Triphosgene

sc-213123

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Triphosgene

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
C3-Cl6-O3, (CCl3O)2CO, bis(trichloromethyl)carbonate, "phosgene, tri-"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	4		
Body Contact:	4		
Reactivity:	1		
Chronic:	2		

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK
Very toxic by inhalation.
Causes burns.
Risk of serious damage to eyes.
Limited evidence of a carcinogenic effect.
Toxic 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.
■ Ingestion of acidic corrosives may produce burns around and in the mouth.
the throat and esophagus.

EYE
■ The material can produce chemical burns to the eye following direct contact.
Vapors 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 effectsmay 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 severely toxic effects; these may be fatal.
■ 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.
■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
There may be dizziness, headache, nausea and weakness.
■ Effects of phosgene exposure may be delayed.
Rapid olfactory fatigue occurs.

CHRONIC HEALTH EFFECTS
■ There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
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.
The extremely short half life in aqueous solution (0.026 secs), with rapid release of hydrochloric acid means no significant retention of phosgene in the body is possible.
Odour fatigue and phosgene tolerance may develop following continuous and repeated use. The development of tolerance is believed to the triggering mechanism of chronic, irreversible pulmonary changes of emphysema and fibrosis from prolonged daily exposure that produce no ostensible acute response.
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.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
triphosgene	32315-10-9	>98
may react under a variety of conditions to form		
phosgene	75-44-5	

Section 4 - FIRST AID MEASURES

SWALLOWED
· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

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.

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.

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN
■ Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort.
For phosgene:
· Toxic effects of phosgene may be delayed and any person exposed to phosgene should be medically observed for onset of symptoms for at least 24 hours.
· In the absence of special detector badges worn by workers, there is no way of knowing the extent of phosgene exposure. But if one waits for the appearance of symptoms, pulmonary oedema may be lethal. Consequently, any exposed person must be treated as if the exposure is life threatening. The person should be kept at rest and given a glucocorticoid anti-inflammatory medication, and should be given oxygen-enriched air.
[Patty's]
Phosgene is an extremely strong respiratory tract irritant. Alveolar toxic oedema may become evident 1 to 24 h after exposure depending upon the level and duration of exposure. Signs and symptoms of this type of pulmonary oedema are rapid shallow breathing, shortness of breath, cough with production of frothy fluid, pulmonary shadows on the X-ray, and reduction in vital capacity and respiratory volume.
· Immediate termination of exposure is essential and the patient should be removed to fresh air.
· After exposure to liquid phosgene, contaminated clothing should be removed and disposed of.
· Exposed skin should be washed with large amounts of soap and water. If there was eye contact, the eyes should be flushed with copious amounts of water for at least 15 min.
· After exposure by inhalation, physical exertion should be avoided and strict bed rest enforced for between 24 and 72 h, particularly if the exposure dose was unknown or above 100 mg/m3-min (25 ppm-min). Chest radiographs, arterial blood gases and other diagnostic procedures are indicated to evaluate the presence of pulmonary oedema, the primary danger after inhalation exposure to phosgene. When pulmonary oedema is present the patient should be managed as though respiratory failure was impending. Deep breathing is recommended to remove additional phosgene from the lung.
· No specific antidote is known. Hexamethylenetetramine is effective only if administered prior to phosgene inhalation.
· Pulmonary oedema should be managed with positive pressure oxygen ventilation and the early intravenous administration of steroids (e.g., 1 g of methyl-prednisolone) may be beneficial. Additionally, the administration of such adrenergic agonists as terbutaline, albuteral, isoetharine and metaproterenol (as aerosols or nebulizers) seems to be effective to correct bronchospasms. In severe cases aminophylline should be considered to control bronchoconstriction and relieve vasoconstriction. Most other drugs are ineffective and may even be harmful, e.g., atropine, epinephrine, cardiac glycosides, sedatives and expectorants.
· Antibiotic treatment might become necessary if secondary infectious pneumonitis occurs.
· Symptomatic therapy may become necessary, and patients should be followed and surveyed until pulmonary function has normalized and the patient fully recovered.
· Depending upon the exposure concentration and time, full recovery can take several months.
IPCS Health and Safety Guide No. 106.
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.

Section 5 - FIRE FIGHTING MEASURES

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

EXTINGUISHING MEDIA
· Foam.
· Dry chemical powder.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
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.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY
■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Full face- shield.
Gloves:
Respirator:
Particulate dust filter.
Acid vapour Type B cartridge/ canister.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· 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.
· Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
· Dampen with water to prevent dusting before sweeping.
· Place in suitable containers for 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.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

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

· Lined metal can, Lined metal pail/drum
· Plastic pail.
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.

STORAGE REQUIREMENTS

· Store in original containers.
· Keep containers securely sealed.

