

## SAFETY DATA SHEET

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

- 1.1. Product identifier:**  
**HEXAMETHYLENE BIS(CHLOROFORMATE)**
- IUPAC name: Hexamethylene bis(chloroformate)  
CAS number: 2916-20-3  
EC number: 220-840-3  
Registration number: 01-2120770100-71-0000 transported isolated intermedier
- 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](mailto: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 (EC) No 1272/2008 (CLP):  
Acute toxicity (oral), Hazard Category 4 – H302  
Skin corrosion/irritation, Hazard Category 2 – H315  
Serious eye damage/eye irritation, Hazard Category 2 – H319  
Specific target organ toxicity – Single exposure, Hazard Category 3, Respiratory tract irritation – H335
- Hazard statements:**  
**H302** – Harmful if swallowed.  
**H315** – Causes skin irritation.  
**H319** – Causes serious eye irritation.  
**H335** – May cause respiratory irritation.
- 2.2. Label elements:**
- IUPAC name: Hexamethylene bis(chloroformate)  
CAS number: 2916-20-3  
EC number: 220-840-3

GHS07



## WARNING

### Hazard statements:

- H302** – Harmful if swallowed.  
**H315** – Causes skin irritation.  
**H319** – Causes serious eye irritation.  
**H335** – May cause respiratory irritation.

### Precautionary statements:

- P280** – Wear protective gloves/protective clothing.  
**P301 + P312** – IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.  
**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:

Information concerning specific hazards for human and environment: See Section 11 and 12.  
Based on the available data, the substance does not meet the criteria for classification as PBT or vPvB.  
Endocrine disrupting property: Not an endocrine disruptor.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substance:

IUPAC name: Hexamethylene bis(chloroformate)  
Synonym: 1,6-Hexanediol-bis-chloroformate  
CAS number: 2916-20-3  
EC number: 220-840-3  
Formula: C<sub>8</sub>H<sub>12</sub>Cl<sub>2</sub> O<sub>4</sub>  
Molar mass: 243.2 g/mol  
Purity: >99.4

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures:

#### INGESTION:

Measures:

- Obtain immediate medical attention and show him the label.
- Place the victim into comfortable position.
- Do not give the victim anything orally, and do not induce vomiting if the victim is unconscious.
- In case of vomiting turn the head down of the injured person.

#### 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.
- Obtain immediate medical attention and show him the safety data sheet or the label.

#### SKIN CONTACT:

Measures:

- Remove the contaminated clothes.
- 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.

#### EYE CONTACT:

Measures:

- In case of contact with eyes flush with plenty of flowing water holding eyelids apart and moving the eyeballs (for at least 15 minutes).
- In case of persistent symptoms, obtain medical help and show him the label.

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

Harmful if swallowed.  
Causes skin irritation.  
Causes serious eye irritation.  
May cause respiratory irritation.

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

No special treatment needed; treat symptomatically.

## SECTION 5: FIREFIGHTING MEASURES

- 5.1. **Extinguishing media:**
  - 5.1.1. **Suitable extinguishing media:**  
Dry chemical, carbon dioxide, foam.
  - 5.1.2. **Unsuitable extinguishing media:**  
Water.
- 5.2. **Special hazards arising from the substance or mixture:**  
Hazardous decomposition products: smoke and other combustion products (HCl, COx). The inhalation of such combustion products can cause 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.
- 6.2. **Environmental precautions:**  
Dispose of the spillage and the resulting waste according to the applicable environmental regulations. Do not allow the product and the resulting waste 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, 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 Sections 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.  
**Technical measures:**  
Ensure adequate ventilation / local extraction.  
**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:** See Section 10.5  
**Packaging material:** metal container lined with polyethylene or polyethylene container. Do not use metal drums without lining.
- 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
Marine water	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 adequate ventilation, especially in closed areas.

Do not eat, drink or smoke during the processing.

Do not inhale the vapours.

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:

1. **Eye/face protection:** Use appropriate protective glasses/protective mask (EN ISO 16321-1:2022; EN 166).

2. **Skin protection:**

a. **Hand protection:** Use appropriate protective gloves (EN 374).

b. **Other:** Use appropriate, acid resistant protective clothes.

3. **Respiratory protection:** Use adequate respirator for organic vapours (EN 136, 141).

