4-Nitrophenyl chloroformate

sc-254713

Material Safety Data Sheet

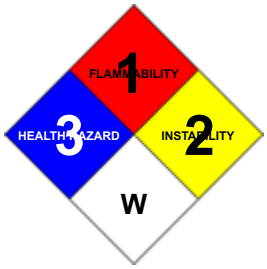
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
4-Nitrophenyl chloroformate

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C7-H4-Cl-N-O4, ClCO2C6H4NO2

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	1		
Toxicity	3		
Body Contact	3		
Reactivity	2		
Chronic	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Reacts violently with water.
Causes burns.
Risk of serious damage to eyes.
Harmful danger of serious damage to health by prolonged exposure through inhalation.
Toxic by inhalation, in contact with skin and if swallowed.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen.
This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).
■ Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus.
Immediate pain and difficulties in swallowing and speaking may also be evident.

EYE

■ The material can produce chemical burns to the eye following direct contact.
Vapours or mists may be extremely irritating.
■ If applied to the eyes, this material causes severe eye damage.
■ Irritation of the eyes may produce a heavy secretion of tears (lachrymation).
■ Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.
Mild burns of the epithelia generally recover rapidly and completely.

SKIN

■ Skin contact with the material may produce toxic effects; systemic effects may result following absorption.
■ The material can produce chemical burns following direct contactwith the skin.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
■ Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
■ Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction.

INHALED

■ If inhaled, this material can irritate the throat andlungs of some persons.
■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
■ Eye contact, inhalation or skin exposure to chloroformate and its products causes an irritant effect which may be initially difficult to perceive, but becomes progressively worse with prolonged exposure.
It may lead to death by causing breathing difficulties and lasting damage to the respiratory system.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
■ Hydrogen chloride (HCl) vapour or fumes present a hazard from a single acute exposure.
Exposures of 1300 to 2000 ppm have been lethal to humans in a few minutes.
■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.

There may be dizziness, headache, nausea and weakness.

CHRONIC HEALTH EFFECTS

■ Harmful danger of serious damage to health by prolonged exposure through inhalation.

This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. This has been demonstrated via both short- and long-term experimentation.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Chronic minor exposure to hydrogen chloride (HCl) vapour or fume may cause discolouration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes.

Repeated exposures of animals to concentrations of about 34 ppm HCl produced no immediate toxic effects.

Workers exposed to hydrochloric acid suffered from gastritis and a number of cases of chronic bronchitis have also been reported.

Repeated or prolonged exposure to dilute solutions of HCl may cause dermatitis.

Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Chronic exposure may inflame the skin or conjunctiva.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
4-nitrophenyl chloroformate	7693-46-1	>98
hydrolyses in water to produce		
hydrogen chloride	7647-01-0	

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE

If this product comes in contact with the eyes

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN

If skin or hair contact occurs

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.

- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

NOTES TO PHYSICIAN

■ For chloroformates

- Patients exposed only to chloroformates gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid or solvents containing chloroformates can secondarily contaminate rescue and medical personnel by direct contact or through off-gassing chloroformates.
- Chloroformates irritate lungs severely. Because of its slow hydrolysis in the alveoli, serious lung effects and, therefore, symptoms of toxicity may be delayed up to 24 hours. Signs of accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) do not usually appear for hours after even severely toxic exposures.
- There is no antidote to be administered to counteract the effects of chloroformates. Treatment consists of supportive measures.

For acute or short term repeated exposures to strong acids

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

The material may induce methaemoglobinaemia following exposure.

- Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis, alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.
- Thorough cleansing of the entire contaminated area of the body, including the scalp and nails, is of utmost importance.

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not manifest until a few hours have passed and they are aggravated by physical effort.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available

EXTINGUISHING MEDIA

Small Fire

- CO_2, dry chemical, dry sand, alcohol-resistant foam (AFFF).
- NOTE Most foams will react with the material and release corrosive/toxic gases

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Move containers from fire area if you can do it without risk.
- DO NOT use water.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

Combustion products include carbon monoxide (CO), carbon dioxide (CO_2), hydrogen chloride, phosgene, nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Cover spill with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimise spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.