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
US NIOSH Recommended Exposure Limits (RELs)	phosgene (Phosgene)	0.1	0.4			0.2	0.8		(Ceiling ([15-minute]))
Canada - Alberta Occupational Exposure Limits	phosgene (Carbonyl chloride (Phosgene))	0.1	0.4						
Canada - British Columbia Occupational Exposure Limits	phosgene (Phosgene)	0.1							

Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	phosgene (Phosgene)	0.1	0.4			
US OSHA Permissible Exposure Levels (PELs) - Table Z1	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US ACGIH Threshold Limit Values (TLV)	phosgene (Phosgene)	0.1				TLV Basis: upper respiratory tract irritation; pulmonary edema & emphysema
US - Minnesota Permissible Exposure Limits (PELs)	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - California Permissible Exposure Limits for Chemical Contaminants	phosgene (Phosgene; carbonyl chloride; COCl2)	0.1	0.4			
US - Idaho - Limits for Air Contaminants	phosgene (Phosgene (carbonyl chloride))	0.1	0.4			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	phosgene (Phosgene (Carbonyl chloride))	0.1		0.3		
US - Hawaii Air Contaminant Limits	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - Alaska Limits for Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
Canada - Yukon Permissible Concentrations for Airborne Contaminant	phosgene (Carbonyl chloride (phosgene))	0.05	0.2	-	-	

Substances						
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	phosgene (Phosgene (carbonyl chloride))	0.1	0.4	0.3	1.2	
US - Washington Permissible exposure limits of air contaminants	phosgene (Phosgene (carbonyl chloride))	0.1		0.3		
US - Michigan Exposure Limits for Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
Canada - Nova Scotia Occupational Exposure Limits	phosgene (Phosgene)	0.1				TLV Basis: upper respiratory tract irritation; pulmonary edema & emphysema
Canada - Prince Edward Island Occupational Exposure Limits	phosgene (Phosgene)	0.1				TLV Basis: upper respiratory tract irritation; pulmonary edema & emphysema
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4			
US - Oregon Permissible Exposure Limits (Z-1)	phosgene (Phosgene (carbonyl chloride))	0.1	0.4			
Canada - Northwest Territories Occupational Exposure Limits (English)	phosgene (Phosgene (Carbonyl chloride))	0.1	0.4	0.3	1.2	

ENDOELTABLE
The following materials had no OELs on our records

• triphosgene: CAS:32315-10-9

PERSONAL PROTECTION

RESPIRATOR

• Particulate dust filter. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)
• Acid vapour Type B cartridge/ canister. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

· Chemical goggles.
· Full face shield.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.
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
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER
· Overalls.
· PVC Apron.

ENGINEERING CONTROLS
· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Corrosive.
Acid.
Toxic or noxious vapours/gas.

State	DIVIDED SOLID	Molecular Weight	296.75
Melting Range (°F)	174- 181	Viscosity	Not Applicable
Boiling Range (°F)	397- 403	Solubility in water (g/L)	Reacts
Flash Point (°F)	Not available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE
White to off-white crystalline; reacts with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable.

STORAGE INCOMPATIBILITY
· Contact with acids produces toxic fumes.
Segregate from alcohol, water.
Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.
· Avoid strong bases.
Avoid reaction with oxidizing agents.
· NOTE: May develop pressure in containers; open carefully. Vent periodically.
Phosgene
· decomposes slowly in water producing hydrochloric acid and carbon monoxide
· reacts violently with strong oxidisers, anhydrous ammonia, amines, isopropanol, chemically active metals, phenols silicon tetrahydride, powdered aluminium, potassium, sodium, lithium
· forms shock-sensitive materials with potassium
· is incompatible with tert-butylazidoformate, sodium azide
· attacks most metals in the presence of moisture, however may not affect monel, tantalum or glass-lined equipment
NOTE: sodium hydroxide or anhydrous ammonia have been used to neutralise the gas.

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

Section 11 - TOXICOLOGICAL INFORMATION

triphosgene

TOXICITY AND IRRITATION

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

■ 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. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

TRIPHOSGENE:

■ No significant acute toxicological data identified in literature search.

PHOSGENE:

TOXICITY	IRRITATION
Inhalation (human) LC50: 3300 mg/m³	Nil Reported
Inhalation (human) LCLo: 50 ppm/5m	
Inhalation (man) LCLo: 360 mg/m³/30m	
Inhalation (human) TCLo: 25 ppm/30m	
Inhalation (rat) LC50: 1400 mg/m³/30m	

■ For phosgene:

In view of the extremely short half-life (0.026 seconds) in aqueous solutions, and the penetration into the tissues of the respiratory tract by phosgene gas, only minimal amounts of phosgene are distributed in the body and no significant retention of phosgene in the body is possible. The hydrolytic products of phosgene, hydrochloric acid and carbon dioxide, are disposed by the body through normal physiological processes. Phosgene exerts its toxicity through the acylation of proteins as well as through the release of hydrochloric acid. The amino, hydroxyl and sulfhydryl groups in proteins appear to be the target for acylation, leading to marked inhibition of several enzymes related to energy metabolism and a breakdown of the blood:air barrier.

