Formic acid

sc-215055

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Formic acid

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
C-O2-H2, CHOOH, "aminic acid", "formylic acid", "hydrogen carboxylic acid", "methanoic acid", "glacial formic acid", "formic acid AR grade", "RCRA Waste Number U123"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	4		
Reactivity:	2		
Chronic:	2		

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

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Harmful if swallowed.
Causes severe burns.
Risk of serious damage to eyes.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ 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 acidic corrosives may produce burns around and in the mouth. the throat and esophagus.
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■ Ingestion of formic acid causes acute local tissue damage with other effects ranging from nausea and dizziness to unconsciousness. Intentional ingestion is reported to produce salivation, vomiting (which may be bloody), a burning sensation in the mouth and pharynx, diarrhoea and severe pain. Circulatory collapse may follow, causing death.
Formic acid might directly damage clotting factors leading to increases in haemorrhage and bleeding. It has an elimination half-life of 2.5 hours.
■ Ingestion of low-molecular organic acid solutions may produce spontaneous hemorrhaging, production of blood clots, gastrointestinal damage and narrowing of the esophagus and stomach entry.

EYE

■ The material can produce severe 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.
■ Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.
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■ Solutions of low-molecular weight organic acids cause pain and injuryto the eyes.
■ Eye contact with formic acid liquid or high vapour concentrations will produce irritation and conjunctivitis and may cause corneal burns.

SKIN

■ The material can produce severe chemical burns following direct contactwith the skin.
■ Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
■ 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.
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■ Skin contact with formic acid may cause irritation and burns with possible chronic effects from repeated exposures. A worker receiving splashes of hot formic acid to the face developed marked dyspnea with difficulty in swallowing, inability to speak and died 6 hours later. The liquid causes burns with vesiculation, and keloid scars may often develop at the site. It is not clear whether irritancy is due to acid effects or whether it is due to the fact that formic acid may react as an aldehyde.
■ 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 can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.
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■ Excessive inhalation of formic acid vapours can produce coughing, difficulty in breathing , possible bronchitis, headache, and body weakness. However, the warning properties of formic acid minimize the chances of systemic effects occurring as a result of inhalation. Workers exposed to 15 ppm of a mixture of formic and acetic acid complained of nausea.

CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.
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Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Chronic occupational exposures to formic acid may produce nausea and albumin or blood in the urine.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
formic acid	64-18-6	>98
water	7732-18-5	<2

Section 4 - FIRST AID MEASURES

SWALLOWED
· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE
■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

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

NOTES TO PHYSICIAN
■ For acute or short term repeated exposures to strong acids:
· Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
· Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.
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.
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Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	33.753 @ 20 deg.C
Upper Explosive Limit (%):	57
Specific Gravity (water=1):	1.22 @ 20 deg.C
Lower Explosive Limit (%):	12

EXTINGUISHING MEDIA
· Alcohol stable foam.
· Water spray or fog.
· Foam.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· Wear full body protective clothing with breathing apparatus.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
■ Combustion products include: carbon monoxide (CO), carbon dioxide (CO_2), other pyrolysis products typical of burning organic material.
· Combustible.
· Slight fire hazard when exposed to heat or flame.

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.
Full face- shield.
Gloves:
1.BUTYL 2.NATURAL RUBBER 3.PVC
Respirator:
Powered Respirator.
Acid vapour Type B cartridge/ canister.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Clean up all spills immediately.
· Avoid breathing vapors and contact with skin and eyes.
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

· DO NOT allow clothing wet with material to stay in contact with skin.
· Avoid all personal contact, including inhalation.
· Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

■ DO NOT repack. Use only containers as originally supplied by manufacturer.
DO NOT use aluminum or galvanized containers.
Check regularly for spills and leaks.
· DO NOT use aluminium, galvanised or tin-plated containers.
· Lined metal can, Lined metal pail/drum
· Plastic pail.
For low viscosity materials
· Drums and jerricans must be of the non-removable head type.
· Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

