

Vinylene carbonate

sc-251428

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Vinylene carbonate

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

C3-H2-O3, "carbonic acid, cyclic vinylene ester", "1, 3-dioxol-2-one", "1, 3-dioxol-4-en-2-one", "1, 3-dioxolenone"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

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

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

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

May cause SENSITISATION by skin contact.

Harmful by inhalation and if swallowed.

Irritating to eyes, respiratory system and skin.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

EYE

■ This material can cause eye irritation and damage in some persons.

SKIN

■ This material can cause inflammation of the skin on contact in some persons.

■ The material may accentuate any pre-existing dermatitis condition.

■ 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.

INHALED

■ Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.

■ The material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
vinylene carbonate	872-36-6	>98
stabilised (typically) against oxidation by		
2,6-di-tert-butyl-4-methylphenol	128-37-0	< 0.5
hydrolysis yields		
carbon dioxide	124-38-9	

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh 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 contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ for poisons (where specific treatment regime is absent):

-----BASIC TREATMENT

· Establish a patent airway with suction where necessary.

· Watch for signs of respiratory insufficiency and assist ventilation as necessary.

Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not available
Upper Explosive Limit (%):	Not available
Specific Gravity (water=1):	1.36
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.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
 - Slight fire hazard when exposed to heat or flame.
- Combustion products include: carbon dioxide (CO₂), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.

FIRE INCOMPATIBILITY

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

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.

MAJOR SPILLS

- Moderate hazard.
- 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

- DO NOT allow clothing wet with material to stay in contact with skin.
- The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.
- Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.
- A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. An expiration date should be determined. The chemical should either be treated to remove peroxides or disposed of before this date.
 - The person or laboratory receiving the chemical should record a receipt date on the bottle. The individual opening the container should add an opening date.
 - Unopened containers received from the supplier should be safe to store for 18 months.
 - Opened containers should not be stored for more than 12 months.
 - Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

- Metal can or drum
- Packing as recommended by manufacturer.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

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	2,6-di-tert-butyl-4-methylphenol (Butylated hydroxytoluene (BHT) (2,6-Di-tert-butyl-p-cresol))		10						
Canada - British Columbia Occupational Exposure Limits	2,6-di-tert-butyl-4-methylphenol (Butylated hydroxytoluene (BHT), Inhalable, (2,6-Di-tert-butyl-p-cresol))		2 (V)						
US ACGIH Threshold Limit Values (TLV)	2,6-di-tert-butyl-4-methylphenol (Butylated hydroxytoluene [BHT])		2						TLV Basis: upper respiratory tract irritation
US NIOSH Recommended Exposure Limits (RELs)	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10						
US - Minnesota Permissible Exposure Limits (PELs)	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10						
US - California Permissible Exposure Limits for Chemical Contaminants	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10						
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)				10				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol (butylated hydroxytoluene or BHT) (inhalable fraction++ and vapour))		2		4				
US - Hawaii Air Contaminant Limits	2,6-di-tert-butyl-4-methylphenol (2,6-Di-tert-butyl-p-cresol)		10		20				

Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	2,6-di-tert-butyl- 4-methylphenol (2,6-Ditert-butyl- p-cresol)	-	10	-	20	
US - Washington Permissible exposure limits of air contaminants	2,6-di-tert-butyl- 4-methylphenol (2, 6-Di-tert-butyl- p-cresol)		10		20	
US - Alaska Limits for Air Contaminants	2,6-di-tert-butyl- 4-methylphenol (2,6-Di-tert-butyl- p-cresol)		10			
Canada - Nova Scotia Occupational Exposure Limits	2,6-di-tert-butyl- 4-methylphenol (Butylated hydroxytoluene [BHT])		2			TLV Basis: upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	2,6-di-tert-butyl- 4-methylphenol (Butylated hydroxytoluene [BHT])		2			TLV Basis: upper respiratory tract irritation
US - Michigan Exposure Limits for Air Contaminants	2,6-di-tert-butyl- 4-methylphenol (2,6-Di-tert-butyl- p-cresol (Butylated hydroxytoluene))		10			
Canada - Northwest Territories Occupational Exposure Limits (English)	2,6-di-tert-butyl- 4-methylphenol (2,6-Ditert-butyl- p-cresol)		10		20	
US NIOSH Recommended Exposure Limits (RELs)	carbon dioxide (Carbon dioxide)	5000	9000	30,000	54,000	
Canada - Alberta Occupational Exposure Limits	carbon dioxide (Carbon dioxide)	5000	9000	30,000	54,000	
Canada - British Columbia Occupational Exposure Limits	carbon dioxide (Carbon dioxide)	5000		15,000		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	carbon dioxide (Carbon dioxide)	5000	9000			
US ACGIH Threshold Limit Values (TLV)	carbon dioxide (Carbon dioxide)	5000		30000		TLV Basis: asphyxia; 19.5% minimum oxygen content by volume under normal atmospheric pressure.
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	carbon dioxide (Carbon dioxide)	10,000	18,000	30,000	54,000	