4. **Thermal hazards:** No thermal hazards 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 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	light, colourless
3. Odour, odour threshold	pungent
4. Melting point/freezing point	-23 °C
5. Boiling point or initial boiling point and boiling range	no data*
6. Flammability	no data*
7. Lower and upper explosion limit	no data*
8. Flash point	110 °C
9. Auto-ignition temperature	no data*
10. Decomposition temperature	> 90 °C
11. pH	not applicable
12. Kinematic viscosity	no data*
13. Solubility in water in other solvents	In contact with water, it decomposes to form hydrochloric acid. Soluble in organic solvents.
14. Partition coefficient n-octanol/water (log value)	not applicable
15. Vapour pressure	no data*
16. Density and/or relative density	1.25 g/cm <sup>3</sup> (20 °C)
17. Relative vapour density	8.4 (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:

Stable within normal temperature and under general work conditions.

### 10.2. Chemical stability:

Stable at room temperature.

### 10.3. Possibility of hazardous reactions:

Reacts with water.

See Section 10.5.

### 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 hydrochloric acid, carbon dioxide and carbon monoxide, in case of hydrolysis, hydrochloric acid and carbon dioxide are formed.

## SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008:**  
**Acute toxicity:** Harmful if swallowed.  
**Skin corrosion/irritation:** Causes skin irritation.  
**Serious eye damage/irritation:** Causes serious eye irritation.  
**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:** May cause respiratory irritation.  
**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:**  
**Acute toxicity:**  
LD<sub>50</sub> (oral, rat): 500 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:**  
**Acute effects:**  
Irritates the mucous membranes. May cause pneumonia if inhaled. The symptoms may be delayed.  
Ingestion: Harmful.  
Inhalation: Irritating effect.  
Skin contact: Skin irritating effect.  
Eye contact: Eye irritating effect.  
Irritation: Skin and eye irritation.  
Sensitization: No sensitizing effect known.  
Sub-acute and chronic toxicity:  
Symptoms by intensive or prolonged exposition: None known.
- 11.1.5. Delayed and immediate effects as well as chronic effects from short and long-term exposure:**  
Harmful if swallowed.  
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.
- 11.2. Information on other hazards:**  
**Endocrine disrupting properties:**  
Endocrine disrupting property: Not an endocrine disruptor.  
**Other information:**  
No test data are available for the substance, other adverse health effects cannot be excluded.

## SECTION 12: ECOLOGICAL INFORMATION

- 12.1. Toxicity:**  
The substance is not classified as hazardous for the environment.
- 12.2. Persistence and degradability:**  
No data available.
- 12.3. Bioaccumulative potential:**  
No data available.
- 12.4. Mobility in soil:**  
No data available.
- 12.5. Results of PBT and vPvB assessment:**  
The substance does not meet the criteria for PBT or vPvB substances.

- 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:**  
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:**  
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:**  
UN 3277
- 14.2. **UN proper shipping name:**  
ADR/RID: CHLOROFORMATES, TOXIC, CORROSIVE N.O.S. (Hexamethylene bis(chloroformate))  
IMDG: CHLOROFORMATES, TOXIC, CORROSIVE N.O.S. (Hexamethylene bis(chloroformate))  
IATA: CHLOROFORMATES, TOXIC, CORROSIVE N.O.S. (Hexamethylene bis(chloroformate))
- 14.3. **Transport hazard class(es):**  
ADR/RID: 6.1. TC1  
IMDG: 6.1  
IATA: 6.1
- 14.4. **Packing group:**  
ADR/RID: II  
IMDG: II  
IATA: II
- 14.5. **Environmental hazards:**  
ADR/RID: no  
IMDG: no  
IATA: no
- 14.6. **Special precautions for user:**  
No relevant information available.
- 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 (EC) No 1999/45 and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive (EEC) No 76/769 and Commission Directives (EEC) No 91/155, (EEC) No 93/67, (EC) No 93/105 and (EC) No 2000/21

**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 (EEC) No 67/548 and (EC) No 1999/45, 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 did not change 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 (05. 06. 2018, version CLP\_C).

### Relevant hazard statements (code and full text) of Sections 2 and 3:

**H302** – Harmful if swallowed.

**H315** – Causes skin irritation.

**H319** – Causes serious eye irritation.

**H335** – May cause respiratory irritation.

**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.  
IUCID: International Uniform Chemical Information Database.  
IUPAC: International Union of Pure and Applied Chemistry.  
Kow: n-Octanol - Water Partition Coefficient.  
LC<sub>50</sub>: Lethal concentration resulting in 50 % mortality.  
LD<sub>50</sub>: 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:  
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