· WARNING: Decomposition may occur after prolonged storage.
Rotate all stock to prevent ageing. Use on FIFO (First In-First Out) basis.
· Store in original containers.
· Keep containers securely sealed.
· Pure formic acid slowly decomposes releasing toxic carbon monoxide and may pressurise containers.
· Water in less concentrated acid improves stability.
· Extreme care needed in opening containers of unknown age.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Notes
Canada - Alberta Occupational Exposure Limits	formic acid (Formic acid)	5	9.4	10	19	
Canada - British Columbia Occupational Exposure Limits	formic acid (Formic acid)	5		10		
Canada - Ontario Occupational Exposure Limits	formic acid (Formic acid)	5		10		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	formic acid (Formic acid)	5	9			
US ACGIH Threshold Limit Values (TLV)	formic acid (Formic acid)	5		10		TLV Basis: upper respiratory tract, eye & skin irritation
US NIOSH Recommended Exposure Limits (RELs)	formic acid (Formic acid)	5	9			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	formic acid (Formic acid)	5	9			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	formic acid (Formic acid)	5	9			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	formic acid (Formic acid)	5	9			

US - Minnesota Permissible Exposure Limits (PELs)	formic acid (Formic acid)	5	9			
US - California Permissible Exposure Limits for Chemical Contaminants	formic acid (Formic acid)	5	9	10	19	
US - Idaho - Limits for Air Contaminants	formic acid (Formic acid)	5	9			
US - Hawaii Air Contaminant Limits	formic acid (Formic acid)	5	9	10	18	
US - Alaska Limits for Air Contaminants	formic acid (Formic acid)	5	9			
US - Michigan Exposure Limits for Air Contaminants	formic acid (Formic acid)	5	9			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	formic acid (Formic acid)	5	9	5	9	
US - Washington Permissible exposure limits of air contaminants	formic acid (Formic acid)	5		10		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	formic acid (Formic acid)	5		10		
Canada - Prince Edward Island Occupational Exposure Limits	formic acid (Formic acid)	5		10		TLV Basis: upper respiratory tract, eye & skin irritation
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	formic acid (Formic acid)	5	9			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	formic acid (Formic acid)	5	9.4	10	19	
US - Oregon Permissible Exposure Limits (Z-1)	formic acid (Formic acid)	5	9			
Canada - Northwest Territories Occupational Exposure Limits (English)	formic acid (Formic acid)	5	9	10	18	
Canada - Nova Scotia Occupational Exposure Limits	formic acid (Formic acid)	5		10		TLV Basis: upper respiratory tract, eye & skin irritation

ENDOELTABLE
The following materials had no OELs on our records

- water: CAS:7732-18-5

PERSONAL PROTECTION

RESPIRATOR

BR3
BR4

Consult your EHS staff for recommendations

EYE

· Chemical goggles.
· Full face shield.

HANDS/FEET

■ Elbow length PVC gloves.
· When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.
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.
· Neoprene rubber gloves.

OTHER

· Overalls.
· PVC Apron.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.
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The ventilation equipment used should be acid-proof and of explosion-proof design.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Mixes with water.
Corrosive.
Acid.

State	Liquid	Molecular Weight	46.03
Melting Range (°F)	47.12	Viscosity	Not Available
Boiling Range (°F)	213.44	Solubility in water (g/L)	Miscible
Flash Point (°F)	156.002 OC @ 90%	pH (1% solution)	2.2
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	896	Vapor Pressure (mmHg)	33.753 @ 20 deg.C
Upper Explosive Limit (%)	57	Specific Gravity (water=1)	1.22 @ 20 deg.C
Lower Explosive Limit (%)	12	Relative Vapor Density (air=1)	1.6
Volatile Component (%vol)	Not available.	Evaporation Rate	0.4 (CCl4 = 1)

APPEARANCE

Clear corrosive and combustible liquid with pungent, penetrating odour. Miscible with water, alcohol, ether and glycerol. 99% material freezes @ 8 deg C. Use care in remelting. The pure substance with little or no water is described as "glacial formic acid". Concentrated (90%) but not glacial acid has improved stability. Physical properties, flash point etc varies with concentration.

log Kow -1.55- -0.22

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of heat source and ignition source.
· Contact with alkaline material liberates heat.
· Presence of incompatible materials.
· Product is considered stable.
Undergoes slow decomposition at room temperature, and will build up pressure in a sealed, unvented container.

