

## SAFETY DATA SHEET

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

1.1. Product identifier:

**2-ethylhexyl chloroformate**

IUPAC name: 2-ethylhexyl chloroformate

CAS number: 24468-13-1

EC number: 246-278-9

Registration number: 01-2119472148-35-0003; Transported isolated intermediate.

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

Organic synthesis intermediate for industrial use.

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

**FRAMOCHEM FRENCH-HUNGARIAN FINE CHEMICALS LTD.**

3700 Kazincbarcika, Szerviz str. 5., POB. 504

Tel.: +36 (48) 311-991

Fax: +36 (48) 512-162

1.3.1. Responsible person: -

E-mail: [info@framochem.hu](mailto:info@framochem.hu)

1.4. Emergency telephone number:

**Public Toxicological Health Service (ETTSZ)**

1096 Budapest, Nagyváradi 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):

Corrosive to metals, Hazard Category 1 – H290

Skin corrosion/irritation, Hazard Category 2 – H315

Sensitisation - Skin, hazard category 1 – H317

Acute toxicity (inhalation), Hazard Category 1 – H330

**Warning H statements:**

**H290** – May be corrosive to metals.

**H315** – Causes skin irritation.

**H317** – May cause an allergic skin reaction.

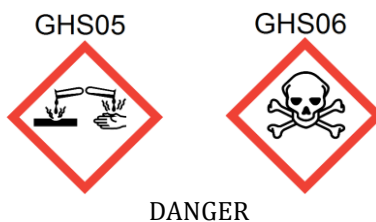
**H330** – Fatal if inhaled.

2.2. Label elements:

IUPAC name: 2-ethylhexyl chloroformate

CAS number: 24468-13-1

EC number: 246-278-9



**Warning H statements:**

**H290** – May be corrosive to metals.

**H315** – Causes skin irritation.

**H317** – May cause an allergic skin reaction.  
**H330** – Fatal if inhaled.

**Precautionary P statements:**

**P280** – Wear protective gloves/protective clothing/eye protection/face protection.  
**P284** – [In case of inadequate ventilation] wear respiratory protection.  
**P310** – Immediately call a POISON CENTER/doctor.  
**P390** – Absorb spillage to prevent material damage.  
**P403** – Store in a well-ventilated place.  
**P406** – Store in corrosive resistant container with a resistant inner liner.

2.3. Other hazards:

No other known specific hazards for human or environment.  
The substance does not meet the criteria for PBT or vPvB substances.

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

3.1. Substance:

IUPAC name: 2-ethylhexyl chloroformate  
Synonym: Chloroformic acid 2-ethylhexyl ester  
CAS number: 24468-13-1  
EC number: 246-278-9  
Formula: C<sub>9</sub>H<sub>17</sub>ClO<sub>2</sub>  
Molar mass: 192.7 g/mol  
Purity: > 99.7 %

**SECTION 4: FIRST AID MEASURES**

4.1. Description of first aid measures:

General advice: 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.

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:

See section 11.

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

No special treatment needed, treat symptomatically.

**SECTION 5: FIRE-FIGHTING MEASURES**

5.1. Extinguishing media:

5.1.1. Suitable extinguishing media:

Dry extinguishing media, carbon dioxide, foam.

5.1.2. Unsuitable extinguishing media:

Water.

5.2. Special hazards arising from the substance or mixture:

Hazardous decomposition products: hydrogen chloride

5.3. Advise for fire fighters:

Wear appropriate 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 the unauthorized persons for the place of the accident.  
Remove the ignition sources.  
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:  
For large amounts: Pump off product.  
For residues: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr).  
Dispose of absorbed material in accordance with regulations.
- 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, avoid inhalation.  
Do not eat, drink and smoke in the workplace.  
Use adequate personal protective equipment (see section 8).  
The contaminated clothes should be removed immediately and should be cleaned before re-use.  
After the handling of the product and before breaks or before eating wash your hands, after the work hours thorough washing (warm water hand washing and showering with soap) is required.  
Technical measures:  
Ensure adequate ventilation.  
Precautions against fire and explosion:  
No special measures required.
- 7.2. Conditions for safe storage, including any incompatibilities:  
Technical measures and storage condition:  
Keep container tightly closed in a cool, well-ventilated place.  
Storage duration: 12 months.  
Protect from moisture.  
Incompatible materials: see section 10.5.  
Packaging material: Metal container lined with polyethylene, with inert material or polyethylene container.
- 7.3. Specific end use(s):  
No specific instructions available.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters:

