SAFETY DATA SHEET

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

1.1. **Product identifier:**
Isopropyl chloroformate

IUPAC name: Isopropyl chloroformate
CAS number: 108-23-6
EC number: 203-563-2
Registration number: 01-2119943484-33-0002; transported isolated intermediate

1.2. **Relevant identified uses of the substance or mixture 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
Tel: +36 (48) 311-991
Fax: +36 (48) 512-162

1.3.1. Responsible person: -
E-mail: info@framochem.hu

1.4. **Emergency telephone number:** **Public Toxicological Health Service (ETTSZ)**
1097 Budapest, Albert Flórián út 2-6.
Tel.: +36 80 201 199 (0-24, free of charge – only from Hungary)
Tel.: +36 1 476 6464 (0-24, normal charge – also from foreign countries)

SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or mixture:**

Classification according to Regulation 1272/2008/EC (CLP):
Flammable liquids, Hazard Category 2 – H225
Acute toxicity (oral), Hazard Category 4 – H302
Skin corrosion/irritation, Hazard Category 1B – H314
Acute toxicity (inhalation), Hazard Category 2 – H330

Hazard statements:
H225 – Highly flammable liquid and vapour.
H302 – Harmful if swallowed.
H314 – Causes severe skin burns and eye damage.
H330 – Fatal if inhaled.

2.2. **Label elements:**

IUPAC name: Isopropyl chloroformate
CAS number: 108-23-6
EC number: 203-563-2

Hazard statements:
H225 – Highly flammable liquid and vapour.
H302 – Harmful if swallowed.
H314 – Causes severe skin burns and eye damage.
H330 – Fatal if inhaled.

Precautionary statements:
P202 – Do not handle until all safety precautions have been read and understood.
P220 – Keep away from clothing and other combustible materials.
P308 + P313 – IF exposed or concerned: Get medical advice/attention.
P280 – Wear protective gloves/protective clothing/eye protection/face 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.
P337 + **P313** – If eye irritation persists: Get medical advice/attention.

2.3. **Other hazards:**
The substance has no other known specific hazards for human or environment.
Information concerning specific hazards for human and environment: see Section 11.
The substance does not meet the PBT or vPvB criteria according to Annex XIII of Regulation 1907/2006/EC.
Endocrine disrupting property: Not an endocrine disruptor.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. **Substance:**

IUPAC name: Isopropyl chloroformate
Synonym: Formic acid chlorine, isopropyl ester
CAS number: 108-23-6
EC number: 203-563-2
Formula: $C_4H_7ClO_2$
Molar mass: 122.5 g/mol
Purity: >99.7 %

Other hazardous contaminant / Concentration range: traces of phosgene and hydrochloric acid.
Other hazardous additive / Concentration range: presence of hazardous additives is not known.

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 doctor.
INGESTION:
Measures:
- Obtain immediate medical help and/or take the victim to the hospital.
- Do not induce vomiting.
- Show the label or the safety data sheet to the physician.

INHALATION:
Measures:
- In case of inhalation exposure, immediately take the victim into fresh air.
- Obtain immediate medical help and/or take the victim to the hospital.

SKIN CONTACT:
Measures:
- Immediately remove the contaminated clothing and shoes.
- The affected skin surface should be immediately flushed/cleaned with plenty of water and soap for at least 15 minutes.
- If symptoms occur, obtain immediate medical attention and show him the label.

EYE CONTACT:
Measures:
- In case of contact with eyes immediately flush with plenty of flowing water holding eyelids apart and moving the eyeballs (for at least 10-15 minutes).
- Obtain immediate ophthalmologist help.

4.2. **Most important symptoms and effects, both acute and delayed:**
Harmful if swallowed.
Causes severe skin burns and eye damage.
Fatal if inhaled.

4.3. **Indication of any immediate medical attention and special treatment needed:**
General information to the physician: Life threating poisoning can happen; pulmonary oedema may occur.
Treatment: General, symptomatic treatment required.

SECTION 5: FIREFIGHTING MEASURES

5.1. **Extinguishing media:**

5.1.1. **Suitable extinguishing media:**
Carbon dioxide, dry powder, foam, in case of smaller fires sand and earth can be used.

5.1.2. **Unsuitable extinguishing media:**
Do not use water jet.

5.2. **Special hazards arising from the substance or mixture:**
Highly flammable liquid and vapour.
In case of fire, smoke and other combustion products (carbon dioxide and hydrogen chloride) may be formed, the inhalation of such combustion products can have serious adverse effects on health.

