

SAFETY DATA SHEET

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

1.1. Product identifier:

HEXYL CHLOROFORMATE

IUPAC name: Hexyl chloroformate

CAS number: 6092-54-2

EC number: 228-036-4

REACH registration number: 01-2120099956-32-0002

1.2. Relevant identified uses of the substance and uses advised against:

Organic synthesis intermediate for industrial use.

Transported, isolated intermediate.

Process category (PROC):

PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions

PROC 8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

PROC 15: Use as laboratory reagent

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

FRAMOChem FRENCH-HUNGARIAN FINE CHEMICALS LTD.

3700 Kazincbarcika,

Szerviz str. 5., POB. 504

Telephone: +36 (48) 311-991

Fax: +36 (48) 512-162

E-mail: info@framochem.hu

1.3.1. Responsible person: -

E-mail: info@framochem.hu

1.4. Emergency telephone number:

Public Toxicological Health Service (ETTSZ)

1096 Budapest, Nagyvárad tér 2.

Tel.: 06 1 476 6464, 06 80 201 199 (0-24 h)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance:

Classification according to Regulation 1272/2008/EC (CLP):

Skin corrosion/irritation, Hazard Category 2 – H315

Serious eye damage/eye irritation, Hazard Category 1 – H318

Acute toxicity (inhalation), Hazard Category 2 – H330

Hazardous to the aquatic environment – Chronic Hazard, Category 3 – H412

Warning **H statements:**

H315 – Causes skin irritation.

H318 – Causes serious eye damage.

H330 – Fatal if inhaled.

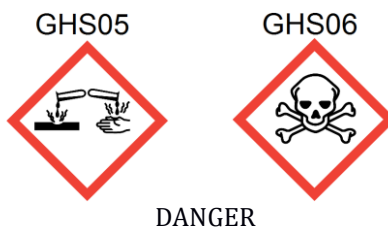
H412 – Harmful to aquatic life with long lasting effects.

2.2. Label elements:

IUPAC name: Hexyl chloroformate

CAS number: 6092-54-2

EC number: 228-036-4



Warning H statements:

- H315** – Causes skin irritation.
H318 – Causes serious eye damage.
H330 – Fatal if inhaled.
H412 – Harmful to aquatic life with long lasting effects.

Precautionary P statements:

- P202** – Do not handle until all safety precautions have been read and understood.
P260 – Do not breathe vapours/spray.
P273 – Avoid release to the environment.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
P284 – [In case of inadequate ventilation] wear respiratory protection.
P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 – Immediately call a POISON CENTER or doctor/physician.
P405 – Store locked up.
P501 – Dispose of contents/container to hazardous waste collection point.

2.3. Other hazards:

Information concerning specific hazards for human and environment: see Section 11.
The substance does not meet the criteria for PBT or vPvB substances.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances:

IUPAC name: Hexyl chloroformate; Chloro(hexyloxy)methanone
Synonym: Chloroformic acid n-hexyl ester
CAS number: 6092-54-2
EC number: 228-036-4
Formula: C₇H₁₃ClO₂
Molar mass: 164.63 g/mol
Purity: > 99.6 %

Other hazardous contaminant / Concentration: The product contains phosgene and hydrochloric acid in traces.
Other hazardous additives / Concentration: The presence of hazardous additive is not known.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures:

General information: Immediately remove contaminated clothing. If danger of loss of consciousness, place patient in recovery position and transport accordingly. Apply artificial respiration if necessary. First aid personnel should pay attention to their own safety.

IN CASE OF INGESTION:

Measures:
- Rinse mouth immediately and then drink plenty of water, seek medical attention.

IN CASE OF INHALATION:

Measures:
- Keep patient calm, remove to fresh air, seek medical attention.
- Immediately inhale corticosteroid dose aerosol.

IN CASE OF SKIN CONTACT:

Measures:
- Immediately wash thoroughly with soap and water, seek medical attention.

