1-(Hydroxymethyl)-5,5-dimethylhydantoin

sc-258513

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

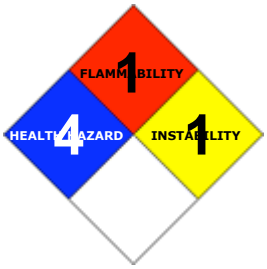
Section 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
1-(Hydroxymethyl)-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
C6-H10-N2-O3, "1-(hydroxymethyl)-5, 5-dimethylhydantoin", "1-(hydroxymethyl)-5, 5-dimethyl-2, 4-imidazolinedione", "1-hydroxymethyl-5, 5-dimethyl hydantoin", "115502 (US EPA PC Code)", "2306 (CA DPR Chem Code)", Glycoserve, "hydantoin, 1-(hydroxymethyl)-5, 5-dimethyl-", "hydroxymethyl-5, 5-dimethyl hydantoin", "monomethylol dimethyl hydantoin", "monomethylol dimethylhydantoin", "MDM hydantoin"

Section 2 – HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

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

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Harmful if swallowed.
Irritating to eyes.
May cause SENSITISATION by skin contact.

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.
■ 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
■ This material can cause eye irritation and damage in some persons.
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.
■ 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
■ The material is not thought to produce either adverse health effects or irritation of the respiratory tract 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
■ Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
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 P4502E1. In general, inducers of this isozyme stabilise the enzyme by preventing phosporylation 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.
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 nasopharangeal 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	%

monomethylol 5,5-dimethylhydantoin	27636–82–4	>98
hydrolysis yields		
formaldehyde	50–00–0	

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.
- Other measures are usually unnecessary.

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.

Section 5 – FIRE FIGHTING MEASURES

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

EXTINGUISHING MEDIA
■

- Foam.
- Dry chemical powder.

FIRE FIGHTING
■

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.

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 (CO_2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.
May emit corrosive fumes.
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 BAX-P Filter of sufficient capacity

Section 6 – ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
■

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS
■ Moderate hazard.

- CAUTION: Advise personnel in area.
- 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
■

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS
■

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

Section 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US 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					
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 Contaminants	formaldehyde (Rosin core solder pyrolysis products, as formaldehyde)		0.1				
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 (Formaldehyde, see Section 5217)	0.75		2			
US – California Permissible Exposure Limits for Chemical Contaminants	formaldehyde (Rosin core solder, pyrolysis products, as formaldehyde)		0.1				
US OSHA Permissible Exposure Levels (PELs) – Table Z2	formaldehyde (Formaldehyde; see 1910.1048)			2			
US – Hawaii Air Contaminant Limits	formaldehyde (Formaldehyde)	0.75					See º12–202–37
US – Alaska Limits for Air Contaminants	formaldehyde (Rosin core solder pyrolysis products, as formaldehyde)		0.1				
US – Oregon Permissible Exposure Limits (Z-1)	formaldehyde (Formaldehyde)	0.75					(See 1910.1048)
US – Michigan Exposure Limits for Air Contaminants	formaldehyde (Formaldehyde; see R325.51451 et seq.F)	0.75	0.9	2	2.5		

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
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 – 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 – Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	formaldehyde (Formaldehyde; see 1910.1048)	0.75		2				
Canada – Quebec Permissible Exposure Values for Airborne Contaminants (English)	formaldehyde (Formaldehyde)					2	3	
US OSHA Permissible Exposure Levels (PELs) – Table Z1	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

The following materials had no OELs on our records

• monomethylol 5,5-dimethylhydantoin:	CAS:27636–82–4

PERSONAL PROTECTION




RESPIRATOR
Type BAX-P Filter of sufficient capacity
Consult your EHS staff for recommendations
EYE
■

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET
■ 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.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocaoutchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.
OTHER
■

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

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

State	Divided Solid	Molecular Weight	158.157
Melting Range (°F)	Not Available	Viscosity	Not Applicable
Boiling Range (°F)	Not Applicable	Solubility in water (g/L)	Reacts
Flash Point (°F)	Not Available	pH (1% solution)	Not Applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not Applicable
Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not Available
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

APPEARANCE
Solid; reacts with water.

log Kow 0–0.35

Material	Value

Section 10 – CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
■

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

STORAGE INCOMPATIBILITY
■ 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 a 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 (CH_2O_3), 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(BCME)ppb = -2.25 + 0.67 log(HCHO) ppm + 0.77 log(HCl)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 reaction with oxidizing agents.

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

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

Section 11 – TOXICOLOGICAL INFORMATION

monomethylol 5,5-dimethylhydantoin

TOXICITY AND IRRITATION
■ unless otherwise specified data extracted from RTECS – Register of Toxic Effects of Chemical Substances.
■ 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.
MONOMETHYLOL 5,5-DIMETHYLHYDANTOIN:
■ 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.
No significant acute toxicological data identified in literature search.

FORMALDEHYDE:

TOXICITY	IRRITATION
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	

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

	US – Rhode Island Hazardous Substance List	IARC	
	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
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

No data

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
monomethylol 5,5-dimethylhydantoin	HIGH		LOW	HIGH
formaldehyde	LOW	LOW	LOW	HIGH

Section 13 – DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
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.

- 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

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

Section 15 – REGULATORY INFORMATION

Regulations for ingredients
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 – 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, PSL 2)","Canada Toxicological Index Service – Workplace Hazardous Materials Information System – WHMIS (English)","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!) 1.0","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 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 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 (AEGLs) – 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) – 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"
No data for monomethylol 5,5-dimethylhydantoin (CAS: , 27636–82–4)

Section 16 – OTHER INFORMATION

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.

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