5.3. **Advice for firefighters:**
Wear appropriate full protective clothing and self-contained breathing apparatus (self-rescue breathing apparatus). These means can protect from the skin and eye contact and from the inhalation of the hazardous gases and smoke.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. **Personal precautions, protective equipment and emergency procedures:**

6.1.1. **For non-emergency personnel:**
Allow only well-trained experts wearing suitable protective clothing to abide in the field of the accident.

6.1.2. **For emergency responders:**
Evacuate the unauthorized persons for the place of the accident.
Remove all ignition sources from the affected area.
Close the designated area.
Ensure adequate ventilation.
Wear appropriate protective equipment.

6.2. **Environmental precautions:**
Avoid release to sewerage system, avoid contamination water sources, waste waters, soil and vegetation.

6.3. **Methods and material for containment and cleaning up:**
Collect the spilled material with inert, non-combustible, mineral absorbent (sand, earth, perlite), then place into a suitable, closed, properly labelled chemical waste container for disposal.
During the collection, placement, disposal of the waste, wear appropriate individual 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.
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 (showering) is required.
Technical measures:
Ensure adequate ventilation (general ventilation and local suction).
Precautions against fire and explosion:
The use/handling of the product must be far from heat and ignition sources, avoid the sparkling and use of open flame.
Use spark and explosion proof equipment/tools during the handling.

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 dry place.
Follow all instructions on the label.
Protect from moisture and heat.
Storage temperature: ≤ 0 °C.
Incompatible materials: see section 10.5
Packaging material: the product must be stored in properly coated (lined with polyethylene) and tightly sealed metal drum.

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 (EC) No 2000/39 of 8 June 2000):
The substance is not regulated with exposure limit value.

DNEL values		Oral exposure		Dermal exposure		Inhalative exposure	
		Short term (acute)	Long term (chronic)	Short term (acute)	Long term (chronic)	Short term (acute)	Long term (chronic)
Consumer	Local	no data	no data	no data	no data	no data	no data
	Systemic	no data	no data	no data	no data	no data	no data
Worker	Local	no data	no data	no data	no data	no data	no data
	Systemic	no data	no data	no data	no data	no data	no data

PNEC values		
Compartment	Value	Note(s)
Freshwater	no data	no notes
Seawater	no data	no notes
Freshwater sediment	no data	no notes
Marine water sediment	no data	no notes
Sewage Treatment Plant (STP)	no data	no notes
Intermittent release	no data	no notes
Secondary poisoning	no data	no notes
Soil	no data	no notes

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 efficient ventilation (general ventilation and local exhaust) in the workplace to avoid harmful exposure and to keep the concentration of the airborne contaminants under the permissible limit value.
The electric equipment has to be spark and explosion proof.
Keep away all heat and ignition sources.
In the place of regular use/in the workplace, hand washing facility should be available. The installation of safety shower is recommended.
The pressure in the containers may be increased that is why it is recommended to eliminate the pressure from the containers regularly. Open the container with care.
Avoid inhalation of vapours.
Sensitive for humidity.

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

1. **Eye/face protection:** Use appropriate protective glasses/protective mask (EN 166).
2. **Skin protection:**
   a. **Hand protection:** Use appropriate protective gloves (EN 374).
   Recommendation: butyl rubber, thickness: 0.7 mm, breakthrough time: >480 min.
   b. **Other:** Use appropriate, acid resistant protective clothes (EN ISO 6529).
3. **Respiratory protection:** Use appropriate respiratory (for organic vapours) protective device (EN 136, EN 141).
4. **Thermal hazards:** No thermal hazards 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 is necessary before deciding upon further protective measures.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. **Information on basic physical and chemical properties:**

Parameter	Value / Test method / Remarks
1. Physical state	liquid
2. Colour	colourless
3. Odour, odour threshold	pungent
4. Melting point/freezing point	-80 °C (101.3 kPa)
5. Boiling point or initial boiling point and boiling range	103-105 °C
6. Flammability	no data*
7. Lower and upper explosion limit	4 vol.% / 15 vol.%
8. Flash point	15.6 °C (101.3 kPa)
9. Auto-ignition temperature	535 °C (101.3 kPa)
10. Decomposition temperature	no data*
11. pH	not applicable
12. Kinematic viscosity	no data*
13. Solubility in water in other solvents	In water: 12.59 g/l (25 °C, pH: 6-8) The product decomposes when exposed to water. Soluble in common organic solvents (e.g. ether, benzene).
14. Partition coefficient n-octanol/water (log value)	log Pow = 1.79 (20 °C)
15. Vapour pressure	36 x 10^2 Pa (20 °C) 63 x 10^2 Pa (57 °C)
16. Density and/or relative density	1.074 g/cm^3 (20 °C) / 1.076 -1.078 (20 °C)
17. Relative vapour density	4.2 (air=1)
18. Particle characteristics	no data*

9.2. **Other information:**

9.2.1. **Information with regard to physical hazard classes:**

No further data available or not applicable for the product.