IN CASE OF EYE CONTACT:

Measures:
- Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

- 4.2. Most important symptoms and effects, both acute and delayed:
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11. Further important symptoms and effects are so far not known.
- 4.3. Indication of any immediate medical attention and special treatment needed:
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote. Pulmonary oedema prophylaxis. Medical monitoring for at least 24 hours.

SECTION 5: FIRE-FIGHTING MEASURES

- 5.1. Extinguishing media:
5.1.1. Suitable extinguishing media:
Dry powder, carbon dioxide, foam.
5.1.2. Unsuitable extinguishing media:
Water.
- 5.2. Special hazards arising from the substance or mixture:
Reacts violently with water.
In case of fire, hydrogen chloride may be formed. The inhalation of the combustion product may have serious adverse effects on health.
- 5.3. Advice for fire fighters:
Wear full protective clothing and self-contained breathing apparatus.
Fire debris must be disposed of in accordance with official regulations.

SECTION 6: ACCIDENTAL RELEASE MEASURES

- 6.1. Personal precautions, protective equipment and emergency procedures:
6.1.1. For non-emergency personnel:
Keep unprotected people away, allow only well trained experts wearing suitable protective clothing to abide in the field of accident.
6.1.2. For emergency responders:
Breathing protection required.
Avoid contact with the skin, eyes and clothing.
Evacuate unauthorized persons from the place of the accident.
Remove all ignition sources from the affected area.
Close the designated area.
Ensure adequate ventilation.
- 6.2. Environmental precautions:
Do not empty into drains.
- 6.3. Methods and material for containment and cleaning up:
Pick up spilled material with suitable appliance and dispose of it.
- 6.4. Reference to other sections:
For further and detailed information see section 8 and 13.

SECTION 7: HANDLING AND STORAGE

- 7.1. Precautions for safe handling:
Observe conventional hygiene precautions.
Protect against moisture.
Avoid contact with skin, eyes and clothing.
Technical measures:
Ensure thorough ventilation of stores and work areas.
Local vapour suction is needed while handling the product.
Precautions against fire and explosion:
Keep away from sources of ignition - No smoking.
- 7.2. Conditions for safe storage, including any incompatibilities:
Technical measures and storage condition:
Segregate from alkalis and alkalizing substances.
Keep container tightly closed in a cool, well-ventilated place.
Keep under dry nitrogen.
Avoid extreme heat.
Storage temperature: < 25 °C
Storage duration: 12 months.
Protect against moisture.
Keep in appropriately labelled container.
The place of storage has to be properly ventilated and cleanable.
Store in a dry place.
Follow all instructions on the label.
Store away from heat.
Incompatible materials: see section 15.

- 7.3. Packaging material: glass, high density polyethylene (HDPE), lead coated, enamelled.
Specific end use(s):
No specific instructions available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters:

Occupational exposure limit values:

The substance is not regulated with exposure limit value.

Phosgene; carbonyl chloride (CAS: 75-44-5):
Eight hours: 0.08 mg/m³; 0.02 ppm (OEL (EU))
Short-term: 0.4 mg/m³; 0.1 ppm (OEL (EU))

Hydrogen chloride (CAS: 7647-01-0):
Eight hours: 8 mg/m³; 5 ppm (OEL (EU))
Short-term: 15 mg/m³; 10 ppm (OEL (EU))

PNEC values:

Freshwater: 0.015 mg/l

Freshwater - intermittent release: 0.15 mg/l

Marine water: 0.002 mg/l

STP: 14 mg/l

Freshwater sediment: 0.119 mg/kg sediment dry weight

Marine water sediment: 0.012 mg/kg sediment dry weight

Soil: 0.015 mg/kg soil dry weight

DNEL		Routes of exposure	Exposure frequency	Remarks:
Worker	Consumer			
no data available	no data available	Dermal	Short term (acute) Long term (repeated)	no data available
no data available	no data available	Inhalative	Short term (acute) Long term (repeated)	no data available
no data available	no data available	Oral	Short term (acute) Long term (repeated)	no data available

8.2. Exposure controls:

In case of a hazardous material with no controlled concentration limit it is the employer's duty to keep concentration levels down to a minimum achievable by existing scientific and technological means, where the hazardous substance poses no harm to workers.