Occupational exposure limit values (COMMISSION DIRECTIVE 2000/39/EC of 8 June 2000):  
The substance is not regulated with exposure limit value.

PNEC values:

Freshwater: 0.017 mg/l

Freshwater – Intermittent release: 0.332 mg/l

Marine water: 0.002 mg/l

STP: 2.5 mg/l

Freshwater sediment: 0.118 mg/kg sediment dry weight

Marine water sediment: 0.012 mg/kg sediment dry weight

Air: no hazards identified

Soil: 0.014 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 breathe vapour/spray.  
Ensure adequate ventilation, especially in closed areas.  
Do not eat or smoke during the processing.  
Before the breaks and after the work hours wash thoroughly (hand and body).  
In the vicinity of the workplace safety shower and eye wash fountain has to be installed.  
The contaminated clothes should be removed immediately and should be cleaned before re-use.
- 8.2.2. **Individual protection measures, such as personal protective equipment:**
1. Eye/face protection: tightly fitting safety goggles (splash goggles) (e.g. EN 166).
  2. Skin protection:
    - a. Hand protection: chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):
      - nitrile rubber (NBR) - 0.4 mm coating thickness
      - fluoroelastomer (FKM) - 0.7 mm coating thicknessManufacturer's directions for use should be observed because of great diversity of types.  
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: wearing of closed work clothing is required additionally to the stated personal protection equipment.
  3. Respiratory protection: 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. <b>Appearance:</b>	colourless liquid		
2. <b>Odour:</b>	unpleasant		
3. <b>Odour threshold:</b>	no data available*		
4. <b>pH:</b>	hydrolyses	aqueous solution	
5. <b>Melting point/freezing point:</b>	<-55 °C		
6. <b>Initial boiling point and boiling range:</b>	decomposes before boiling		
7. <b>Flash point:</b>	86 °C	1013 hPa	
8. <b>Evaporation rate:</b>	no data available*		
9. <b>Flammability (solid, gas):</b>	not applicable		
10. <b>Upper/lower flammability or explosive limits:</b>	no data available*		
11. <b>Vapour pressure:</b>	2.11 hPa at 55.0 °C 5.43 hPa at 70.0 °C 17.23 hPa at 90.0 °C 78.20 hPa at 110.0 °C		
12. <b>Vapour density:</b>	6.6	air = 1	
13. <b>Relative density:</b>	0.98	20 °C	
14. <b>Solubility(ies):</b>	48.86 mg/l	25 °C	reacts with water, soluble in common solvents
15. <b>Partition coefficient: n-octanol/water:</b>	log Pow = 2.97	25 °C	
16. <b>Auto-ignition temperature:</b>	235 °C	1013 hPa	
17. <b>Decomposition temperature:</b>	180 °C		
18. <b>Viscosity:</b>	1.774 mPas	dynamic, 20 °C	
19. <b>Explosive properties:</b>	no data available*		

20. Oxidizing properties: no oxidising  
properties

9.2. Other information:

Flammability (liquid): combustible.

\*: 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:

Corrosive effect on metals.

10.2. Chemical stability:

Stable at room temperature.

10.3. Possibility of hazardous reactions:

Reacts with alkalis. Reacts with amine-containing products. Reacts with water.

10.4. Conditions to avoid:

Contact with water. Strong heating.

10.5. Incompatible materials:

Bases, water, amines and alcohol.