9.2.2. **Other safety characteristics:**

No other characteristics available.

*: 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, or the property is not applicable for the product.

SECTION 10: STABILITY AND REACTIVITY

10.1. **Reactivity:**

Not stable under normal conditions.

10.2. **Chemical stability:**

Thermally unstable. Unstable at room temperature.

10.3. **Possibility of hazardous reactions:**
Reacts violently with water.
See also Section 10.5.

10.4. **Conditions to avoid:**
Contact with water. Do not store above 0°C.

10.5. **Incompatible materials:**
Water, alkalis, acids, metals, amines, alcohols, oxidising agents.

10.6. **Hazardous decomposition products:**
In case of thermal decomposition: carbon monoxide, carbon dioxide and hydrochloric acid.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. **Information on hazard classes as defined in Regulation (EC) No 1272/2008:**
Acute toxicity: Harmful if swallowed. Fatal if inhaled.
Skin corrosion/irritation: Causes severe skin burns and eye damage.
Serious eye damage/irritation: Based on available data, the classification criteria are not met.
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. **Summaries of the information derived from the test conducted:**
No data available.

11.1.2. **Relevant toxicological properties:**
LD50 (oral, rat): 468.3-632.4 mg/kg bw
LD50 (oral, rat): ca. 544.2 mg/kg bw
LD50 (dermal, rabbit): 11300 mg/kg bw
LC50 (inhalative, rat): 299 ppm/1h

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:**
Corrosive, may cause burning.
In case of inhalation, ingestion or absorption through skin may cause fatal poisoning.
The substance is extremely destructive for the mucous membranes, respiratory tract, eyes and skin.
Ingestion: Harmful.
Inhalation: May cause fatal poisoning. Burns and serious damage in tissues may occur in the respiratory tract.
Major symptoms of the poisoning: burning feeling, coughing, wheezing, inflammation of the larynx, laboured breathing, headache, nausea and vomiting.
After the respiratory tract irritation (after some hours), pulmonary oedema may develop.
Skin contact: Can cause irritation and burns.
Eye contact: Lacrymatory agent. May cause strong eye irritation, and in some cases may cause burning.
Irritation: May cause strong eye irritation. May cause skin irritation.

11.1.5. **Delayed and immediate effects as well as chronic effects from short and long-term exposure:**
Harmful if swallowed.
Causes severe skin burns and eye damage.
Fatal if inhaled.

11.1.6. **Interactive effects:**
No data available.

11.1.7. **Absence of specific data:**
No information.

11.2. **Information on other hazards:**
Endocrine disrupting properties:
Endocrine disrupting property: Not an endocrine disruptor.
Other information:
No data available.

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity:**
Based on available data, the classification criteria are not met.
During the hydrolysis, the product decomposes into hydrochloric acid, carbon dioxide and isopropanol.
Isopropyl alcohol (Isopropanol): Miscible with water in all ratio.

12.2. **Persistence and degradability:**
No data available.

12.3. **Bioaccumulative potential:**
No data available.

12.4. **Mobility in soil:**
In case of hydrolysis hydrochloric acid, carbon dioxide and isopropanol is formed, which is completely soluble in water.
Henry's Law constant: 0.004 atm m^3/mol (25 °C, 101.3 kPa)

12.5. **Results of PBT and vPvB assessment:**
The substance does not meet the PBT or vPvB criteria according to Annex XIII of Regulation 1907/2006/EC.

12.6. **Endocrine disrupting properties:**
Endocrine disrupting property: Not an endocrine disruptor.

12.7. **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.
List of Waste Code:
No waste disposal key according to the List of Waste Code (LoW code) can be determined for this product, as only the purpose of application defined by the user enables an allocation. The LoW code number has to be determined after a discussion with a waste disposal specialist.

13.1.2. **Information regarding the disposal of the packaging:**
Dispose according to the relevant regulations.
The contaminated packaging should be cleaned with alkaline solution.

13.1.3. **Physical/chemical properties that may affect waste treatment options shall be specified:**
No data available.

13.1.4. **Sewage disposal:**
No data available.

