

1,3-Dibromo-5,5-dimethylhydantoin

sc-251583

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

1,3-Dibromo-5,5-dimethylhydantoin

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

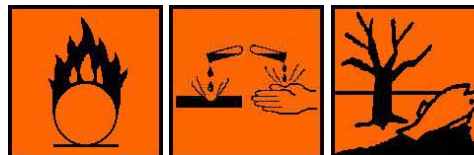
SYNONYMS

C5-H6-Br2-N2-O2, "hydantoin, 1, 3-dibromo-5, 5-dimethyl-", dibromatin, dibromatine, "N, N' -dibromodimethylhydantoin", dibromodimethylhydantoin, "1, 3-dibromo-5, 5-dimethyl-2, 4-imidazolidinedione"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	3		
Reactivity:	2		
Chronic:	3		
			Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Contact with combustible material may cause fire.
 Harmful if swallowed.
 Causes burns.
 Risk of serious damage to eyes.
 May cause SENSITISATION by skin contact.
 Very toxic 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.
- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Hydantoin derivatives may damage the stem cell which acts as the precursor to components of the blood and, as a result, produce blood dyscrasias.

Most blood cells originate from a single pluripotent stem cell which are present in the circulating blood, but differentiates only in intact bone marrow.

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.

SKIN

- The material can produce chemical burns following direct contact with the skin.
- Skin contact is not thought to produce harmful health effects (as classified using animal models).

Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

- Open cuts, abraded or irritated skin should not be exposed to this material.
- Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction.
- 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

- If inhaled, this material can irritate the throat and lungs of some persons.
- The material is not thought to produce adverse health effects following inhalation (as classified using animal models).

Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

- 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.

CHRONIC HEALTH EFFECTS

- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.

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.

There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.

Exposure to the material may cause concerns for human fertility, on the basis that similar materials provide some evidence of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects.

Imidazole is structurally related to histamine and has been used as an antagonist to counteract the effects of excess histamine found in certain induced physiological conditions (it therefore acts as an antihistamine).

Imidazoles have been reported to disrupt male fertility through disruption of testicular function.

2-Methylimidazole decreased luteinising hormone secretion and tissue interstitial fluid testosterone concentration two hours after injection into Sprague Dawley rats.

Imidazoles bind to cytochrome P450 haeme, resulting in inhibition of catalysis. However, 2-substituted imidazoles are considered to be poor inhibitors. Imidazole is probably an inducer of cytochrome P450E1. In general, inducers of this isozyme stabilise the enzyme by preventing phosphorylation of a serine which leads to haeme loss.

Several drugs containing an imidazole moiety were retained and bound in connective tissue when administered to laboratory animals. The bound material was primarily recovered from elastin (70%) and the collagen. It is postulated that reaction with aldehydes gives an aldol condensation product.

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.

Chronic intoxication with ionic bromides, historically, has resulted from medical use of bromides but not from environmental or occupational exposure; depression, hallucinosis, and schizophreniform psychosis can be seen in the absence of other signs of intoxication. Bromides may also induce sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness (aphasias), dysarthria, weakness, fatigue, vertigo, stupor, coma, decreased appetite, nausea and vomiting, diarrhoea, hallucinations, an acne like rash on the face, legs and trunk, known as bronchoderma (seen in 25-30% of case involving bromide ion), and a profuse discharge from the nostrils (coryza). Ataxia and generalised hyperreflexia have also been observed. Correlation of neurologic symptoms with blood levels of bromide is inexact. The use of substances such as brompheniramine, as antihistamines, largely reflect current day usage of bromides; ionic bromides have been largely withdrawn from therapeutic use due to their toxicity. Several cases of foetal abnormalities have been described in mothers who took large doses of bromides during pregnancy.

When administered by inhalation, formaldehyde induced squamous cell carcinomas of the nasal cavity in rats of both sexes. Although excess occurrence of a number of cancers has been reported in humans, the evidence for a possible involvement of formaldehyde is strongest for nasal and nasopharyngeal cancer. The occurrence of these cancers showed an exposure-response gradient in more than one study, but the numbers of exposed cases were often small and some studies did not show excesses. In humans, formaldehyde exposure has been associated with cancers of the lung, nasopharynx and oropharynx and nasal passages.