8.2.1. Appropriate engineering controls:

In pursuance of work is proper foresight needed to avoid spilling onto clothes and floors and to avoid contact with eyes and skin.

Do not inhale vapours.

Ensure adequate ventilation, especially in closed areas.

Do not eat, drink or smoke during the processing.

Wash thoroughly after the work hours.

In the vicinity of the workplace safety shower and eye wash fountain has to be installed.

8.2.2. Individual protection measures, such as personal protective equipment:

Avoid contact with the skin, eyes and clothing. Do not breathe vapour/spray.

1. Eye/face protection: use appropriate, tightly fitting protective glasses (EN 166).

2. Skin protection:

a. Hand protection: use appropriate, chemical resistant protective gloves (EN 374).

Suitable materials short-term contact and/or splashes (recommended: At least protective index 2, corresponding > 30 minutes of permeation time according to EN 374):

butyl rubber (butyl) - 0.7 mm thickness

Manufacturer's directions for use should be observed because of great diversity of types.

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

b. Other: use appropriate protective clothes. Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust)

3. Respiratory protection: use appropriate respiratory protective device against organic vapours (EN 136, 141). Breathing protection if gases/vapours are formed. Gas filter for gases/vapours of organic compounds (boiling point > 65 °C, e. g. EN 14387 Type A) Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.
4. Thermal hazard: none known.
- 8.2.3. Environmental exposure controls:
No special measures required.

The requirements detailed in Section 8 assume skilled work under normal conditions and usage of the product for appropriate aims. If conditions differ from normal or work is carried out under extreme conditions an expert's advice should be sought out before deciding upon further protective measures.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties:

Parameter		Test method:	Remarks:
1. Appearance:	organic, clear, colourless liquid	20°C, 1013 hPa	
2. Odour:	characteristic		
3. Odour threshold:	no data available*		
4. pH value:	not applicable		
5. Melting point/ freezing point:	no melting temperature was found between -100 °C and 50 °C; a glass transition might exist below -100 °C		
6. Initial boiling point/boiling range:	60 – 61 °C	7 mm Hg	
7. Flash point:	69.5 °C	1 013 hPa	
8. Evaporation rate:	no data available*		
9. Flammability (solid, gas):	no data available*		
10. Upper/lower flammability or explosive limits:	no data available*		
11. Vapour pressure:	0.71 hPa 2.79 hPa	20 °C 30 °C	
12. Vapour density:	5,6	air = 1	
13. Relative density:	1.007		
14. Solubility(ies):	reacts with water		
15. Partition coefficient: n-octanol/water:	log Pow = 2.591	25 °C	
16. Self-ignition temperature:	250 °C	ca. 1013.25 hPa	
17. Degradation temperature:	no data available*		
18. Viscosity:	1.34 mPa.s 0.98 mPa.s	20 °C, dynamic 40 °C, dynamic	
19. Explosive properties:	no data available*		
20. Oxidizing properties:	no data available*		

9.2. Other information:

Density (20 °C): 1.007 g/cm³

*: The manufacturer did not carry out any tests on this parameter for the product or the results of the tests are not available at the time of publication of the data sheet.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity:

Stable at room temperature.

See also section 10.3.

Corrosion to metals: Corrosive effect on metals.

Reaction with water.

10.2. Chemical stability:

At normal temperature and general conditions of work stable. Decomposes in contact with heat, moist air or water.

The product is stable if stored and handled as prescribed/indicated.

10.3. Possibility of hazardous reactions:

Reacts with alkalis, water, acids, amines and alcohols.

Reacts with water and basic components to generate heat. Reacts with amines. Reacts with alcohols, amines, aqueous acids and alkalis. The formation of gaseous decomposition products builds up pressure in tightly closed containers if the product is greatly overheated. Evolution of corrosive gases/vapours. Reacts with activated carbon. Reacts with alkalis and metals. Reacts with water and moisture, with formation of hydrogen chloride. Partly very violent reactions with bases and numerous organic classes of substances such as alcohols and amines. Impurities promote decomposition. Energy is

released when reacting with e.g. acids, alkaline reacting substances, amines or catalysts. ppm traces of heavy metals reduce the onset temperature and lead to instability and exothermic product release with gas formation.

