Benzyl alcohol

sc-326216

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Benzyl alcohol

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
C7-H8-O, hydroxytoluene, alpha-hydroxytoluene, alpha-toluenol, "benzene carbinol", benzenecarbinol, benzenemethanol, "benzoyl alcohol", phenylcarbinol, "phenyl carbinol", "benzene methanol", "phenyl methanol", phenylmethanol, "phenyl methyl alcohol", "phenylmethyl alcohol", "(hydroxymethyl) benzene", "benzyl alcohol FCC"

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 form explosive peroxides.
Irritating to eyes.
Harmful by inhalation, in contact with skin and if swallowed.
Vapours may cause drowsiness and dizziness.

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.
■ Ingestion of large doses of benzyl alcohol may cause abdominal pain, nausea, vomiting, diarrhea.
It may affect behavior/central nervous system and cause headache, somnolence, excitement, dizziness, ataxia, coma, convulsions, and other symptoms of central nervous system depression.
■ Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness.
Serious poisonings may result in respiratory depression and may be fatal.

EYE

■ There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation.
Severe inflammation may be expected with pain.

SKIN

■ Skin contact with the material may be harmful; systemic effects may resultfollowing absorption.
■ There is some evidence to suggest that the material may cause moderate inflammation of the skin either following direct contact or after a delay of some time.
Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
■ 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 vapours may cause drowsiness and dizziness.
This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
■ There is some evidence to suggest that the material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
■ Inhalation of benzyl alcohol may affect respiration (paralysis of the respiratory center, respiratory depression, gasping respirations), cardiovascular system (hypotension.
■ Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
■ Acute effects from inhalation of high vapor concentrations may be chest and nasal irritation with coughing, sneezing, headache and even nausea.

CHRONIC HEALTH EFFECTS

■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.
Prolonged or repeated exposure to benzyl alcohol may cause allergic contact dermatitis.
Prolonged or repeated ingestion may affect behavior/central nervous system with symptoms similar to acute ingestion. It may also affect the liver, kidneys, cardiovascular system, and metabolism (weight loss).
Animal studies have shown this compound to cause lung, liver, kidney and CNS disorders. Studies in animals have shown evidence of teratogenicity in the chick embryo. The significance of the information for humans is unknown.
Benzyl alcohol showed no evidence of carcinogenic activity in long-term toxicology and carcinogenesis study.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
benzyl alcohol	100-51-6	> 99
impurities as		

benzaldehyde	100-52-7	0.3 appr.
dibenzyl ether	103-50-4	0.1 appr.

Section 4 - FIRST AID MEASURES

SWALLOWED
· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

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.
Clinical experience of benzyl alcohol poisoning is generally confined to premature neonates in receipt of preserved intravenous salines.
· Metabolic acidosis, bradycardia, skin breakdown, hypotonia, hepatorenal failure, hypotension and cardiovascular collapse are characteristic.
· High urine benzoate and hippuric acid as well as elevated serum benzoic acid levels are found.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	0.038 @ 20 C
Upper Explosive Limit (%):	13.0
Specific Gravity (water=1):	1.04 @ 20 C
Lower Explosive Limit (%):	1.3

EXTINGUISHING MEDIA
· Alcohol stable foam.
· Dry chemical powder.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 100 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
· Combustible.
· Slight fire hazard when exposed to heat or flame.
Combustion products include: carbon dioxide (CO_2), aldehydes, other pyrolysis products typical of buming organic material.
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:
1.BUTYL 2.VITON
Respirator:
Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■ Slippery when spilt.
· Remove all ignition sources.
· Clean up all spills immediately.
MAJOR SPILLS
■ Slippery when spilt.
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
US AIHA Workplace Environmental Exposure Levels (WEELs)	benzyl alcohol (Benzyl Alcohol *)	10							
Canada - Ontario Occupational Exposure Limits	benzaldehyde (Benzaldehyde / Benzaldéhyde)			4	17				
US AIHA Workplace Environmental Exposure Levels (WEELs)	benzaldehyde (Benzaldehyde)	2		4					DSEN
US - Idaho - Limits for Air Contaminants	benzaldehyde (Copper - Fume (as Cu))		0.1						