MAJOR SPILLS

- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- A vapour suppressing foam may be used to reduce vapors.
- DO NOT GET WATER on spilled substance or inside containers.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Glass container is suitable for laboratory quantities
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

<. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.
Corrodes steel.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	4-nitrophenyl chloroformate (Hydrogen chloride)					2	3		
Canada - British Columbia Occupational Exposure Limits	4-nitrophenyl chloroformate (Hydrogen chloride Revised 2003)					C 2			
US - Minnesota Permissible Exposure Limits (PELs)	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7		
US ACGIH Threshold Limit Values (TLV)	4-nitrophenyl chloroformate (Hydrogen chloride)					2			TLV® Basis URT irr
US NIOSH Recommended Exposure Limits (RELs)	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7		

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)	(C)5	(C)7					
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
US - California Permissible Exposure Limits for Chemical Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride; muriatic acid)	5	7			C		
US - Idaho - Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
US - Hawaii Air Contaminant Limits	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
US - Alaska Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
US - Michigan Exposure Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	4-nitrophenyl chloroformate (Hydrogen chloride)	5	7	-	-			
US - Washington Permissible exposure limits of air contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5.0		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	4-nitrophenyl chloroformate (Hydrogen chloride)					2		
US - Oregon Permissible Exposure Limits (Z-1)	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7	
Canada - Quebec Permissible Exposure Values for Airborne Contaminants	4-nitrophenyl chloroformate (Hydrogen chloride)					5	7,5	

(English)					
US OSHA Permissible Exposure Levels (PELs) - Table Z1	4-nitrophenyl chloroformate (Hydrogen chloride)		5	7	
Canada - Northwest Territories Occupational Exposure Limits (English)	4-nitrophenyl chloroformate (Hydrogen chloride)		5	7.5	
Canada - Nova Scotia Occupational Exposure Limits	4-nitrophenyl chloroformate (Hydrogen chloride)		2		TLV Basis upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	4-nitrophenyl chloroformate (Hydrogen chloride)		2		TLV® Basis URT irr
Canada - Ontario Occupational Exposure Limits	4-nitrophenyl chloroformate (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs)	3 (R)			
Canada - Ontario Occupational Exposure Limits	4-nitrophenyl chloroformate (Particles (Insoluble or Poorly Soluble) Not Otherwise)	10 (I)			

PERSONAL PROTECTION

RESPIRATOR

•Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

ENGINEERING CONTROLS

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Corrosive.
Acid.
Reacts violently with water.

State	Divided solid	Molecular Weight	201.56
Melting Range (°F)	171- 174	Viscosity	Not Applicable
Boiling Range (°F)	318- 324 (19 mm)	Solubility in water (g/L)	Reacts
Flash Point (°F)	>230	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not available
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	>1
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE

Crystalline powder; reacts with water to give corresponding acid.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

¦ Chloroformates

- reaction with sulfoxides may be violent or explosive in the absence of diluent or other effective control of reaction rate; violent reactions may be explained in terms of exothermic polymerisation of formaldehyde which is formed under a variety of conditions by interaction of the sulfoxide with reactive halides.

- may react with rust on corroded materials
- avoid contact with metallic compounds which may act as decomposition catalysts

Hydrogen chloride

- reacts strongly with strong oxidisers (releasing chlorine gas), acetic anhydride, caesium cyanotridecahydrodecaborate(2-), ethylidene difluoride, hexalithium disilicide, metal acetylide, sodium, silicon dioxide, tetraselenium tetranitride, and many organic materials
- is incompatible with alkaline materials, acetic anhydride, acetylides, aliphatic amines, alkanolamines, alkylene oxides, aluminium, aluminium-titanium alloys, aromatic amines, amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, borides, calcium phosphide, carbides, carbonates, cyanides, chlorosulfonic acid, ethylenediamine, ethyleneimine, epichlorohydrin, formaldehyde, isocyanates, metals, metal oxides, metal hydroxides, metal acetylides, metal carbides, oleum, organic anhydrides, potassium permanganate, perchloric acid, phosphides, 3-propiolactone, silicides, sulfides, sulfites, sulfuric acid, uranium phosphide, vinyl acetate, vinylidene fluoride
- attacks most metals forming flammable hydrogen gas, and some plastics, rubbers and coatings
- reacts with zinc, brass, galvanised iron, aluminium, copper and copper alloys