- 10.4. Conditions to avoid:
Avoid contact with water.
Protect from heat.
Temperature: > 40 °C
- 10.5. Incompatible materials:
Alkalis, water, acids, amines and alcohols.
Water, alkaline reactive substances, alcohols, bases, amines, iron compounds, heavy metal salts.
- 10.6. Hazardous decomposition products:
In case of thermal decomposition carbon monoxide, hydrogen chloride gas and carbon dioxide are formed.

SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1. Information on toxicological effects:
Acute toxicity: Fatal if inhaled.
Skin corrosion/irritation: Causes skin irritation.
Serious eye damage/eye irritation: Causes serious eye damage.
Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
Germ cell mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT-single exposure: Based on available data, the classification criteria are not met.
STOT-repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.
- 11.1.1. For substances subject to registration, brief summaries of the information derived from the test conducted:
No data available.
- 11.1.2. Relevant toxicological properties of the hazardous substances:
Acute toxicity:
LC50 (inhalation, rat, male/female): 1.17 mg/l air/4 h
Genetic toxicity:
Negative ($\geq 2500 \mu\text{g}/\text{plate}$).
- 11.1.3. Information on likely routes of exposure:
Ingestion, inhalation, skin contact, eye contact.
- 11.1.4. Symptoms related to the physical, chemical and toxicological characteristics:
In case of inhalation, ingestion or absorption through skin is toxic, may cause fatal poisoning! The product extremely destructs the tissues, the mucous membranes, the upper respiratory tract, the eyes and the skin.
Ingestion: Mucous membrane irritation and burning is likely.
Inhalation: The inhalation of the vapors may cause mucous membrane irritation, and it may cause convulsions and inflammation in the larynx and in the bronchia.
May cause burning in the respiratory tract. Pneumonia, pulmonary edema may occur.
Symptoms of the exposition: burning feeling, coughing, labored breath, inflammation of the larynx, short breath, headache, nausea, vomiting.
Skin contact: Causes skin irritation.
Eye contact: It may cause serious eye damage, the injury of the cornea, the deterioration of the eyesight, blindness.
- 11.1.5. Delayed and immediate effects as well as chronic effects from short and long-term exposure:
Causes skin irritation.
Causes serious eye damage.
Fatal if inhaled.
- 11.1.6. Interactive effects:
No data available.
- 11.1.7. Absence of specific data:
No information.
- 11.1.8. Other information:
No data available.

SECTION 12: ECOLOGICAL INFORMATION

- 12.1. Toxicity:
Harmful to aquatic life with long lasting effects.
- Short-term toxicity to fish:
LC50 (Danio rerio): 15 mg/l/96h
- Short-term toxicity to aquatic invertebrates:
EC50 (Daphnia magna): 201 mg/l/24h
- Toxicity to aquatic algae and cyanobacteria:
EC50 (Pseudokirchneriella subcapitata): 79.7 mg/l/72h
- Toxicity to microorganisms:

- EC10 (activated sludge): 140 mg/l/3h
- 12.2. Persistence and degradability:
Biodegradation: 44 % / 28 days
- 12.3. Bioaccumulation potential:
Bioaccumulation factor:
BCF: 10.1 l/kg (log KCF: 1.01)
BAF: 9.35 l/kg (log BAF: 0.97)
- 12.4. Mobility in soil:
Adsorption coefficient:
Koc: 43.3 (25 °C)
log Koc: 1.637 (25 °C)
Henry's Law constant:
H1: 1.78 Pa m³/mol (25 °C)
H2: 1.73 Pa m³/mol (25 °C)
Distribution:
Air (%): 42.2
Water (%): 56.8
Soil (%): 0.481
Sediment (%): 0.487
Susp. sediment (%): 0
Biota (%): 0
Aerosol (%): 0
- 12.5. Results of PBT and vPvB assessment:
Not considered a PBT or vPvB substance.
- 12.6. Other adverse effects:
No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