US - Minnesota Permissible Exposure Limits (PELs)	benzaldehyde (Copper - Dusts and mists (as Cu))		1				
US ACGIH Threshold Limit Values (TLV)	benzaldehyde (Copper - Dusts and/or mists (as Cu))		1				TLV Basis: irritation; GI; metal fume fever
US - Minnesota Permissible Exposure Limits (PELs)	benzaldehyde (Copper - Fume (as Cu))		0.1				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	benzaldehyde (Copper - Fume (as Cu))		0.1				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	benzaldehyde (Copper - Dusts and mists (as Cu))		1				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	benzaldehyde (Copper - Dusts and mists (as Cu))		1				
US - Idaho - Limits for Air Contaminants	benzaldehyde (Copper - Dusts and Mists (as Cu))		1				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	benzaldehyde (Copper - Fume (as Cu))		0.1				
US ACGIH Threshold Limit Values (TLV)	benzaldehyde (Copper - Fume (as Cu))		0.2				TLV Basis: irritation; GI; metal fume fever
US - Hawaii Air Contaminant Limits	benzaldehyde (Copper - Dusts and mists (as Cu))		1		2		
Canada - Nova Scotia Occupational Exposure Limits	benzaldehyde (Copper - Fume (as Cu))		0.2				TLV Basis: irritation; GI; metal fume fever
US - Hawaii Air Contaminant Limits	benzaldehyde (Copper - Fume (as Cu))		0.1				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	benzaldehyde (Copper - Fume)	-	0.2	-	0.2		

Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	benzaldehyde (Copper - Dusts and mists (as Cu))	-	1	-	2		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	benzaldehyde (Copper - Fume (as Cu))		0.1				
US OSHA Permissible Exposure Levels (PELs) - Table Z1	benzaldehyde (Copper - Dusts and mists (as Cu))		1				
Canada - Prince Edward Island Occupational Exposure Limits	benzaldehyde (Copper - Dusts and/or mists (as Cu))		1				TLV Basis: irritation; GI; metal fume fever
Canada - Nova Scotia Occupational Exposure Limits	benzaldehyde (Copper - Dusts and/or mists (as Cu))		1				TLV Basis: irritation; GI; metal fume fever
Canada - Prince Edward Island Occupational Exposure Limits	benzaldehyde (Copper - Fume (as Cu))		0.2				TLV Basis: irritation; GI; metal fume fever
US - California Permissible Exposure Limits for Chemical Contaminants	benzaldehyde (Copper salts, dusts and mists, as Cu)		1				
US - Oregon Permissible Exposure Limits (Z-3)	benzaldehyde (Inert or Nuisance Dust: (d) Total dust)		10				Oregon Permissible Exposure Limits (PELs) are different than the federal limits.
US OSHA Permissible Exposure Levels (PELs) - Table Z3	benzaldehyde (Inert or Nuisance Dust: (d) Respirable fraction)		5				
US OSHA Permissible Exposure Levels (PELs) - Table Z3	benzaldehyde (Inert or Nuisance Dust: (d) Total dust)		15				
US - Hawaii Air Contaminant Limits	benzaldehyde (Particulates not other wise regulated - Total dust)		10				
US - Hawaii Air Contaminant Limits	benzaldehyde (Particulates not other wise regulated - Respirable fraction)		5				
US - Oregon Permissible Exposure Limits (Z-3)	benzaldehyde (Inert or Nuisance Dust:(d) Respirable fraction)		5				Oregon Permissible Exposure Limits (PELs) are different than the

federal limits.