10.6. Hazardous decomposition products:

In case of thermal decomposition: carbon dioxide, in case of hydrolysis: hydrochloric acid, carbon dioxide, and 2-ethylhexanol is 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: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation: May cause an allergic skin reaction.

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:

LD50 (oral, rat): 5420 mg/kg bw

LC50 (inhalative, rat): ca. 0.27 mg/l/4h

LD50 (dermal, rabbit): > 3038 mg/kg bw

Skin irritation/corrosion:

Moderately irritating (rabbit).

Eye irritation:

Not irritating (rabbit).

Skin sensitisation:

Sensitizing.

Genetic toxicity:

in vitro: negative without metabolic activation.

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:

Acute effects:

Inhalation: toxic if inhaled.

Skin contact: irritating.

Eye contact: may cause irritation of the eyes.

11.1.5. Delayed and immediate effects as well as chronic effects from short and long-term exposure:

Causes skin irritation.

May cause an allergic skin reaction.

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:  
Short-term toxicity to fish:  
LC50 (Pimephales promelas): 28.2 mg/l/96h  
Short-term toxicity to aquatic invertebrates:  
LC50 (Daphnia magna): 35.2 mg/l/48h  
Toxicity to aquatic algae and cyanobacteria:  
EC50 (Desmodesmus subspicatus): 16.6 mg/l/72h  
Toxicity to microorganisms:  
EC50 (activated sludge): ca. 250 mg/l/30 min
- 12.2. Persistence and degradability:  
Phototransformation in air:  
Based on an estimated OH radical rate constant of  $13.2292E-12 \text{ cm}^3/(\text{molecule} \cdot \text{sec})$ , the half-life of 2-ethylhexanol was calculated to be 1.21 d (test conditions: sensitizer for indirect photolysis: OH;  $0.5 \text{ E}06 \text{ OH}/\text{cm}^3$ , 24-h d). This estimation refers to dry air.  
Hydrolysis:  
t1/2 (pH4) = 7.58 h at 0.0 °C  
t1/2 (pH7) = 6.50 h at 0.0 °C  
t1/2 (pH9) = 3.54 h at 0.0 °C  
t1/2 (pH4) = 2.49/2.53 h at 10.0 °C  
t1/2 (pH7) = 2.29/2.14 h at 10.0 °C  
t1/2 (pH9) = 1.28/1.37 h at 10.0 °C  
Degradation: 85.3 % / 17 days  
The substance is readily biodegradable.
- 12.3. Bioaccumulation potential:  
BCF: 42.33
- 12.4. Mobility in soil:  
Adsorption/desorption:  
Koc: 35.3 (25 °C)  
log Koc: 1.55 (25 °C)  
Henry's Law constant: 2.69 Pa m<sup>3</sup>/mol (25 °C)  
Percent distribution:  
Air (%): 39.2  
Water (%): 52.9  
Soil (%): 3.9  
Sediment (%): 4
- 12.5. Results of PBT and vPvB assessment:  
The substance does not meet the criteria for PBT or vPvB substances.
- 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.  
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.
- 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:  
UN 2748
- 14.2. UN proper shipping name:

- 14.3. 2-ETHYLHEXYL CHLOROFORMATE  
Transport hazard class(es):  
ADR/RID: 6.1. TC1  
IMDG: 6.1  
IATA: 6.1
- 14.4. Packaging group:  
II
- 14.5. Environmental hazard:  
ADR/RID: no  
IMDG: no  
IATA: no
- 14.6. Special precautions for user:  
Labels: 6.1+8
- 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.

Data sources:

Previous version of the safety data sheet (14. 03. 2018, version: CLP \_ E),  
REACH Registration dossier.

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

- H290** – May be corrosive to metals.  
**H315** – Causes skin irritation.  
**H317** – May cause an allergic skin reaction.  
**H330** – Fatal if inhaled.

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](mailto:info@msds-europe.com)