

Chloroacetic acid

sc-211072



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

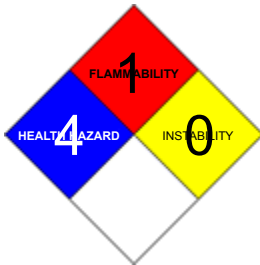
PRODUCT NAME

Chloroacetic acid

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
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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

C2-H3-Cl-O2, CH2ClCO2H, "monochloroacetic acid", "monochloracetic acid", "monochloroethanoic acid", "alpha chloracetic acid", solid, "chloroethanoic acid", MCA

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

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

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



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Causes burns.

Risk of serious damage to eyes.

Toxic by inhalation, in contact with skin and if swallowed.

Very toxic to aquatic organisms.

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 low-molecular organic acid solutions may produce spontaneous hemorrhaging, production of blood clots, gastrointestinal damage and narrowing of the esophagus and stomach entry.
- Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and esophagus.
- Monochloroacetic acids are highly poisonous and irritate the skin and eyes. Symptoms include jerks and convulsions, absence of urine movements, and depression of breathing.

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.
- Solutions of low-molecular weight organic acids cause pain and injury to the eyes.
- 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 contact with the skin.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- 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.
- 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.
- Human fatalities have occurred when chloroacetic acid covered 10% of skin area. Clinical symptoms involving a whole body drench included first degree burns to the skin and spitting up of blood, convulsions, loss of consciousness and death within 4 hours. Autopsy first-degree burns on the body, haemorrhage of the lungs, pleura membranes, liver, damage, and mucous membranes of the bronchia; point shaped bleedings of the epicardium, pleura and brain; spotted bleeding between the soft membranes of the brain; and the right heart cavities were dilated and filled with blood. In animal tests lethal results have followed from 3% skin area cover.

INHALED

- If inhaled, this material can irritate the throat and lungs of some persons.
- Inhalation of vapors, aerosols (mists, fumes) or dusts, generated by the material during the course of normal handling, may produce toxic effects.
- 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.
- Mice, rats and guinea pigs, exposed for 1.5 and 60 minutes to air saturated with chloroacetic acid survived with only mild eye and nasal irritation. Mild hyperaemia of the lungs was observed at autopsy.

CHRONIC HEALTH EFFECTS

■ There has been some 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.

In general, alpha-halocarboxylic acids and their esters are good alkylating agents and should be handled with care.

Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) needs months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.

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.

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	%
chloroacetic acid	79-11-8	> 99

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

- 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

Experimental antidotes effective against fluoroacetates are said to be effective against chloroacetates. For poisonings involving fluoroacetate the following regime is advised

- Induce vomiting immediately if possible.
- Gastric lavage with tap water unless convulsions/imminent convulsions make this impracticable.

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.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	0.203 @ 25 C
Upper Explosive Limit (%)	Not available.
Specific Gravity (water=1)	1.40-1.58
Lower Explosive Limit (%)	8

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.

May emit poisonous fumes.

FIRE INCOMPATIBILITY

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

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- 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.
- 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.

MAJOR SPILLS

- DO NOT touch the spill material
- 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

Glass container.

- 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/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
US AIHA Workplace Environmental Exposure Levels (WEELs)	chloroacetic acid (Monochloroacetic Acid)	0.5							skin
Canada - Alberta Occupational Exposure Limits	chloroacetic acid (Monochloroacetic acid)	0.5	1.9						
Canada - British Columbia Occupational Exposure Limits	chloroacetic acid (Chloroacetic acid)	0.3							
Canada - Nova Scotia Occupational Exposure Limits	chloroacetic acid (Monochloroacetic acid)	0.5							TLV Basis upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	chloroacetic acid (Monochloroacetic acid)	0.5							TLV Basis upper respiratory tract irritation

PERSONAL PROTECTION



RESPIRATOR

•Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, 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

Solid.

Corrosive.

Acid.

State	Divided solid	Molecular Weight	94.50
Melting Range (°F)	122- 145	Viscosity	Not Applicable
Boiling Range (°F)	372	Solubility in water (g/L)	Soluble 81%
Flash Point (°F)	259	pH (1% solution)	1-2
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapor Pressure (mmHg)	0.203 @ 25 C
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.40-1.58
Lower Explosive Limit (%)	8	Relative Vapor Density (air=1)	3.2
Volatile Component (%vol)	Low	Evaporation Rate	Not available

chloroacetic acid

log Kow (Prager 1995) 0.22

APPEARANCE

Crystals or powder. Sharp odor. Soluble in water, alcohol, ether, chloroform and carbon disulfide.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

↓ Chloroacetic acid

- is a strong acid in aqueous solution; reacts violently with strong bases
- is compatible with sulfuric acid, ammonia, alcohols, amines, alkanolamines, alkylene oxides, cyanides, epichlorohydrin, isocyanates, strong oxidisers, sulfides
- attacks some plastics, rubbers and coatings, including nitrile rubber, PVC and polyvinyl alcohol (PVA)
- attacks most metals in the presence of moisture
- Contact with moisture or water may generate heat

Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.

Avoid storage with reducing agents.

- Avoid strong bases.