ENDOELTABLE
The following materials had no OELs on our records

• dibenzyl ether: CAS:103-50-4

PERSONAL PROTECTION




RESPIRATOR

•Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

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

OTHER

· Overalls.
· 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.
Does not mix with water.
Sinks in water.

State	Liquid	Molecular Weight	108.14 Pure
Melting Range (°F)	4	Viscosity	Not Available
Boiling Range (°F)	397- 408	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	214(CC)	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	802- 815	Vapor Pressure (mmHg)	0.038 @ 20 C
Upper Explosive Limit (%)	13.0	Specific Gravity (water=1)	1.04 @ 20 C
Lower Explosive Limit (%)	1.3	Relative Vapor Density (air=1)	3.72
Volatile Component (%vol)	100	Evaporation Rate	Negligible

VOC(regulatory)	lb/gall	VOC(actual)	lb/gall

APPEARANCE

Clear, colourless, combustible liquid with a mild aromatic odour; partly soluble in water. Soluble in diethyl ether, acetone. Solubility in water (20 C): 35,000 mg/l ; (25 C) 42,900 mg/l Critical Temperature 441.85 C Sharp burning taste. Available in purity grades of: B.P., Photographic, Technical and Textile.

log Kow 1.1 log Kow 1.48

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

■ Benzyl alcohol:
· may froth in contact with water
· slowly oxidises in air, oxygen forming benzaldehyde
· is incompatible with mineral acids, caustics, aliphatic amines, isocyanates
· reacts violently with strong oxidisers, and explosively with sulfuric acid at elevated temperatures
· corrodes aluminium at high temperatures
· is incompatible with aluminum, iron, steel
· attacks some nonfluorinated plastics; may attack, extract and dissolve polypropylene
Benzyl alcohol contaminated with 1.4% hydrogen bromide and 1.2% of dissolved iron(II) polymerises exothermically above 100 deg. C.
Avoid strong acids.
Avoid reaction with oxidizing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

benzyl alcohol

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
DIBENZYL ETHER:
BENZALDEHYDE:
■ 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.
BENZALDEHYDE:
BENZYL ALCOHOL:
■ 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.
BENZYL ALCOHOL:

TOXICITY	IRRITATION
Oral (rat) LD50: 1230 mg/kg	Skin (man): 16 mg/48h-Mild
Inhalation (rat) LCLo: 2000 ppm/4h	Skin (rabbit):10 mg/24h open-Mild
Inhalation (rat) LC50: 1000 ppm/8h	Eye (rabbit): 0.75 mg Open SEVERE
Inhalation (rat) LC50: >4178 mg/m³/4h	
Dermal (rabbit) LD50: 2000 mg/kg	

▪ For benzyl alkyl alcohols:
Unlike benzylic alcohols, the beta-hydroxyl group of the members of this cluster is unlikely to undergo phase II metabolic activation. Instead, the beta-hydroxyl group is expected to contribute to detoxification via oxidation to hydrophilic acid. Despite structural similarity to carcinogenic ethyl benzene, only a marginal concern has been assigned to phenethyl alcohol due to limited mechanistic analogy.
For benzoates:

Acute toxicity: Benzyl alcohol, benzoic acid and its sodium and potassium salt can be considered as a single category regarding human health, as they are all rapidly metabolised and excreted via a common pathway within 24 hrs. Systemic toxic effects of similar nature (e.g. liver, kidney) were observed. However with benzoic acid and its salts toxic effects are seen at higher doses than with benzyl alcohol.
The compounds exhibit low acute toxicity as for the oral and dermal route. The LD50 values are > 2000 mg/kg bw except for benzyl alcohol which needs to be considered as harmful by the oral route in view of an oral LD50 of 1610 mg/kg bw. The 4 hrs inhalation exposure of benzyl alcohol or benzoic acid at 4 and 12 mg/l as aerosol/dust respectively gave no mortality, showing low acute toxicity by inhalation for these compounds.
Benzoic acid and benzyl alcohol are slightly irritating to the skin, while sodium benzoate was not skin irritating. No data are available for potassium benzoate but it is also expected not to be skin irritating. Benzoic acid and benzyl alcohol are irritating to the eye and sodium benzoate was only slightly irritating to the eye. No data are available for potassium benzoate but it is expected also to be only slightly irritating to the eye.
Sensitisation: The available studies for benzoic acid gave no indication for a sensitising effect in animals, however occasionally very low positive reactions were recorded with humans (dermatological patients) in patch tests. The same occurs for sodium benzoate. It has been suggested that the very low positive reactions are non-immunologic contact urticaria. Benzyl alcohol gave positive and negative results in animals. Benzyl alcohol also demonstrated a maximum incidence of sensitization of only 1% in human patch testing. Over several decades no sensitization with these compounds has been seen among workers.
Repeat dose toxicity: For benzoic acid repeated dose oral toxicity studies give a NOAEL of 800 mg/kg/day. For the salts values > 1000 mg/kg/day are obtained. At higher doses increased mortality, reduced weight gain, liver and kidney effects were observed.
For benzyl alcohol the long-term studies indicate a NOAEL > 400 mg/kg bw/d for rats and > 200 mg/kg bw/d for mice. At higher doses effects on bodyweights, lesions in the brains, thymus, skeletal muscle and kidney were observed. It should be taken into account that administration in these studies was by gavage route, at which saturation of metabolic pathways is likely to occur.
Mutagenicity: All chemicals showed no mutagenic activity in in vitro Ames tests. Various results were obtained with other in vitro genotoxicity assays. Sodium benzoate and benzyl alcohol showed no genotoxicity in vivo. While some mixed and/or equivocal in vitro chromosomal/chromatid responses have been observed, no genotoxicity was observed in the in vivo cytogenetic, micronucleus, or other assays. The weight of the evidence of the in vitro and in vivo genotoxicity data indicates that these chemicals are not mutagenic or clastogenic. They also are not carcinogenic in long-term carcinogenicity studies.
In a 4-generation study with benzoic acid no effects on reproduction were seen (NOAEL: 750 mg/kg). No compound related effects on reproductive organs (gross and histopathology examination) could be found in the (sub) chronic studies in rats and mice with benzyl acetate, benzyl alcohol, benzaldehyde, sodium benzoate and supports a non-reprotoxic potential of these compounds. In addition, data from reprotoxicity studies on benzyl acetate (NOAEL >2000 mg/kg bw/d; rats and mice) and benzaldehyde (tested only up to 5 mg/kg bw; rats) support the non-reprotoxicity of benzyl alcohol and benzoic acid and its salts.
Developmental toxicity: In rats for sodium benzoate dosed via food during the entire gestation developmental effects occurred only in the presence of marked maternal toxicity (reduced food intake and decreased body weight) (NOAEL = 1400 mg/kg bw). For hamster (NOEL: 300 mg/kg bw), rabbit (NOEL: 250 mg/kg bw) and mice (CD-1 mice, NOEL: 175 mg/kg bw) no higher doses (all by gavage) were tested and no maternal toxicity was observed. For benzyl alcohol: NOAEL= 550 mg/kg bw (gavage; CD-1 mice). LOAEL = 750 mg/kg bw (gavage mice). In this study maternal toxicity was observed e.g. increased mortality, reduced body weight and clinical toxicology. Benzyl acetate: NOEL = 500 mg/kg bw (gavage rats). No maternal toxicity was observed.