- 13.1. Waste treatment methods:
Disposal according to the local regulations.
- 13.1.1. Information regarding the disposal of the product:
Incinerate in suitable incineration plant, observing local authority regulations.
The product can be incinerated in a chemical incinerator equipped with an afterburner and scrubber.
No appropriate EWC code can be given for the substance, since the identification of the proper code can be done with the method of use defined by the user of the substance. The European waste code number has to be determined after a discussion with a specialist dealing with waste disposal.
- 13.1.2. Information regarding the disposal of the packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.
The packaging material contaminated with hazardous waste should be disposed according to the local regulations.
The emptied packaging material should be collected and disposed of according to the pertinent regulation.
- 13.1.3. Physical/chemical properties that may affect waste treatment options shall be specified:
None known.
- 13.1.4. Sewage disposal:
None known.
- 13.1.5. Special precautions for any recommended waste treatment:
No data available.

SECTION 14: TRANSPORT INFORMATION

- 14.1. UN Number:
ADR/RID; IMDG; IATA:
UN 3277
- 14.2. UN proper shipping name:
ADR/RID: CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S. (Hexyl-chloroformate)
IMDG: CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S. (Hexyl-chloroformate)
IATA: CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S. (Hexyl-chloroformate)
- 14.3. Transport hazard class(es):
ADR/RID: 6.1 (8)
IMDG: 6.1 (8)
IATA: 6.1 (8)
- 14.4. Packaging group:
ADR/RID: II
IMDG: II
IATA: II
- 14.5. Environmental hazard:

ADR/RID: no

IMDG: no

IATA: no

14.6. Special precautions for user:

No relevant information available.

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code:

Not applicable.

SECTION 15: REGULATORY INFORMATION

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

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

15.2. Chemical safety assessment: no information available.

SECTION 16: OTHER INFORMATION

Information regarding the revision of the safety data sheet:

The safety data sheet has been revised according to Regulation (EU) 2015/830 (Section 1-16).

The classification of the substance has been changed compared to the previous version.

Full text of the abbreviations in the safety data sheet:

DNEL: Derived no effect level. PNEC: Predicted no effect concentration. CMR effects: carcinogenicity, mutagenicity and toxicity for reproduction. PBT: Persistent, bioaccumulative and toxic. vPvB: Very Persistent, Very Bioaccumulative. n.d.: not defined. n.a.: not applicable. ADR: European agreement concerning the carriage of dangerous goods by road. RID: Regulation concerning the international transport of dangerous goods by train. IMDG: International maritime code for dangerous goods. IATA DGR: International air transport association dangerous goods regulation.

Key literature references and sources for data:

Previous version of the safety data sheet (dated 04. 10. 2017, version CLP_D),
data provided by the manufacturer (REACH registration dossier).

Relevant H-Phrases (number and full text) of Section 2 and 3:

H315 – Causes skin irritation.

H318 – Causes serious eye damage.

H330 – Fatal if inhaled.

H412 – Harmful to aquatic life with long lasting effects.

Training advice: no data available.

This safety data sheet had been prepared on the basis of information provided by the manufacturer/supplier and conform to the relevant regulations.

The information, data and recommendations contained herein are provided in good faith, obtained from reliable sources and believed to be true and accurate as of the date issued; however, no representation is made as to the comprehensiveness of the information. The SDS shall be used only as a guide for handling the product; in the course of handling and using the product other considerations may arise or be required.

Users are cautioned to determine the appropriateness and applicability of the above information to their particular circumstances and purposes and assume all risk associated with the use of this product. It is the responsibility of the user to fully comply with local, national and international regulations concerning the use of this product.

Safety data sheet was prepared by: ToxInfo Kft.

Professional help regarding the explanation of the safety data sheet:
+36 70 335 8480; info@msds-europe.com

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Date of revision: 13. 09. 2018
Version: CLP_E

FramoChem
A VanDeMark Company

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