Several investigations have concluded that specific respiratory sensitisation occurs based on positive bronchial provocation tests amongst formaldehyde-exposed workers. These studies have been criticised for methodological reasons. One large study however revealed that 5% of persons exposed to formaldehyde and had asthma-like symptoms met the study criteria for formaldehyde-induced asthma; this included a positive response on a bronchial provocation test with 2.5 mg/m³ formaldehyde. Although differential individual sensitivity has been established, the mechanism for this increased sensitivity is unknown.

There is limited evidence that formaldehyde has any adverse effect on reproduction or development in humans. An investigation of reproductive function in female workers exposed to formaldehyde in the garment industry, revealed an increased incidence of menstrual disorders, inflammatory disease of the reproductive tract, sterility, anaemia, and low birth weights amongst off-spring.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
1,3-dibromo-5,5-dimethylhydantoin	77-48-5	>95
Decomposes on contact with moisture and releases		
bromine	7726-95-6	
formaldehyde	50-00-0	

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. If swallowed feed bread soaked in milk, followed by cooking oil or olive oil.

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 corrosives:

BASIC TREATMENT

· Establish a patent airway with suction where necessary.
· Watch for signs of respiratory insufficiency and assist ventilation as necessary.

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

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

EXTINGUISHING MEDIA

‡ FOR SMALL FIRE:

- USE FLOODING QUANTITIES OF WATER.

- DO NOT use dry chemicals, CO2 or foam.

Do NOT use ammonium phosphate extinguishers.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.

- May be violently or explosive reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.

- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), hydrogen bromide, nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

‡ Avoid storage with reducing agents.

- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

¶EXTINGUISHING MEDIA

‡ FOR SMALL FIRE:

- USE FLOODING QUANTITIES OF WATER.

- DO NOT use dry chemicals, CO2 or foam.

Do NOT use ammonium phosphate extinguishers.

¶FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.

- May be violently or explosive reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

¶GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.

- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), hydrogen bromide, nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

¶FIRE INCOMPATIBILITY

‡ Avoid storage with reducing agents.

- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

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 all spills immediately.

- No smoking, naked lights, ignition sources.

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 personal contact and inhalation of dust, mist or vapors.

- Provide adequate ventilation.

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

- DO NOT repack. Use containers supplied by manufacturer only.

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.

STORAGE REQUIREMENTS

! In addition, Goods of Class 5.1, packing group II should be:

- stored in piles so that
- the height of the pile does not exceed 1 metre
- the maximum quantity in a pile or building does not exceed 1000 tonnes unless the area is provided with automatic fire extinguishers
- the maximum height of a pile does not exceed 3 metres where the room is provided with automatic fire extinguishers or 2 meters if not.
- the minimum distance between piles is not less than 2 metres where the room is provided with automatic fire extinguishers or 3 meters if not.
- the minimum distance to walls is not less than 1 metre.

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	bromine (Bromine)	0.1	0.7	0.2	1.3				
Canada - British Columbia Occupational Exposure Limits	bromine (Bromine)	0.1		0.2					
US NIOSH Recommended Exposure Limits (RELs)	bromine (Bromine)	0.1	0.7	0.3	2				
US OSHA Permissible Exposure Levels (PELs) - Table Z1	bromine (Bromine)	0.1	0.7						
US ACGIH Threshold Limit Values (TLV)	bromine (Bromine)	0.1		0.2					TLV Basis: upper and lower respiratory tract irritation; lung damage
US - Minnesota Permissible Exposure Limits (PELs)	bromine (Bromine)	0.1	0.7	0.3	2				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	bromine (Bromine)	0.1	0.7						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits	bromine (Bromine)	0.1	0.7	0.3	2				