TOXICITY	**IRRITATION**
BENZALDEHYDE:	
Oral (rat) LD50: 1300 mg/kg	Skin (rabbit):500 mg/24h-Moderate
Oral (mouse) LD50: 28 mg/kg	
Intraperitoneal (mouse) LD50: 9 mg/kg	
Subcutaneous (rabbit) LD50: 5000 mg/kg	
Oral (g.pig) LD50: 1000 mg/kg	
Oral (Human) LD: 714.3 mg/kg	

■ For certain benzyl derivatives:

All members of this group (benzyl, benzoate and 2-hydroxybenzoate (salicylate) esters) contain a benzene ring bonded directly to an oxygenated functional group (aldehyde or ester) that is hydrolysed and/or oxidised to a benzoic acid derivative. As a stable animal metabolite, benzoic acid derivatives are efficiently excreted primarily in the urine. These reaction pathways have been reported in both aquatic and terrestrial species. The similarity of their toxicologic properties is a reflection their participation in these common metabolic pathways.

In general, members of this group are rapidly absorbed through the gastrointestinal tract, metabolised primarily in the liver, and excreted in the urine either unchanged or as	At high doses, conjugation pathways (e.g., glycine) may be saturated; in which case, free benzoic acid is excreted unchanged. Absorption, distribution and excretion studies

conjugates of benzoic acid derivatives	have been conducted several members of this group and structural relatives. These substances exhibit remarkably similar patterns of pharmacokinetics and metabolism. The benzyl, benzoate, and 2-hydroxybenzoate (salicylate) esters which comprise this category are hydrolysed to the corresponding alcohols and carboxylic acids. The benzyl alcohol and benzaldehyde derivatives are oxidised to the corresponding benzoic acid derivatives that are subsequently excreted unchanged or as glycine or glucuronic acid conjugates. If methoxy or phenolic functional groups are present on the benzene ring, additional minor metabolic options become available. O-demethylation yields the corresponding phenol that is subsequently excreted as the glucuronic acid or sulfate conjugates. At high dose levels, gut microflora may act to produce minor amounts of reduction metabolites.

Acute toxicity: Oral LD50 values ranged from 887 to greater than 5,000 mg/kg bw demonstrating the low to moderate toxicity of these compounds.

Repeat dose toxicity: Overall, numerous repeat-dose studies using various routes of exposure have been conducted in different animal species with members of this chemical category or their close structural relatives. It is important to note that all the benzyl derivatives in this category are eventually metabolised to a common metabolite, benzoic acid, and are rapidly excreted in the urine as benzoic acid or as its glycine, sulfate, or glucuronic acid conjugate. For this reason, the repeat-dose studies currently available provide adequate support for the safety of the benzyl derivatives. Moreover, the levels at which no adverse effects were reported were sufficiently high to accommodate any potential differences among the members of the category.

Reproductive toxicity: Several reproductive toxicity studies have been conducted with representatives of this group and produced no evidence of reproductive toxicity As with the repeat-dose studies, the benzyl derivatives generally follow the similar metabolic pathways and the studies conducted provide an adequate database for this endpoint. In addition, the dose levels tested provide margins of safety large enough to accommodate any differences among the group.

Developmental toxicity: Representative substances from this group were tested for developmental toxicity with uniform results, and indicated no teratogenic potential in the absence of maternal toxicity. Again, the representative substances undergo similar metabolism to the entire benzyl derivative group and therefore, provide an adequate representation for this endpoint.

Genetic toxicity: Overall, in vitro and in vivo genotoxicity studies have been conducted with substances representing the structural characteristics of the benzyl category. The results of these studies were predominantly negative demonstrating a low order of genotoxic potential.. Limited positive and/or equivocal findings have been reported for 3 aldehydes and benzyl acetate, but, in most cases, other studies of the same endpoint with same test substance show no activity. Most importantly, in vivo studies on benzaldehyde derivatives and closely related benzyl esters have all yielded negative results. These negative in vivo genotoxicity assays are supported by the lack of tumorigenicity in chronic animal studies with representatives of this group.

Data available for more than 100 in vitro genotoxicity assays for 9 members of the category and five metabolic precursors or metabolites of benzyl derivatives indicate a low genotoxic potential for members of this chemical category

Equivocal results have been reported mainly for aromatic aldehydes in the MLA and ABS assays.