13.1.5. **Special precautions for any recommended waste treatment:**
No data available.

SECTION 14: TRANSPORT INFORMATION

14.1. **UN number or ID number:**

ADR/RID:	UN 2407
IMDG:	UN 2407
IATA:	-

14.2. **UN proper shipping name:**

ADR/RID:	ISOPROPYL CHLOROFORMATE
IMDG:	ISOPROPYL CHLOROFORMATE
IATA:	Air transport of the substance is PROHIBITED!

14.3. **Transport hazard class(es):**

ADR/RID:	6.1 TFC
Labels:	6.1 + 3 + 8
IMDG:	6.1
IATA:	-

14.4. **Packing group:**

ADR/RID:	I
IMDG:	I
IATA:	-

14.5. **Environmental hazards:**

ADR/RID:	no
IMDG:	no

IATA: -

14.6. **Special precautions for user:**
Refrigerated transport!
Tunnel restriction code: (D)

14.7. **Maritime transport in bulk according to IMO instruments:**
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) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

15.2. **Chemical safety assessment:** No information.

SECTION 16: OTHER INFORMATION

Information regarding the revision of the safety data sheet:
The safety data sheet has been revised according to Regulation (EU) 2020/878 (Section 1-16).
The hazard classification of the substance was modified compared to the previous version.

This safety data sheet supersedes all previous versions according to Annex II of Regulation (EC) No 1907/2006.

Literature references / data sources:
Previous version of the safety data sheet (22. 12. 2017, version CLP_E).

Relevant hazard statements (code and full text) of Sections 2 and 3:
H225 – Highly flammable liquid and vapour.
H302 – Harmful if swallowed.
H314 – Causes severe skin burns and eye damage.
H330 – Fatal if inhaled.

Training advice: No data available.

Full text of the abbreviations in the safety data sheet:
ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
ADR: Agreement concerning the International Carriage of Dangerous Goods by Road.
ATE: Acute Toxicity Estimate.
AOX: Adsorbable organic halides.
BCF: Bioconcentration factor.
BOD: Biological Oxygen Demand.
CAS number: Chemical Abstract Service number.
CLP: Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.
CMR effects: Carcinogenic, mutagenic, reprotoxic effects.
COD: Chemical Oxygen Demand.
CSA: Chemical Safety Assessment.
CSR: Chemical Safety Report.
DNEL: Derived-No-Effect-Level.
ECHA: European Chemical Agency.
EC: European Community.

EC number: EINECS and ELINCS numbers (see also EINECS and ELINCS).
EEC: European Economic Community.
EEA: European Economic Area (EU + Iceland, Liechtenstein and Norway).
EINECS: European Inventory of Existing Commercial Chemical Substances.
ELINCS: European List of Notified Chemical Substances.
EN: European Norm.
EU: European Union.
EWC: European Waste Catalogue (replaced by LoW – see below).
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
IATA: International Air Transport Association.
ICAO-TI: Technical Instructions for the Safe Transport of Dangerous Goods by Air.
IMDG: International Maritime Dangerous Goods.
IMO: International Maritime Organization.
IMSBC: International Maritime Solid Bulk Cargoes.
IUCLID: International Uniform Chemical Information Database.
IUPAC: International Union of Pure and Applied Chemistry.
Kow: n-Octanol - Water Partition Coefficient.
LC50: Lethal concentration resulting in 50 % mortality.
LD50: Lethal dose resulting in 50 % mortality (median lethal dose).
LoW: List of Waste.
LOEC: Lowest Observed Effect Concentration.
LOEL: Lowest Observed Effect Level.
NOEC: No Observed Effect Concentration.
NOEL: No Observed Effect Level.
NOAEC: No Observed Adverse Effect Concentration.
NOAEL: No Observed Adverse Effect Level.
OECD: Organization for Economic Cooperation and Development.
OSHA: Occupational Safety and Health Administration.
PBT: Persistent, Bioaccumulative and Toxic.
PNEC: Predicted No Effect Concentration.
QSAR: Quantitative Structure Activity Relationship.
REACH: Regulation 1907/2006/EC concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.
RID: Regulations Concerning the International Transport of Dangerous Goods by Rail.
SCBA: Self Contained Breathing Apparatus.
SDS: Safety Data Sheet.
STOT: Specific Target Organ Toxicity.
SVHC: Substances of Very High Concern.
UN: United Nations.
UVCB: Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials.
VOC: Volatile Organic Compound.
vPvB: very Persistent and very Bioaccumulative.

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:
MSDS-Europe
International branch of ToxInfo Kft.

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