for Air
Contaminants

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	bromine (Bromine)	0.1	0.7	0.3	2	
US - California Permissible Exposure Limits for Chemical Contaminants	bromine (Bromine)	0.1	0.7			C
US - Idaho - Limits for Air Contaminants	bromine (Bromine)	0.1	0.7			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	bromine (Bromine)	0.1	0.66	0.2	1,3	
US - Hawaii Air Contaminant Limits	bromine (Bromine)	0.1	0.7	0.3	2	
US - Alaska Limits for Air Contaminants	bromine (Bromine)	0.1	0.7	0.3	2	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	bromine (Bromine)	0.1		0.2		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	bromine (Bromine)	0.1	0.7	0.3	2	
US - Washington Permissible exposure limits of air contaminants	bromine (Bromine)	0.1		0.3		
US - Michigan Exposure Limits for Air Contaminants	bromine (Bromine)	0.1	0.7	0.3	2	
Canada - Prince Edward Island Occupational Exposure Limits	bromine (Bromine)	0.1		0.2		TLV Basis: upper and lower respiratory tract irritation; lung damage
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air	bromine (Bromine)	0.1	0.7			

Contaminants

Canada - Nova Scotia Occupational Exposure Limits	bromine (Bromine)	0.1		0.2			TLV Basis: upper and lower respiratory tract irritation; lung damage
US - Oregon Permissible Exposure Limits (Z-1)	bromine (Bromine)	0.1	0.7				
Canada - Northwest Territories Occupational Exposure Limits (English)	bromine (Bromine)	0.1	0.65	0.3	2		
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	formaldehyde (FORMALDEHYDE)	0.04					
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	formaldehyde (FORMALDEHYDE)	0.03					
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	formaldehyde (FORMALDEHYDE)	0.008					
Canada - Ontario Occupational Exposure Limits	formaldehyde (Formaldehyde / Formaldéhyde)			1	1.5		
US NIOSH Recommended Exposure Limits (RELs)	formaldehyde (Formaldehyde)	0.016			0.1		See Appendix A; Ca; (Ceiling ([15-minute]))
US ACGIH Threshold Limit Values (TLV)	formaldehyde (Formaldehyde)				0.3		TLV Basis: upper respiratory tract & eye irritation
Canada - British Columbia Occupational Exposure Limits	formaldehyde (Formaldehyde)	0.3			1		A2, 1; S
Canada - Alberta Occupational Exposure Limits	formaldehyde (Formaldehyde)	0.75	0.9		1	1.3	
US - Idaho - Acceptable Maximum Peak Concentrations	formaldehyde (Formaldehyde (Z37.16-1967))	3			5		
US - Tennessee Occupational Exposure Limits - Limits For Air	formaldehyde (Rosin core solder pyrolysis products, as formaldehyde)		0.1				

Contaminants						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	formaldehyde (Formaldehyde; see 1910.1048)	3			5	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	formaldehyde (Formaldehyde; see 1910.1048)		See Table Z-2 for			
US - California Permissible Exposure Limits for Chemical Contaminants	formaldehyde (Rosin core solder, pyrolysis products, as formaldehyde)		0.1			
US - California Permissible Exposure Limits for Chemical Contaminants	formaldehyde (Formaldehyde, see Section 5217)	0.75		2		
US - Alaska Limits for Air Contaminants	formaldehyde (Rosin core solder pyrolysis products, as formaldehyde)		0.1			
US - Michigan Exposure Limits for Air Contaminants	formaldehyde (Formaldehyde; see R325.51451 et seq.F)	0.75	0.9	2	2.5	
US - Oregon Permissible Exposure Limits (Z-1)	formaldehyde (Rosin core solder pyrolysis products (as Formaldehyde))	-	0.1			Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.
US - Oregon Permissible Exposure Limits (Z-1)	formaldehyde (Formaldehyde)	0.75				(See 1910.1048)
US - Hawaii Air Contaminant Limits	formaldehyde (Formaldehyde)	0.75				See °12-202-37
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	formaldehyde (Rosin core solder pyrolysis products (as formaldehyde))	-	0.1	-	0.3	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	formaldehyde (Formaldehyde)	2	3	-	-	