Acyl halides

- tend to react violently with protic organic solvents, water, and the aprotic solvents, dimethylformamide and dimethyl sulfoxide.
- may react dangerously with ethers .
- may react violently or explosively with sulfoxides in the absence of diluent or other effective control of reaction rate; violent reactions may be explained in terms of exothermic polymerisation of formaldehyde which is formed under a variety of conditions by interaction of the sulfoxide with reactive halides.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.
- Segregate from alcohol, water.
- Avoid strong bases.
- Avoid reaction with oxidising agents
- NOTE May develop pressure in containers; open carefully. Vent periodically.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

4-nitrophenyl chloroformate

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

■ The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.

■ The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

No significant acute toxicological data identified in literature search.

CARCINOGEN

Hydrochloric acid	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
Acid mists, strong inorganic	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Hydrogen chloride	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4

hydrogen chloride	US - Rhode Island Hazardous Substance List	IARC	
TWA_MG_M3~	US - Maine Chemicals of High Concern List	Carcinogen	A4
TWA_MG_M3~	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis URT irr
TWAPPM~	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis upper respiratory tract irritation

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. In most instances the supplier of the material should be consulted.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.

Recycle wherever possible.

- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Mixing or slurrying in water; Neutralisation with soda-lime or soda-ash followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	G	Hazard class or Division:	6.1
Identification Numbers:	UN3277	PG:	II
Label Codes:	6.1, 8	Special provisions:	IB2, T8, TP2, TP13, TP28
Packaging: Exceptions:	153	Packaging: Non-bulk:	202
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	30 L	Vessel stowage: Location:	A
Vessel stowage: Other:	12, 13, 25, 40		

Hazardous materials descriptions and proper shipping names:
Chloroformates, toxic, corrosive, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	8
UN/ID Number:	3277	Packing Group:	II
Special provisions:	None		
Cargo Only			
Packing Instructions:	660	Maximum Qty/Pack:	30 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	653	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y640	Maximum Qty/Pack:	0.5 L

Shipping name:CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.(contains 4-nitrophenyl chloroformate)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	8
UN Number:	3277	Packing Group:	II
EMS Number:	F-A,S-B	Special provisions:	274
Limited Quantities:	100 ml		

Shipping name:CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.(contains 4-nitrophenyl chloroformate)

Section 15 - REGULATORY INFORMATION

4-nitrophenyl chloroformate (CAS: 7693-46-1) is found on the following regulatory lists;
"Canada Non-Domestic Substances List (NDSL)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Regulations for ingredients

hydrogen chloride (CAS: 7647-01-0) is found on the following regulatory lists;
"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada CEPA Environmental Registry Substance Lists - List of substances on the DSL that meet the human health criteria for categorization (English)","Canada Controlled Drugs and Substances Act Schedule VI","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release

Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Council of Chemical Associations (ICCA) - High Production Volume List","International Maritime Dangerous Goods Requirements (IMDG Code) - Goods Forbidden for Transport","United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II","United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control (Red List) - Table II","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Delaware Pollutant Discharge Requirements - Reportable Quantities","US - Florida Essential Chemicals","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Louisiana Minimum Emission Rates Toxic Air Pollutants","US - Louisiana Toxic Air Pollutant Ambient Air Standards","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wisconsin Control of Hazardous Pollutants - Emission Thresholds, Standards and Control Requirements (Hazardous Air Contaminants)","US - Wisconsin Control of Hazardous Pollutants - Substances of Concern for Sources of Incidental Emissions of Hazardous Air Contaminants","US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA High Production Volume Chemicals Additional List","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US FDA CFSAN GRAS Substances evaluated by the Select Committee on GRAS Substances (SCOGS)","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US NIOSH Recommended Exposure Limits (RELs)","US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US SARA Section 302 Extremely Hazardous Substances","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US USDA National Organic Program - Synthetic substances allowed for use in organic crop production"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.

* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes

4- nitrophenyl chloroformate	7693- 46- 1	Xn; R22 Xi; R38 R52/53
hydrogen chloride	7647- 01- 0	Xn; R22 Xi; R38 R52/53

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

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