tox. 2 (H310) Acute Tox. 1 (H330) STOT RE 1 (H372)

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Full text of Hazard Statements: see section 16

## **SECTION 4: FIRST AID MEASURES**

#### 4.1. Description of first aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in

attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In

the case of contact with eyes, rinse immediately with plenty of water and seek medical

advice.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. Immediate medical

attention is required.

**Ingestion** Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the

substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If

not breathing, give artificial respiration.

**Self-Protection of the First Aider** Remove all sources of ignition.

## 4.2. Most important symptoms and effects, both acute and delayed

Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

## 4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

## **SECTION 5: FIREFIGHTING MEASURES**

## 5.1. Extinguishing media

## **Suitable Extinguishing Media**

Water mist may be used to cool closed containers.

#### Extinguishing media which must not be used for safety reasons

No information available.

## 5.2. Special hazards arising from the substance or mixture

Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Extremely flammable.

#### **Hazardous Combustion Products**

None under normal use conditions.

## 5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

## **SECTION 6: ACCIDENTAL RELEASE MEASURES**

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#### 6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

#### 6.2. Environmental precautions

Should not be released into the environment. See Section 12 for additional Ecological Information.

#### 6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

## 6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

## **SECTION 7: HANDLING AND STORAGE**

## 7.1. Precautions for safe handling

Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

## **Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

## 7.2. Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame.

Technical Rules for Hazardous Substances (TRGS) 510 Class 3 Storage Class (LGK) (Germany)

#### 7.3. Specific end use(s)

Use in laboratories

## **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

#### 8.1. Control parameters

## **Exposure limits**

List source(s): **UK** - EH40/2005 Work Exposure Limits, Fourth edition. Published 2020. **IRE** - 2021 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Iron, pentacarbonyl-	STEL: 0.03 ppm 15 min		TWA: 0.1 ppm 8 hr. Fe
	STEL: 0.24 mg/m <sup>3</sup> 15 min		STEL: 0.2 ppm 15 min
	TWA: 0.01 ppm 8 hr		
	TWA: 0.08 mg/m <sup>3</sup> 8 hr		

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#### **Biological limit values**

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

## Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)

See table for values

Component	Acute effects local (Inhalation)	Acute effects systemic (Inhalation)	Chronic effects local (Inhalation)	Chronic effects systemic (Inhalation)
Iron, pentacarbonyl- 13463-40-6 ( >95 )	DNEL = 1.82mg/m <sup>3</sup>	DNEL = 1.82mg/m <sup>3</sup>	DNEL = 1.82mg/m <sup>3</sup>	DNEL = 1.82mg/m <sup>3</sup>

## **Predicted No Effect Concentration (PNEC)**

No information available.

#### 8.2. Exposure controls

#### **Engineering Measures**

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

#### Personal protective equipment

**Eye Protection** Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material Natural rubber Nitrile rubber Neoprene	Breakthrough time See manufacturers recommendations	Glove thickness	<b>EU standard</b> EN 374	Glove comments (minimum requirement)
PVC				

Skin and body protection Long sleeved clothing.

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use

appropriate certified respirators.

To protect the wearer, respiratory protective equipment must be the correct fit and be used

and maintained properly

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits

are exceeded or if irritation or other symptoms are experienced

Recommended Filter type: Particulates filter conforming to EN 143 Inorganic gases and

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vapours filter Type B Grey conforming to EN14387

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Small scale/Laboratory use Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure

limits are exceeded or if irritation or other symptoms are experienced.