US - Washington Permissible exposure limits of air contaminants	formaldehyde (Formaldehyde (see chapter 296-856 WAC))	0.75	2		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	formaldehyde (Formaldehyde)			0.3	SEN, T20
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	formaldehyde (Formaldehyde)			2	3
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	formaldehyde (Formaldehyde: see 1910.1048)	0.75	2		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	formaldehyde (Formaldehyde; see 1910.1048)	0.75	2		
US OSHA Permissible Exposure Levels (PELs) - Table Z2	formaldehyde (Formaldehyde; see 1910.1048)		2		
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	formaldehyde (Formaldehyde; see 1910.1048)	0.75	2		
Canada - Northwest Territories Occupational Exposure Limits (English)	formaldehyde (Formaldehyde)			2	2.4
Canada - Northwest Territories Occupational Exposure Limits (English)	formaldehyde (Rosin core solder pyrolysis products (as formaldehyde))	0.1		0.3	

Canada - Prince
Edward Island
Occupational
Exposure Limits

formaldehyde
(Formaldehyde)

0.3

TLV Basis:
upper
respiratory
tract & eye
irritation

Canada - Nova
Scotia
Occupational
Exposure Limits

formaldehyde
(Formaldehyde)

0.3

TLV Basis:
upper
respiratory
tract & eye
irritation

ENDOELTABLE

The following materials had no OELs on our records

- 1,3-dibromo-5,5-dimethylhydantoin: CAS:77-48-5

PERSONAL PROTECTION



RESPIRATOR

- Type BAX-P Filter of sufficient capacity. (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.

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:

- 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.

- DO NOT wear cotton or cotton-backed gloves.
- DO NOT wear leather gloves.
- Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.

OTHER

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

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

Does not mix with water.

Corrosive.

State	DIVIDED SOLID	Molecular Weight	285.93
Melting Range (°F)	387- 390 (decomp)	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	Not available	pH (1% solution)	Not available
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)	Not applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

Granular powder with faint halogen odour; slightly soluble in water. Soluble in benzene, chloroform, glacial acetic acid. Contains 55% active bromine which is released slowly in solution.

log Kow 0-0.35

Material	Value
----------	-------

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable under normal handling conditions.

STORAGE INCOMPATIBILITY

- Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
- Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
- Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
- Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
- Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

Formaldehyde:

- is a strong reducing agent
- may polymerise in air unless properly inhibited (usually with methanol up to 15%) and stored at controlled temperatures
- will polymerize with active organic material such as phenol
- reacts violently with strong oxidisers, hydrogen peroxide, potassium permanganate, acrylonitrile, caustics (sodium hydroxide, yielding formic acid and flammable hydrogen), magnesium carbonate, nitromethane, nitrogen oxides (especially at elevated temperatures), peroxyformic acid
- is incompatible with strong acids (hydrochloric acid forms carcinogenic bis(chloromethyl)ether*), amines, ammonia, aniline, bisulfides, gelatin, iodine, magnesite, phenol, some monomers, tannins, salts of copper, iron, silver.
- acid catalysis can produce impurities: methylal, methyl formate

Aqueous solutions of formaldehyde:

- slowly oxidise in air to produce formic acid
- attack carbon steel

Concentrated solutions containing formaldehyde are:

- unstable, both oxidising slowly to form formic acid and polymerising; in dilute aqueous solutions formaldehyde appears as monomeric hydrate (methylene glycol) - the more concentrated the solution the more polyoxymethylene glycol occurs as oligomers and polymers (methanol and amine-containing compounds inhibit polymer formation)
- readily subject to polymerisation, at room temperature, in the presence of air and moisture, to form paraformaldehyde (8-100 units of formaldehyde), a solid mixture of linear polyoxymethylene glycols containing 90-99% formaldehyde; a cyclic trimer, trioxane (CH₂O₃), may also form

Flammable and/or toxic gases are generated by the combination of aldehydes with azo, diazo compounds, dithiocarbamates, nitrides, and strong reducing agents

*The empirical equation may be used to determine the concentration of bis(chloromethyl)ether (BCME) formed by reaction with HCl:

$$\log(\text{BCME})_{\text{ppb}} = -2.25 + 0.67 \log(\text{HCHO})_{\text{ppm}} + 0.77 \log(\text{HCl})_{\text{ppm}}$$

Assume values for formaldehyde, in air, of 1 ppm and for HCl of 5 ppm, resulting BCME concentration, in air, would be 0.02 ppb.