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

Section 11 - TOXICOLOGICAL INFORMATION

chloroacetic acid

TOXICITY AND IRRITATION

CHLOROACETIC ACID

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

TOXICITY

IRRITATION

Oral (rat) LD50 580 mg/kg

Nil Reported

Oral (rat) LD50 76 mg/kg* *[Van Waters & Rogers]

Inhalation (rat) LC50 180 mg/m³

Dermal (rabbit) LD50 175 mg/kg*

for monochloroacetic acid (MCA) and sodium monochloroacetate (SMCA)

The anticipated acute and chronic human health hazards posed by MCA/SMCA are effects on the cardiac system, the central nervous system, and kidneys. Chronic exposure may also result in hepatotoxicity and teratogenic effects (SMCA tested only). In addition, MCA is highly corrosive and irritating to the eyes, skin and respiratory tract.

The toxicity profile of MCA and SMCA are similar for the oral route of exposure. However, SMCA is much less toxic than MCA by the dermal route in acute studies indicating that dermal absorption of MCA is greater than for SMCA. Toxicity associated with inhalation exposure is difficult to determine for MCA because of poor study design and/or inadequate reporting of available studies. Studies for SMCA are not available. However, due to the corrosive property of MCA and toxicity profile of MCA/SMCA it is prudent to recommend that exposure by the inhalation to MCA and SMCA should be avoided.

Acute dermal exposure of workers to MCA may result in death even after rapid and extensive washing of the skin area. The effects may be delayed. However, under "normal" exposure conditions with strict use of recommended protective measures it is envisaged that exposure and subsequent effects will be low. It has been suggested that oral and inhalation absorption may be limited because of the irritating effects of MCA and that the low odour threshold for MCA (0.01 ppm, 0.042 mg/m³) indicates good alert properties of the compound. In contrast, SMCA is less irritating and therefore oral, inhalation dermal exposure may occur unobserved. Because SMCA forms dusts, inhalation and dermal exposure may represent important routes of exposure.

The biochemical mechanism of action resulting in death is not understood. Contributing factors apparently believed to be involved are (i) the inhibition of the tricarboxylic acid cycle decreasing cellular energy supply and increasing acidosis with glycolic acid and oxalate production, and; (ii) effects on cellular components where sulfhydryl groups are critical for normal biological activity. Both of these effects may contribute to CNS, cardiovascular, renal and hepato effects. In addition, the metabolites glycolic acid and oxalates may contribute to CNS and renal toxicity.

Monofluoroacetic acid (MFA; CAS No. 144-49-0), monoiodoacetic acid (MIA CAS No. 64-69-7), monobromoacetic acid (MBA; CAS No. 79-08-3) and the sodium salts of MFA and MIA (CAS No. 62-74-8 and 305-53-3) are close structural analogues of MCA and SMCA. MFA is more toxic than MCA but it is also corrosive and may cause effects on the cardiac system, the central nervous system and kidneys which may result in death. However, MCA apparently has a different mechanism of action than its structural halo analogues. For example, both MCA and MFA inhibit aconitase required for acetate metabolism in the tricarboxylic acid cycle but their inhibition kinetics are different. In addition, MCA like MIA but unlike MFA depletes organ thiols. Hence, comparison of MCA or SMCA with its structural halo analogues for risk assessment or identifying antidotes should only be done with prudence.

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.

Equivocal tumorigen by RTECS criteria

CARCINOGEN

Monochloroacetic acid	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
TWA_F_CC~	US - Maine Chemicals of High Concern List	Carcinogen	A4
TWA_F_CC~	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis upper respiratory tract irritation

SKIN

chloroacetic acid	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
chloroacetic acid	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis upper respiratory tract irritation
chloroacetic acid	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	skin
chloroacetic acid	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1,3

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms.
 This material and its container must be disposed of as hazardous waste.
 Avoid release to the environment.
 Refer to special instructions/ safety data sheets.

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS Cas No	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3
Chloroacetic acid	450	184	0	0	R	2	0	2	3	(4)	3C	3	A		D	3

acid /
 CAS:79-
 11- 8
 /

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acute mammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation & corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lung injury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

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.

! 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:	None	Hazard class or Division:	6.1
Identification Numbers:	UN1751	PG:	II
Label Codes:	6.1, 8	Special provisions:	A3, A7, IB8, IP2, IP4, N34, T3, TP33

Packaging: Exceptions:	153	Packaging: Non-bulk:	212
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	15 kg
Quantity Limitations: Cargo aircraft only:	50 kg	Vessel stowage: Location:	C
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:

Chloroacetic acid, solid

Air Transport IATA:

ICAO/IATA Class:	6.1 (8)	ICAO/IATA Subrisk:	None
UN/ID Number:	1751	Packing Group:	II
Special provisions:	None		

Cargo Only

Packing Instructions:	675	Maximum Qty/Pack:	50 kg
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	668	Maximum Qty/Pack:	15 kg
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y644	Maximum Qty/Pack:	1 kg

Shipping Name: CHLOROACETIC ACID, SOLID

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	8
UN Number:	1751	Packing Group:	II
EMS Number:	F-A,S-B	Special provisions:	None
Limited Quantities:	500 g	Marine Pollutant:	Yes

Shipping Name: CHLOROACETIC ACID, SOLID

Section 15 - REGULATORY INFORMATION

chloroacetic acid (CAS: 79-11-8) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","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","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Toxic Air Contaminant List Category IV","US - Massachusetts Oil & Hazardous Material List","US - Minnesota Hazardous Substance List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US AIHA Workplace Environmental Exposure Levels (WEELs)","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","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 High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","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 SARA Section 302 Extremely Hazardous Substances","US Toxic Substances

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
- Limited evidence of a carcinogenic effect*.

* (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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