

SAFETY DATA SHEET

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

- 1.1. Product identifier:
ISOBUTYL CHLOROFORMATE
- IUPAC name: Isobutyl chloroformate
Synonym: Chlorformate-isobutyl ester
CAS number: 543-27-1
EC number: 208-840-1
Registration number: 01-2120770099-46-0000; 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 út 5, Pf. 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):
Flammable Liquids 3 – H226
Acute toxicity 4 – H302
Acute toxicity 4 – H312
Acute toxicity 4 – H332
Skin irritation 2 – H315
Eye irritation 2 – H319
Specific target organ toxicity (STOT) – single exposure 3 – H335
- Warning H statements:**
H226 – Flammable liquid and vapour.
H302 – Harmful if swallowed.
H312 – Harmful in contact with skin.
H315 – Causes skin irritation.
H319 – Causes serious eye irritation.
H332 – Harmful if inhaled.
H335 – May cause respiratory irritation.
- 2.2. Label elements
- IUPAC name: Isobutyl chloroformate
CAS number: 543-27-1
EC number: 208-840-1

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WARNING

Warning H statements:

- H226** – Flammable liquid and vapour.
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- H332** – Harmful if inhaled.
- H335** – May cause respiratory irritation.

Precautionary P statements:

- P233** – Keep container tightly closed.
- P270** – Do not eat, drink or smoke when using this product.
- P271** – Use only outdoors or in a well-ventilated area.
- P305 + P351 + P338** – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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. Substances:

Description: organic synthesis intermediate
IUPAC name: Isobutyl chloroformate
Chemical name: Isobutyl chloroformate
Synonym: Chloroformate-isobutyl ester
CAS number: 543-27-1
EC number: 208-840-1
Formula: $C_5H_9ClO_2$
Molar weight: 136.6 g/mol
Purity: $\geq 99\%$

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures:

GENERAL INFORMATION: Obtain immediate medical attention and show the label or the safety data sheet to the physician.

IN CASE OF INGESTION:

Measures:

- Obtain immediate medical attention and show the label or the safety data sheet to the physician.
- Flush the mouth of the victim with plenty of water and give him plenty of water to drink.

IN CASE OF INHALATION:

Measures:

- Take the victim into fresh air, loosen his clothes and let him rest.
- If the victim is unconscious and breathing, place him into recovery position and protect from cooling down!
- Obtain immediate medical attention and show the label or the safety data sheet to the physician.

IN CASE OF SKIN CONTACT:

Measures:

- Immediately remove the contaminated clothing.
- Wash the skin surface with plenty of water and soap (for 15 minutes).
- If symptoms occur, obtain immediate medical attention and show him the label.

IN CASE OF EYE CONTACT:

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Measures:

- Flush with plenty of flowing water holding eyelids apart (for at least 15 minutes).
 - Obtain immediate medical help.
- 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:
See section 11.

SECTION 5: FIRE-FIGHTING MEASURES

- 5.1. Extinguishing media:
- 5.1.1. Suitable extinguishing media:
Dry extinguishing agent, carbon dioxide, appropriate foam.
- 5.1.2. Unsuitable extinguishing media:
Water.
- 5.2. Special hazards arising from the substance or mixture:
Flammable liquid and vapour.
Hazardous decomposition products:
Smoke and other combustion products (carbon monoxide, carbon dioxide and hydrochloric acid).
The inhalation of such combustion products can cause serious adverse effects on health.
- 5.3. Advise for fire fighters
Wear appropriate full protective clothing and self-contained breathing apparatus.

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:
Remove all ignition sources.
Ensure adequate ventilation.
- 6.2. Environmental precautions:
Dispose of spillage and waste in accordance with all applicable environmental laws. Do not allow to enter sewers/soil/surface or ground water. Notify the respective authorities in accordance with local law in the case of environmental pollution immediately.
- 6.3. Methods and material for containment and cleaning up:
Collect the spilled material with inert, non-combustible, mineral absorbent (sand, earth, and perlite), then place into a suitable, closed, properly labelled chemical waste container for disposal.
During disposal wear suitable personal protective equipment.
- 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.
Avoid contact with skin, eyes and clothing.
The inhalation exposure should be avoided.
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 (showering) 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 in original, closed and appropriately labelled container.
The place of storage has to be properly ventilated and cleanable.
Store in cool and dry place.
Follow all instructions on the label.

Incompatible materials: water, alcohols, amines, bases.
 Packaging material: no special prescriptions.

- 7.3. Specific end use(s):
 No specific instructions available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

- 8.1. Control parameters:
 Exposure limit values:
 The substance is not regulated with exposure limit value.