Segregate from alcohol, water.

Avoid storage with reducing agents.

Avoid contact with ammonia, urea, or other nitrogen containing compounds.

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

Section 11 - TOXICOLOGICAL INFORMATION

1,3-dibromo-5,5-dimethylhydantoin

TOXICITY AND IRRITATION

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

FORMALDEHYDE:

1,3-DIBROMO-5,5-DIMETHYLHYDANTOIN:

■ 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.

FORMALDEHYDE:

BROMINE:

■ The material may cause severe 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. Repeated exposures may produce severe ulceration.

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

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

1,3-DIBROMO-5,5-DIMETHYLHYDANTOIN:

TOXICITY	IRRITATION
Oral (rat) LD50: 760 mg/kg	Skin (rabbit): SEVERE/ CORROSIVE *
Dermal (Rat) LD50: >2000 mg/kg *	
Inhalation (Rabbit) LC50: 510 mg/m ³ *	

■ Formaldehyde generators (releasers) are often used as preservatives. Formaldehyde may be generated following hydrolysis.

Formaldehyde generators are a diverse group of chemicals that can be recognised by a small, easily detachable formaldehyde moiety.

According to Annex VI of the Cosmetic Directive 76/768/EC, the maximum authorised concentration of free formaldehyde is 0.2%. In addition, the provisions of Annex VI state that,

All finished products containing formaldehyde or substances in this Annex and which release formaldehyde must be labelled with the warning "contains formaldehyde" where the concentration of formaldehyde in the finished product exceeds 0.05%.

Formaldehyde-releasing preservatives have the ability to release formaldehyde in very small amounts over time. The use of formaldehyde-releasing preservatives ensures that the actual level of free formaldehyde in the products is always very low but at the same time sufficient to ensure absence of microbial growth. The formaldehyde reacts most rapidly with organic and inorganic anions, amino and sulfide groups and electron-rich groups to disrupt metabolic processes, eventually causing death of the organism.

There is concern that when formaldehyde-releasing preservatives are present in a formulation that also includes amines, such as triethanolamine (TEA), diethanolamine (DEA), or monoethanolamine (MEA), nitrosamines can be formed,; nitrosamines are carcinogenic substances that can potentially penetrate skin.

for halohydantoins

Acute toxicity: The halohydantoins were shown to be of low toxicity by the oral and dermal routes of exposure. Acute toxicity by the inhalation route is more significant. The halohydantoins are significant eye and skin irritants. Dermal sensitization has also been observed for some of the halohydantoin compounds.

Non-acute toxicity testing of halohydantoins and their breakdown products dimethylhydantoin and ethylmethylhydantoin (DMH/EMH) (including sub chronic, developmental, reproductive, and chronic toxicity testing) all show the presence of non-specific toxicity only at relatively high doses of the test chemical. The primary reason for developing generic data on DMH and EMH rather than the entire halohydantoin molecule is that these ring structures represent the persistent component of the halohydantoins. A secondary reason for evaluating the halohydantoin moieties is that the corrosive properties of the released halogens would limit the amount of chemical that could be administered to laboratory animals; thereby precluding a meaningful evaluation of the halohydantoin moieties.

Developmental and reproductive toxicity data demonstrate no increase in susceptibility to the toxic effects of 5,5-dimethylhydantoin with the exception of one study, where foetal and litter effects (increased incidence of 27th presacral vertebrae) in rabbits were observed at a lower dose level than that which resulted in maternal toxicity (decreased body weight and food consumption during the dosing period) following treatment. The increase of 27th presacral vertebrae is a common variation found in rabbit developmental toxicity studies and was not considered an adverse effect. In a prenatal developmental toxicity study conducted in rabbits with 5-ethyl-5-methylhydantoin, there was no increased susceptibility of the foetuses observed.