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	5000	9000		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	10,000	18,000	30,000	54,000
US - Minnesota Permissible Exposure Limits (PELs)	carbon dioxide (Carbon dioxide)	10,000	18,000	30,000	54,000
US - California Permissible Exposure Limits for Chemical Contaminants	carbon dioxide (Carbon dioxide)	5,000	9,000	30,000	54,000
US - Idaho - Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	5000	9000		
US - Hawaii Air Contaminant Limits	carbon dioxide (Carbon dioxide)	5,000	9,000	15,000	27,000
US - Alaska Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	10	18	30	54
US - Michigan Exposure Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	10000	18000	30000	54000
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	carbon dioxide (Carbon dioxide)	5,000	9,000	15,000	27,000
US - Washington Permissible exposure limits of air contaminants	carbon dioxide (Carbon dioxide)	5,000		30,000	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	carbon dioxide (Carbon dioxide)	5000		30,000	
Canada - Prince Edward Island Occupational Exposure Limits	carbon dioxide (Carbon dioxide)	5000		30000	
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	carbon dioxide (Carbon dioxide)	5000	9000		

TLV Basis:
asphyxia;
19.5%
minimum
oxygen
content by
volume under
normal
atmospheric
pressure.

Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	carbon dioxide (Carbon dioxide)	5000	9000	30000	54000
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US - Oregon Permissible Exposure Limits (Z-1)	carbon dioxide (Carbon dioxide)	5,000	9,000		
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Canada - Northwest Territories Occupational Exposure Limits (English)	carbon dioxide (Carbon dioxide)	5000	9000	15000	27000
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Canada - Nova Scotia Occupational Exposure Limits	carbon dioxide (Carbon dioxide)	5000		30000	
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TLV Basis:
asphyxia;
19.5%
minimum
oxygen
content by
volume under
normal
atmospheric
pressure.

ENDOELTABLE

The following materials had no OELs on our records

- vinylene carbonate: CAS:872-36-6

PERSONAL PROTECTION



RESPIRATOR

Type A Filter of sufficient capacity

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

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

- 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).

· 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) 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) 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.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

State	Liquid	Molecular Weight	86.05
Melting Range (°F)	66- 72	Viscosity	Not Available
Boiling Range (°F)	329	Solubility in water (g/L)	Reacts
Flash Point (°F)	163	pH (1% solution)	Not applicable.
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)	1.36
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE

Colourless liquid; does not mix well water.

log Kow 4.17

Material	Value
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Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

■ Carbon dioxide:

- reacts violently with strong bases and alkali metals (especially their dusts)
- may ignite or explode when heated or in suspended chemically active metals (and their hydrides) such as aluminium, chromium, manganese, magnesium (above 775 C), titanium (above 550 C), uranium (above 750 C) or zirconium, diethylmagnesium
- is incompatible with water, acrolein, acrylaldehyde, amines, anhydrous ammonia, aziridine, metal acetylides (such as lithium acetylide), caesium monoxide (moist), lithium, potassium, sodium, sodium carbide, sodium-potassium alloy, sodium peroxide, titanium
- may build up static electricity when discharged at high flow rates from storage cylinders or fire extinguishers - this may produce sparks resulting in ignition of flammables or explosives.
- may decompose to toxic carbon monoxide and flammable oxygen when exposed to electrical discharges or very high temperatures.
- The various oxides of nitrogen and peroxyacids may be dangerously reactive in the presence of alkenes. BREThERICK L.: Handbook of Reactive Chemical Hazards
- Avoid reaction with strong Lewis or mineral acids.
- Reaction with halogens requires carefully controlled conditions.
- Free radical initiators should be avoided.

The interaction of alkenes and alkynes with nitrogen oxides and oxygen may produce explosive addition products; these may form at very low temperatures and explode on heating to higher temperatures (the addition products from 1,3-butadiene and cyclopentadiene form rapidly at -150 C and ignite or explode on warming to -35 to -15 C). These derivatives ("pseudo- nitrosites") were formerly used to characterize terpene hydrocarbons.

Segregate from alcohol, water.