Somnolence , tremor, coma, ulceration of the small intestine, increased urine volume recorded.

DIBENZYL ETHER:

Oral (rat) LD50: 2500 mg/kg		Skin (rabbit): 500 mg/24h - Mild
	Eye (rabbit): 500 mg/24h - Mild	

■ 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.

CARCINOGEN

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

benzaldehyde	US - Rhode Island Hazardous Substance List	IARC

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
benzyl alcohol	LOW	No Data Available	LOW	HIGH
benzaldehyde	LOW	No Data Available	LOW	HIGH
dibenzyl ether	HIGH	No Data Available	LOW	MED

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / EHS TRN A1a A1b A1 A2 B1 B2 C1 C2 C3 D1 D2 D3 E1 E2 E3 Cas No / RTECS No _____ Benzyl 349 139 1 1 R 2 NI 1 1 2 2 2 SD 2 alcohol / CAS:100- 51- 6 /

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

Section 13 - DISPOSAL CONSIDERATIONS

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

DOT:
Symbols: A G Hazard class or Division: 9
Identification Numbers: UN3334 PG: None
Label Codes: 9 Special provisions: A35
Packaging: Exceptions: 155 Packaging: Non- bulk: 204
Packaging: Exceptions: 155 Quantity limitations: No limit
Passenger aircraft/rail:

Quantity Limitations: Cargo No limit Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: None
Hazardous materials descriptions and proper shipping names:
Aviation regulated liquid, n.o.s.

Air Transport IATA:

UN/ID Number: 3334 Packing Group: -
Special provisions: A27
Cargo Only
Packing Instructions: 964 Maximum Qty/Pack: 220 L
Passenger and Cargo Passenger and Cargo
Packing Instructions: Y964 Maximum Qty/Pack: 100 L
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: 964 Maximum Qty/Pack: 30 kg G
Shipping Name: AVIATION REGULATED LIQUID, N.O.S. *
†(CONTAINS BENZYL ALCOHOL)
NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: IMDG

Section 15 - REGULATORY INFORMATION

benzyl alcohol (CAS: 100-51-6) is found on the following regulatory lists;

"Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Council of Chemical Associations (ICCA) - High Production Volume List","International Fragrance Association (IFRA) Standards Restricted","International Fragrance Association (IFRA) Survey: Transparency List","US - Minnesota Hazardous Substance List","US - Pennsylvania - Hazardous Substance List","US AIHA Workplace Environmental Exposure Levels (WEELs)","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients with insufficient data to support safety","US DOE Temporary Emergency Exposure Limits (TEELs)","US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes","US EPA High Production Volume Program Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Food Additive Database","US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Regulations for ingredients

benzaldehyde (CAS: 100-52-7) is found on the following regulatory lists;

"Canada - Ontario Occupational Exposure Limits","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Fragrance Association (IFRA) Standards Restricted","International Fragrance Association (IFRA) Survey: Transparency List","US - Florida Precursor Chemicals","US - Massachusetts Oil & Hazardous Material List","US - Minnesota Hazardous Substance List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US AIHA Workplace Environmental Exposure Levels (WEELs)","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe as used","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US EPA Master Testing List - Index II Chemicals Removed","US Food Additive Database","US -Texas Air Monitoring Comparison Values for Evaluating VOCs","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List","US TSCA Section 8 (d) - Health and Safety Data Reporting"

dibenzyl ether (CAS: 103-50-4) is found on the following regulatory lists;

"Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Fragrance Association (IFRA) Standards Restricted","International Fragrance Association (IFRA) Survey: Transparency List","US Food Additive Database","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.
■ May produce discomfort of the respiratory system and skin*.
■ Possible skin sensitiser*.
* (limited evidence).

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.

Issue Date: Aug-20-2009

Print Date:Aug-5-2011