Available metabolism data indicate that DMH and EMH are excreted unchanged in the rat. However, it is known that hydroxymethylhydantoins are formaldehyde releasers. The DMH portion of the molecule is assumed to behave the same as the hydantoins from the halohydantoin compounds. Any risk associated from the formaldehyde portion of the hydroxymethylhydantoin molecule must be addressed further.

Carcinogenicity: Cancer studies in rats and mice indicated no systemic effects other than decreased body weight and body weight gains in females (rats) and males (mice) and increased hyperplasia of submandibular lymph nodes in males (rats). No evidence of carcinogenicity of the test material was reported. 5,5-dimethylhydantoin is classified as 'not likely' to be a carcinogen based upon the negative evidence for carcinogenicity in both the rat and mouse studies as well as the negative evidence of mutagenicity.

Mutagenicity: The data on mutagenicity of dimethylhydantoin shows, in large part, negative responses in the studies conducted. Literature reports indicate a positive effect for 2 in vitro mammalian cytogenetic assays in Chinese Hamster Ovary cells.

Non-sensitising

* RED for Halohydantoins

TOXICITY	IRRITATION
----------	------------

BROMINE:

Oral (human) LDLo: 14 mg/kg.	Nil Reported
------------------------------	--------------

Inhalation (human) LCLo: 1000 ppm.

Oral (Human) LD: 14 mg/kg

Inhalation (Human) LC: 1000 ppm/4h

Oral (Rat) LD50: 2600 mg/kg

Inhalation (Rat) LC50: 2700 mg/m³/4h

Oral (Mouse) LD50: 3100 mg/kg

Oral (Rabbit) LD50: 4160 mg/kg

Oral (Guinea pig) LD50: 5500 mg/kg

None (None) None: None None None

FORMALDEHYDE:

Oral (woman) LDLo: 108 mg/kg	Skin (human): 0.15 mg/3d-I Mild
------------------------------	---------------------------------

Oral (man) TDLo: 643 mg/kg	Skin (rabbit): 2 mg/24H SEVERE
----------------------------	--------------------------------

Oral (rat) LD50: 100 mg/kg	Eye (human): 4 ppm/5m
----------------------------	-----------------------

Inhalation (man) TCLo: 0.3 mg/m³	Eye (rabbit): 0.75 mg/24H SEVERE
----------------------------------	----------------------------------

Inhalation (rat) LC50: 203 mg/m³

Dermal (rabbit) LD50: 270 mg/kg

■ **WARNING:** This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen

[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

CARCINOGEN

BROMINE COMPOUNDS (ORGANIC OR INORGANIC)	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
bromine	US - Rhode Island Hazardous Substance List	IARC	
INORGANIC BROMINE COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC

Formaldehyde	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Formaldehyde	US EPA Carcinogens Listing	Carcinogenicity	B1
Formaldehyde	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B1
Formaldehyde	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A2
formaldehyde	US - Rhode Island Hazardous Substance List	IARC	
formaldehyde	US - Rhode Island Hazardous Substance List	IARC	C
FORMALDEHYDE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
FORMALDEHYDE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Formaldehyde	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2A
Formaldehyde	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
formaldehyde	US - Maine Chemicals of High Concern List	Carcinogen	B1
TWAPPM~	US - Maine Chemicals of High Concern List	Carcinogen	A2
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; IRIS; NTP 11th ROC
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

B. Component Waste Numbers

When formaldehyde 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 U122 (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.
- For small quantities of oxidizing agent:
- Cautiously acidify a 3% solution to pH 2 with sulfuric acid.
 - Gradually add a 50% excess of sodium bisulfite solution with stirring.
 - 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: 5.1

Identification Numbers: UN3085 PG: II

Label Codes: 5.1, 8 Special provisions: 62, IB6,

IP2, T3,

TP33

Packaging: Exceptions: None Packaging: Non- bulk: 212

Packaging: Exceptions: None Quantity limitations: 5 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 25 kg Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: 13, 34,

56, 58,

106, 138

Hazardous materials descriptions and proper shipping names:

Oxidizing solid, corrosive, n.o.s.