Recommended half mask:- Particle filtering: EN149:2001 When RPE is used a face piece Fit Test should be conducted

**Environmental exposure controls** No information available.

## **SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

## 9.1. Information on basic physical and chemical properties

**Physical State** Liquid

**Appearance** Brown

Odor No information available **Odor Threshold** No data available -20 °C / -4 °F **Melting Point/Range Softening Point** No data available **Boiling Point/Range** 103 °C / 217.4 °F

@ 760 mmHg Flammability (liquid) Highly flammable On basis of test data Liquid

Flammability (solid,gas) Not applicable

**Explosion Limits** No data available

**Flash Point** -15 °C / 5 °F Method - No information available

**Autoignition Temperature** 49 - °C / 120.2 - °F **Decomposition Temperature** No data available pН No information available No data available **Viscosity** 

Water Solubility Insoluble

Solubility in other solvents No information available

Partition Coefficient (n-octanol/water)

log Pow Component

Iron, pentacarbonyl-

**Vapor Pressure** 35 hPa (20°C) **Density / Specific Gravity** 1.490

Not applicable **Bulk Density** Liquid 6.74 (Air = 1.0)Vapor Density (Air = 1.0)

**Particle characteristics** Not applicable (liquid)

9.2. Other information

C5 Fe O5 **Molecular Formula Molecular Weight** 195.9

**Explosive Properties** Vapors may form explosive mixtures with air

## **SECTION 10: STABILITY AND REACTIVITY**

10.1. Reactivity None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerization does not occur. **Hazardous Polymerization** 

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**Hazardous Reactions** None under normal processing.

10.4. Conditions to avoid

Incompatible products. Excess heat. Keep away from open flames, hot surfaces and

sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. Strong bases. Halogens. Amines.

#### 10.6. Hazardous decomposition products

None under normal use conditions.

## **SECTION 11: TOXICOLOGICAL INFORMATION**

## 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

#### **Product Information**

(a) acute toxicity;

OralCategory 2DermalCategory 2InhalationCategory 1

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation	
Iron, pentacarbonyl-	LD50 = 40 mg/kg (Rat)	LD50 = 56 mg/kg (Rabbit)	LC50 = 0.32 mg/L (Rat) 4 h	

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;

**Respiratory Skin**No data available
No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; Category 1

Target Organs Respiratory system, Blood, Liver, Gastrointestinal tract (GI), Central nervous system (CNS),

Eyes, Kidney, Skin.

(j) aspiration hazard; No data available

Other Adverse Effects The toxicological properties have not been fully investigated.

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Symptoms / effects.both acute and Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, delayed

tiredness, nausea and vomiting.

## 11.2. Information on other hazards

**Endocrine Disrupting Properties** 

Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

## **SECTION 12: ECOLOGICAL INFORMATION**

# 12.1. Toxicity

**Ecotoxicity effects** 

Component	Freshwater Fish	Water Flea	Freshwater Algae
Iron, pentacarbonyl-		EC50: = 130 mg/L, 48h	EC50: = 150 mg/L, 72h
		(Daphnia magna)	(Desmodesmus subspicatus)

Component	Microtox	M-Factor
Iron, pentacarbonyl-	EC50 > 10000 mg/L 30 min	

## 12.2. Persistence and degradability

**Persistence** Persistence is unlikely.

Degradability Not relevant for inorganic substances.

#### 12.3. Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Iron, pentacarbonyl-	3	No data available

## 12.4. Mobility in soil

Spillage unlikely to penetrate soil The product is insoluble and sinks in water The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

## 12.5. Results of PBT and vPvB

assessment

No data available for assessment.

## 12.6. Endocrine disrupting

properties

**Endocrine Disruptor Information** 

This product does not contain any known or suspected endocrine disruptors

## 12.7. Other adverse effects

**Persistent Organic Pollutant Ozone Depletion Potential** 

This product does not contain any known or suspected substance This product does not contain any known or suspected substance

## **SECTION 13: DISPOSAL CONSIDERATIONS**

## 13.1. Waste treatment methods

Waste from Residues/Unused Waste is classified as hazardous. Dispose of in accordance with the European Directives

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on waste and hazardous waste. Dispose of in accordance with local regulations. **Products** 

Dispose of this container to hazardous or special waste collection point. Empty containers **Contaminated Packaging** 

retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and

empty container away from heat and sources of ignition.

According to the European Waste Catalog, Waste Codes are not product specific, but **European Waste Catalogue (EWC)** 

application specific.

Other Information Waste codes should be assigned by the user based on the application for which the product

was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with

local regulations.