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

PNEC			Exposure frequency:	Remarks:
Water	Soil	Air		
no data available	no data available	no data available	Short term (single use) Long term (continuous)	no data available
no data available	no data available	no data available	Short term (single use) Long term (continuous)	no data available
no data available	no data available	no data available	Short term (single use) Long term (continuous)	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.
 Ensure adequate ventilation.
 Hand wash / shower facilities should be provided and disinfection equipment is mandatory.
 Avoid contact with skin, eyes and clothing, avoid inhalation.
 The inhalation exposure should be avoided.
 The contaminated clothes should be removed immediately and should be cleaned before re-use.
 Before the breaks and after the work hours wash thoroughly (hand and body).
 Do not eat or smoke during the processing.
 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:
1. Eye/face protection: use adequate protective goggles/ protective mask (EN 166).
 2. Skin protection:
 - a. Hand protection: use adequate protective gloves (EN 374).
 - b. Other: use adequate acid resistant protective clothes.
 3. Respiratory protection: use adequate respirator (against organic vapours) (EN 136, 141).
 4. Thermal hazard: none known.
- 8.2.3. Environmental exposure controls:
 No specific prescription.
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:

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1. Appearance:	colourless liquid	
2. Odour:	characteristic	
3. Odour threshold:	no data available	
4. pH value:	no data available	
5. Melting point/ freezing point:	no data available	
6. Initial boiling point and boiling range:	126 °C	
7. Flash point:	39.5 °C	
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:	12 x 10 ² Pa (20 °C) 95 x 10 ² Pa (100 °C)	
12 Vapour density:	4.7	air = 1
13. Relative density:	no data available	
14. Solubility(ies):	reacts with water, soluble in common solvents	
15. Partition coefficient: n-octanol/water:	no data available	
16. Auto-ignition temperature:	no data available	
17. Decomposition temperature:	no data available	
18. Viscosity:	no data available	
19. Explosive properties:	no data available	
20. Oxidizing properties:	no data available	
9.2. <u>Other information:</u>		
Density (20 °C): 1.05 g/cm ³		

SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity:
None known.
- 10.2. Chemical stability:
Stable at room temperature and general conditions of work.
- 10.3. Possibility of hazardous reactions:
Reacts with water.
- 10.4. Conditions to avoid:
Contact with water.
- 10.5. Incompatible materials:
Bases, water, amines and alcohol.
- 10.6. Hazardous decomposition products:
In case of thermal decomposition: carbon dioxide, carbon monoxide and hydrogen chloride are formed.

SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1. Information on toxicological effects:
Acute toxicity: Harmful if swallowed. Harmful in contact with skin. Harmful if inhaled.
Skin corrosion/irritation: Causes skin irritation.
Serious eye damage/eye irritation: Causes serious eye irritation.
Respiratory or skin sensitisation: none known.
Germ cell mutagenicity: none known.
Carcinogenicity: none known.
Reproductive toxicity: none known.
STOT-single exposure: May cause respiratory irritation.
STOT-repeated exposure: none known.
Aspiration hazard: none known.
- 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:
LD50 (oral, rat) value: 1400 mg/kg.
- 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:
No data available.

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- 11.1.5. Delayed and immediate effects as well as chronic effects from short and long-term exposure:
 - Harmful if swallowed.
 - Harmful in contact with skin.
 - Harmful if inhaled.
 - Causes skin irritation.
 - Causes serious eye irritation.
 - May cause respiratory irritation.
- 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:
 - No data available.
- 12.2. Persistence and degradability
 - Biodegradable.
- 12.3. Bioaccumulation potential:
 - No data available.
- 12.4. Mobility in soil
 - No data available.
- 12.5. Results of PBT and vPvB assessment
 - No 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:
 - The product can be incinerated in a chemical incinerator equipped with an afterburner and scrubber.
 - European Waste Code:
 - 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:
 - According to the consideration regarding the product.
 - The contaminated packaging should be cleaned with alkaline solution.
- 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:
 - 2742
- 14.2. UN proper shipping name:
 - CHLOROFORMATES, TOXIC, FLAMMABLE, CORROSIVE N.O.S. (Isobutyl chloroformate)
- 14.3. Transport hazard class(es)
 - 6.1.TFC
- 14.4. Packaging group
 - II
- 14.5. Environmental hazard
 - None.
- 14.6. Special precautions for user:
 - No relevant information available.

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- 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 2015/830/EU (Section 1-16).

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 and very bioaccumulative. n.d.: not defined. n.a.: not applicable.

Data sources: previous version of the safety data sheet (12. 07. 2017.)
REACH registration

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

- H226** – Flammable liquid and vapour.
- H302** – Harmful if swallowed.
- H312** – Harmful in contact with skin.
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- H319** – Causes serious eye irritation.
- H332** – Harmful if inhaled.
- H335** – May cause respiratory irritation.

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 Ltd.

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