The cascade of events after acute inhalation exposure in humans is similar to that in experimental animals. Their occurrence is dose-related and results in pulmonary oedema and death in humans at levels exceeding 120 mg/m3-min. Three distinct clinico-pathological phases can be recognised, namely: pain in the eyes and throat and tightness of the chest, often with shortness of breath, wheezing and coughing; a latent phase which is often asymptomatic and lasts normally up to 24 h depending upon the concentration and duration of exposure; and the final phase of pulmonary oedema. In one study pulmonary oedema occurred after a latent phase of 48 h.

Populations exposed to phosgene after industrial accidents have reported a wide variety of symptoms, including headache, nausea, cough, dyspnoea, fatigue, pharyngeal pain, chest tightness and pain, intense pain in the eye, and severe lacrimation. After short-term exposures throat irritation occurs at levels of 12 mg/m3 and eye irritation is noted at 16 mg/m3. It has been calculated that doses below 100 mg/m3 will result in no permanent adverse effects, whereas pulmonary oedema results from doses above 600 mg/m3-min. Death has been recorded at doses above 400 mg/m3-min, and exposure for several hours at concentrations at or below the odour threshold of 6 mg/m3 may result in severe tissue damage and death. Thus, the odour threshold for phosgene is an unacceptable parameter for early warning

In all species that have been studied, the lung is the major target organ. After acute exposures of between 4 and 800 mg/m3 (1-200 ppm) the toxicological effect is due to the exposure (C) x time (T) (Habers Law), based on studies of lung disease and death. This relationship does not hold for chronic exposures. The L(CT)50 for single exposure was reported to vary widely among animal species, ranging from 900 mg/m3-min (225 ppm-min) in the mouse to 1920 mg/m3-min (250 ppm-min) in the monkey. In all species the characteristic pathological feature was the dose-dependent clinical manifestation of pulmonary oedema. The extent of the long-term chronic effects of acute exposure appears to depend on the severity of the initial pathology. At low concentrations, pathological changes in the terminal bronchioles and alveoli were reported to be typical of a pulmonary irritant, whereas at higher levels pulmonary oedema occurred, leading to interference with gas exchange and death. Preliminary data from single 4-h exposures to 2 or 4 mg/m3 in rats and mice (480 mg/m3-min or 960 mg/m3-min) indicated a decrease in pulmonary immuno-competence. No effects were seen at 0.4 mg/m3 (96 mg/m3-min). Although limited, other data confirmed these findings. In rats exposed to 4 mg/m3 for 4 h (960 mg/m3-min), a 10-fold increase in influenza virus titre was noted per day post-infection. Pulmonary bacterial clearance was reduced in rats exposed for 6 h to 0.4 mg phosgene/m3 (144 mg/m3-min) or to 0.4 mg/m3 for 6 h/day, 5 days/week for 4 to 12 weeks. This effect was reversible following termination of exposure. In a host resistance assay in mice, exposure to concentrations of phosgene of 0.1 mg/m3 or more for 4 h (>24 mg/m3-min) led to an increase in mortality from Streptococcus zooepidemicus infection.

CARCINOGEN

phosgene	US - Rhode Island Hazardous Substance List	IARC

SKIN

phosgene	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
phosgene	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

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)
B. Component Waste Numbers
When phosgene is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number P095 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
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.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: G Hazard class or Division: 6.1
Identification Numbers: UN2928 PG: I
Label Codes: 6.1, 8 Special provisions: IB7, T6, TP33
Packaging: Exceptions: None Packaging: Non- bulk: 211
Packaging: Exceptions: None Quantity limitations: 1 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 25 kg Vessel stowage: Location: B
aircraft only:
Vessel stowage: Other: 40
Hazardous materials descriptions and proper shipping names:
Toxic solids, corrosive, organic, n.o.s.

Air Transport IATA:

UN/ID Number: 2928 Packing Group: I
Special provisions: A5
Cargo Only
Packing Instructions: 672 Maximum Qty/Pack: 25 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: Forbidden Maximum Qty/Pack: 1 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: 665 Maximum Qty/Pack: Forbidden
Shipping Name: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.
*(CONTAINS TRIPHOSGENE)

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: 8
UN Number: 2928 Packing Group: I
EMS Number: F-A,S-B Special provisions: 274
Limited Quantities: 0
Shipping Name: TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.(contains triphosgene)

Section 15 - REGULATORY INFORMATION

triphosgene (CAS: 32315-10-9) is found on the following regulatory lists;

"US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements","US TSCA Section 5(a)(2) - Significant New Use Rules (SNURs)"

Regulations for ingredients

phosgene (CAS: 75-44-5) 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 - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Chemical Weapons Schedule 3 (English)","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)","Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (English)","International Council of Chemical Associations (ICCA) - High Production Volume List","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 Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","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 Hazardous Constituents","US - Vermont Hazardous Waste - Acutely Hazardous Wastes","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 Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""P"" Chemical Products","US - Washington Permissible exposure limits of 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 CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","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 EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA Acute Exposure Guideline Levels (AEGLs) - Interim","US EPA High Production Volume Program Chemical List","US EPCRA Section 313 Chemical List","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 RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.

* (limited evidence).

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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. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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