## **SECTION 14: TRANSPORT INFORMATION**

## IMDG/IMO

14.1. UN number UN1994

14.2. UN proper shipping name IRON PENTACARBONYL

14.3. Transport hazard class(es) 6.1 **Subsidiary Hazard Class** 3 14.4. Packing group I

## ADR

14.1. UN number UN1994

IRON PENTACARBONYL 14.2. UN proper shipping name

14.3. Transport hazard class(es) 6.1 **Subsidiary Hazard Class** 3 14.4. Packing group Ι

FORBIDDEN FOR IATA TRANSPORT IATA

14.1. UN number UN1994

IRON PENTACARBONYL FORBIDDEN FOR IATA TRANSPORT 14.2. UN proper shipping name

14.3. Transport hazard class(es) 6.1 **Subsidiary Hazard Class** 3 I 14.4. Packing group

14.5. Environmental hazards No hazards identified

No special precautions required. 14.6. Special precautions for user

14.7. Maritime transport in bulk Not applicable, packaged goods according to IMO instruments

## **SECTION 15: REGULATORY INFORMATION**

## 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

## International Inventories

Europe (EINECS/ELINCS/NLP), China (IECSC), Taiwan (TCSI), Korea (KECL), Japan (ENCS), Japan (ISHL), Canada (DSL/NDSL), Australia (AICS), New Zealand (NZIoC), Philippines (PICCS). US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

#### Iron pentacarbonyl

Component

pentacarbonyi	Revision Date 22-Sep-2023

IECSC TCSI

KECL ENCS

Iron, pentacarbonyl-	13463-40-6	236-670-8	-	ı	-	X	KE-27863	Х	X
Component	CAS No	TSCA	TSCA Ir notific	ation -	DSL	NDSL	AICS	NZIoC	PICCS
			Active-	nactive					
Iron, pentacarbonyl-	13463-40-6	Х	ACT	IVE	Х	-	Х	X	Х

EINECS ELINCS NLP

Legend: X - Listed '-' - Not Listed KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

CAS No

Authorisation/Restrictions according to EU REACH

Not applicable

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	J	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Iron, pentacarbonyl-	13463-40-6	-	-	-

## Seveso III Directive (2012/18/EC)

Component	CAS No	Seveso III Directive (2012/18/EC) -	Seveso III Directive (2012/18/EC) -
		Qualifying Quantities for Major Accident	Qualifying Quantities for Safety Report
		Notification	Requirements
Iron, pentacarbonyl-	13463-40-6	Not applicable	Not applicable

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals

Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)? Not applicable

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work .

## **National Regulations**

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

WGK Classification See table for values

	Component	Germany - Water Classification (AwSV)	Germany - TA-Luft Class
ſ	Iron, pentacarbonyl-	WGK2	

## 15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

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#### Full text of H-Statements referred to under sections 2 and 3

H225 - Highly flammable liquid and vapor

H300 - Fatal if swallowed

H310 - Fatal in contact with skin

H330 - Fatal if inhaled

H372 - Causes damage to organs through prolonged or repeated exposure

#### Legend

**CAS** - Chemical Abstracts Service

TSCA - United States Toxic Substances Control Act Section 8(b)

Inventory **DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic

Substances List

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical

Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances **IECSC** - Chinese Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**ENCS** - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

**DNEL** - Derived No Effect Level

RPE - Respiratory Protective Equipment

LC50 - Lethal Concentration 50%

**NOEC** - No Observed Effect Concentration PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

Predicted No Effect Concentration (PNEC)

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50% POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road

IMO/IMDG - International Maritime Organization/International Maritime

Dangerous Goods Code OECD - Organisation for Economic Co-operation and Development

**BCF** - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from

ATE - Acute Toxicity Estimate VOC - (Volatile Organic Compound)

Key literature references and sources for data

https://echa.europa.eu/information-on-chemicals

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

## **Training Advice**

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hvaiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

**Creation Date** 25-Jan-2011 **Revision Date** 22-Sep-2023 Not applicable. **Revision Summary** 

## This safety data sheet complies with Regulation UK SI 2019/758 and UK SI 2020/1577 as amended.

#### Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

## **End of Safety Data Sheet**

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