Avoid reaction with oxidizing agents.

- NOTE: May develop pressure in containers; open carefully. Vent periodically.

Slow hydrolysis may lead to build up of carbon dioxide and pressure in containers.

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

Section 11 - TOXICOLOGICAL INFORMATION

vinylene carbonate

TOXICITY AND IRRITATION

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

2,6-DI-TERT-BUTYL-4-METHYLPHENOL:

VINYLENE CARBONATE:

■ 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.

VINYLENE CARBONATE:

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.

No significant acute toxicological data identified in literature search.

Tumours at site of application.

Neoplastic by RTECS criteria.

2,6-DI-TERT-BUTYL-4-METHYLPHENOL:

TOXICITY	IRRITATION
Oral (woman) TDLo: 80 mg/kg	Skin (human): 500 mg/48h - Mild
Oral (rat) LD50: 890 mg/kg	Skin (rabbit): 500 mg/48h-Moderate
	Eye (rabbit): 100 mg/24h-Moderate

■ 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.

For hindered phenols:

Acute oral and dermal toxicity data are available for all but two of the substances in the group. The data show that acute toxicity of these substances is low.

Mutagenicity. Data from bacterial reverse mutation assays and in vitro and in vivo chromosome aberration studies were reviewed. All assays, with and without metabolic activation, were negative. The weight of evidence for mutagenic potential for this category indicates these substances are not mutagenic.

In Vitro Chromosome Aberration Studies. In vitro chromosome aberration studies are available for several members All except 2,6-di-tert-butyl-p-cresol were negative

In Vivo Chromosome Aberration Studies. In vivo studies evaluating chromosome damage are available for six of the hindered phenols. All in vivo evaluations were negative.

Repeated Dose Toxicity. Repeated dose toxicity data of approximately three months (90-day, 12- and 13-week) are available for most of the substances in this group. The liver was the target organ in rats for almost all of the substances with subchronic toxicity data in that species. Other target organs included thyroid and kidney and mesenteric lymph nodes. NOAELs in rats ranged from 100 ppm (approximately 5 mg/kg/day) to 10,000 ppm (500 mg/kg/day)

Carcinogenicity: Data is available for 2,6-di-tert-butyl-p-cresol (128-37-0); and 4,4'-thiobis-6-(t-butyl-m-cresol) (96-69-5). Liver adenomas were reported for 2,6-di-tert-butyl-p-cresol (128-37-0) and a NOAEL was established for the study at 25 mg/kg/day. 4,4'-Thiobis-6-(t-butyl-m-cresol) (96-69-5) was not carcinogenic in rats or mice, but the kidney was identified as a target organ in female rats.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

TOXICITY	IRRITATION
CARBON DIOXIDE:	
Inhalation (rat) LCLo: 657190 ppm/15 m	
Inhalation (human) TCLo: 2000 ppm	
Inhalation (human) LCLo: 9 pph/5 m (9%)	
- pulmonary effects	
IDLH: 50,000 ppm	

CARCINOGEN

	US - Rhode Island Hazardous Substance List	IARC	
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC

REPROTOXIN

carbon dioxide	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility
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Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
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vinylene carbonate	HIGH	LOW	HIGH
2,6-di-tert-butyl-4-methylphenol	HIGH	LOW	LOW
carbon dioxide	LOW	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

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. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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 or consult manufacturer for recycling options.

· Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

vinylene carbonate (CAS: 872-36-6) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)", "US Toxic Substances Control Act (TSCA) - Inventory"

Regulations for ingredients

2,6-di-tert-butyl-4-methylphenol (CAS: 128-37-0) is found on the following regulatory lists;

"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 Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "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 - 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 ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe as used", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US FDA Direct Food Substances Generally Recognized as Safe", "US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives", "US Food Additive Database", "US NFPA 499 Combustible Dusts", "US NIOSH Recommended Exposure Limits (RELs)", "US Toxic Substances Control Act (TSCA) - Inventory"

carbon dioxide (CAS: 124-38-9) is found on the following regulatory lists;

"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 Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "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", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Alaska Limits for Air Contaminants", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "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 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 - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US Food Additive Database", "US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 8 (a) Inventory Update Rule (IUR) - Partial Exemptions"

Section 16 - OTHER INFORMATION

ND

Substance CAS Suggested codes vinylene carbonate 872- 36- 6 Xn; R22 2, 6- di- tert- butyl- 4- methylphenol 128- 37- 0 Carc3; R40 Mut3; R68 Xn; R22 Xi; R38 N; R50/53 carbon dioxide 124- 38- 9 Xn; R22

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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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