STORAGE INCOMPATIBILITY

· 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.
Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.
· Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
Formic acid:
· reacts explosively or violently strong oxidisers, with hydrogen peroxide, furfuryl alcohol, hypochlorites, isocyanides, nitromethane, chromic acid, nitric acid, phosphorus pentaoxide, strong bases thallium nitrate, nitromethane.
· reacts with concentrated sulfuric acid to produce carbon dioxide
· is incompatible with alkalis, ammonia, aliphatic amines, alkanolamines, furfuryl alcohol, isocyanates, alkylene oxides, epichlorohydrin, palladium
· is a strong reducing agent
· attacks aluminium, cast iron and steel, some plastics, rubber and coatings
· slowly decomposes in storage forming carbon dioxide gas.
· Avoid strong bases.
Segregate from alkalis, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

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

Section 11 - TOXICOLOGICAL INFORMATION

FORMIC ACID

TOXICITY AND IRRITATION

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

TOXICITY	IRRITATION
Oral (rat) LD50: 1100 mg/kg	Skin (rabbit): 610 (open) - Mild
Inhalation (rat) LC50: 15000 mg/m³/15m	Eye (rabbit): 122 mg - SEVERE
Intravenous (Rabbit) LD: 239 mg/kg	
Oral (Human) TDLo: 2200 mg/kg	
Oral (Mouse) LD50: 700 mg/kg	
Intraperitoneal (Mouse) LD50: 940 mg/kg	
Intravenous (Mouse) LD50: 145 mg/kg	
Oral (Human) LD: 2.44 mg/kg	

■ 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.
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 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.

WATER:

■ No significant acute toxicological data identified in literature search.

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
formic acid	LOW		HIGH	HIGH

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 _____ Formic 809 356 0 NI 0 R 2 NI 1 (1) 2 3C 3 D 3 acid / CAS:64- 18- 6 / LQ4900000

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

US EPA Waste Number & Descriptions

A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)
B. Component Waste Numbers
When formic acid 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 U123 (waste code C,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. 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.
· 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: 8
Identification Numbers: UN1779 PG: II
Label Codes: 8, 3 Special provisions: B2, B28,
IB2, T7,
TP2
Packaging: Exceptions: 154 Packaging: Non- bulk: 202
Packaging: Exceptions: 154 Quantity limitations: 1 L
Passenger aircraft/rail:
Quantity Limitations: Cargo 30 L Vessel stowage: Location: A
aircraft only:
Vessel stowage: Other: 40.
Hazardous materials descriptions and proper shipping names:
Formic acid with more than 85% acid by mass

Air Transport IATA:

ICAO/IATA Class: 8 ICAO/IATA Subrisk: 3
UN/ID Number: 1779 Packing Group: II
Special provisions: None
Cargo Only
Packing Instructions: 812 Maximum Qty/Pack: 30 L
Passenger and Cargo Passenger and Cargo
Packing Instructions: 808 Maximum Qty/Pack: 1 L
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y808 Maximum Qty/Pack: 0.5 L
Shipping Name: FORMIC ACID

Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: 3
UN Number: 1779 Packing Group: II
EMS Number: F-E , S-C Special provisions: None
Limited Quantities: 1 L
Shipping Name: FORMIC ACID with more than 85% acid, by mass

Section 15 - REGULATORY INFORMATION

REGULATIONS

formic acid (CAS: 64-18-6) 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 - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","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)","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) Survey: Transparency List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont 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 Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US 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 Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US EPCRA Section 313 Chemical List","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 NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","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 Toxic Substances Control Act (TSCA) - Inventory"

Regulations for ingredients

water (CAS: 7732-18-5) is found on the following regulatory lists;

"Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","IMO IBC Code Chapter 18: List of products to which the Code does not apply","International Fragrance Association (IFRA) Survey: Transparency List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Pennsylvania - Hazardous Substance List","US DOE Temporary Emergency Exposure Limits (TEELs)","US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 8 (a) Inventory Update Rule (IUR) - Partial Exemptions"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.

* (limited evidence).

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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