Air Transport IATA:

UN/ID Number: 3085 Packing Group: II

Special provisions: A3

Cargo Only

Packing Instructions: 562 Maximum Qty/Pack: 25 kg

Passenger and Cargo Passenger and Cargo

Packing Instructions: Y544 Maximum Qty/Pack: 5 kg

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 558 Maximum Qty/Pack: 2.5 kg

Shipping Name: OXIDIZING SOLID, CORROSIVE, N.O.S.

*(CONTAINS 1,3-DIBROMO-5,5-DIMETHYLHYDANTOIN)

Maritime Transport IMDG:

IMDG Class: 5.1 IMDG Subrisk: 8

UN Number: 3085 Packing Group: II

EMS Number: F-A,S-Q Special provisions: 274

Limited Quantities: 1 kg Marine Pollutant: Yes

Shipping Name: OXIDIZING SOLID, CORROSIVE, N.O.S.(contains 1,3-dibromo-5,5-dimethylhydantoin)

Section 15 - REGULATORY INFORMATION

1,3-dibromo-5,5-dimethylhydantoin (CAS: 77-48-5) is found on the following regulatory lists;

"Canada Domestic Substances List (DSL)", "US Inventory of Effective Food Contact Substance Notifications", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Regulations for ingredients

bromine (CAS: 7726-95-6) 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 National Pollutant Release Inventory (NPRI)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "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 Permissible Exposure Limits for Chemical Contaminants", "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 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 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 CERCLA Priority List of Hazardous Substances", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA Acute Exposure Guideline Levels (AEGLs) - Final", "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 NIOSH Recommended Exposure Limits (RELs)", "US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "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"

formaldehyde (CAS: 50-00-0,8005-38-7,8006-07-3,8013-13-6,112068-71-0) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Ontario Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List", "Canada Domestic Substances List (DSL)", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Priority Substances List (PSL1, PSL2)", "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", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.1", "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 OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - Carcinogens", "US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens", "US - California Toxic Air Contaminant List Category II", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Acceptable Maximum Peak Concentrations", "US - Idaho - Limits for Air Contaminants", "US - Maine Chemicals of High Concern List", "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 - Oregon Permissible Exposure Limits (Z-2)", "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 wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "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 Class A toxic air pollutants: Known and Probable Carcinogens", "US - Washington Dangerous waste constituents list", "US - Washington Discarded Chemical Products List - ""U"" 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 - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US American Apparel & Footwear Association (AAFA) Restricted Substance List (RSL)", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)", "US CERCLA Priority List of Hazardous Substances", "US Clean Air Act - Hazardous Air Pollutants", "US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications", "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

(AEGIs) - Interim", "US EPA Carcinogens Listing", "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 as Components of Coatings - Acrylate ester copolymer coating", "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 National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen", "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 Carcinogens Listing", "US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US OSHA Permissible Exposure Levels (PELs) - Table Z2", "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 Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US -Texas Air Monitoring Comparison Values for Evaluating VOCs", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
- May be harmful to the foetus/ embryo*.
- May possibly affect fertility*.

* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance CAS Suggested codes 1, 3- dibromo- 5, 5- dimethylhydantoin 77- 48- 5 Xn; R22 Xi; R38 bromine 7726- 95- 6 Xn; R22 Xi; R38 formaldehyde 50- 00- 0 Xn; R22 Xi; R38 formaldehyde 8005- 38- 7 Xn; R22 Xi; R38 formaldehyde 8006- 07- 3 Xn; R22 Xi; R38 formaldehyde 8013- 13- 6 Xn; R22 Xi; R38 formaldehyde 112068- 71- Xn; R22 Xi; R38 0

Ingredients with multiple CAS Nos

Ingredient Name CAS formaldehyde 50-00-0, 8005-38-7, 8006-07-3, 8013-13-6, 112068-71-0

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

- 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.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: Sep-9-2010

Print Date: Sep-15-2011