

Dimethyl glutarate

sc-255106



The Power to Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

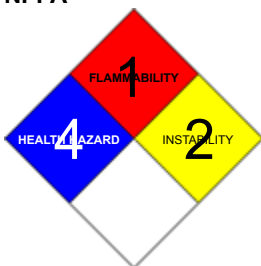
PRODUCT NAME

Dimethyl glutarate

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-H12-O4, "dibasic glutaric acid methyl ester", dimethylglutarate, "dibasic ester DBE-5", "pentanedioic acid dimethyl ester", dimethylpentanedioate

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.

HARMFUL - May cause lung damage if swallowed.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result.

(ICSC13733).

■ Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.

g.

EYE

■ There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation.

Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.

SKIN

■ Skin contact with the material may damage the health of the individual; systemic effects may result following 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.

■ Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

■ 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.

■ Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae.

Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision.

■ The main effects of simple esters are irritation, stupor and insensibility.

Headache, drowsiness, dizziness, coma and behavioral changes may occur.

CHRONIC HEALTH EFFECTS

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

Long-term exposure to methanol vapor, at concentrations exceeding 3000 ppm, may produce cumulative effects characterized by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.

Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS].

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
dimethyl glutarate	1119-40-0	99
methanol	67-56-1	< 0.1
hydrogen cyanide	74-90-8	0.0003 app

Section 4 - FIRST AID MEASURES

SWALLOWED

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

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

- Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically.

for simple esters

BASIC TREATMENT

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

For acute and short term repeated exposures to methanol

- Toxicity results from accumulation of formaldehyde/formic acid.
- Clinical signs are usually limited to CNS, eyes and GI tract. Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	0.105 @ 20 C
Upper Explosive Limit (%)	7.9
Specific Gravity (water=1)	1.09 @ 20C
Lower Explosive Limit (%)	0.9

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.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.

Combustion products include carbon dioxide (CO₂), aldehydes, other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

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

FIRE INCOMPATIBILITY

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

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.

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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/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	dimethyl glutarate (Methanol (Methyl alcohol))	200	262	250	328				
Canada - British Columbia Occupational Exposure Limits	dimethyl glutarate (Methanol)	200		250					Skin
US - Minnesota Permissible Exposure Limits (PELs)	dimethyl glutarate (Methyl alcohol)	200	260	250	325				
US NIOSH Recommended Exposure Limits (RELs)	dimethyl glutarate (Methyl alcohol)	200	260	250	325				[skin]
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	dimethyl glutarate (Methyl alcohol)	200	260	250	325				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	dimethyl glutarate (Methyl alcohol)	200	260						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for	dimethyl glutarate (Methyl alcohol)	200	260	250	310				

Air Contaminants							
US - California Permissible Exposure Limits for Chemical Contaminants	dimethyl glutarate (Methyl alcohol; methanol)	200	260	250	325	1000	
US - Idaho - Limits for Air Contaminants	dimethyl glutarate (Methyl alcohol)	200	260				
US - Hawaii Air Contaminant Limits	dimethyl glutarate (Methyl alcohol (methanol))	200	260	250	325		
US - Alaska Limits for Air Contaminants	dimethyl glutarate (Methyl alcohol (Methanol))	200	260	250	310		
US - Michigan Exposure Limits for Air Contaminants	dimethyl glutarate (Methyl alcohol)	200	260	250	325		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	dimethyl glutarate (Methyl alcohol (methanol) - Skin)	200	260	250	310		
US - Washington Permissible exposure limits of air contaminants	dimethyl glutarate (Methanol (Methyl alcohol))	200		250			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	dimethyl glutarate (Methyl alcohol (methanol))	200		250			Skin
US - Oregon Permissible Exposure Limits (Z-1)	dimethyl glutarate (Methyl alcohol (methanol))	200	260				
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	dimethyl glutarate (Methyl alcohol)	200	260				
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	dimethyl glutarate (Methyl alcohol)	200	262	250	328		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	dimethyl glutarate (Methyl alcohol)	200	260				
Canada - Northwest Territories Occupational Exposure Limits	dimethyl glutarate (Methyl alcohol (Methanol) - Skin)	200	262	250	328		

(English)						
Canada - Nova Scotia Occupational Exposure Limits	dimethyl glutarate (Methanol)	200	250			TLV Basis headache; eye damage. BEI
Canada - Prince Edward Island Occupational Exposure Limits	dimethyl glutarate (Methanol)	200	250			TLV Basis headache; eye damage. BEI
Canada - Alberta Occupational Exposure Limits	hydrogen cyanide (Cyanide and Cyanide salts and hydrogen cyanide as CN Hydrogen cyanide)			4.7	5.2	
Canada - British Columbia Occupational Exposure Limits	hydrogen cyanide (Hydrogen cyanide, as CN)			4.7		Skin
US - Minnesota Permissible Exposure Limits (PELs)	hydrogen cyanide (Hydrogen cyanide)			4.7	5	
US NIOSH Recommended Exposure Limits (RELs)	hydrogen cyanide (Hydrogen cyanide)			4.7	5	[skin]
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	hydrogen cyanide (Hydrogen cyanide)			4.7	5	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)	10	11			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)			4.7	5	
US - California Permissible Exposure Limits for Chemical Contaminants	hydrogen cyanide (Hydrogen cyanide)	4.7	5			C
US - Idaho - Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)	10	11			
US - Hawaii Air Contaminant Limits	hydrogen cyanide (Hydrogen cyanide)			4.7	5	

US - Alaska Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)			4.7	5		
US - Michigan Exposure Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)			4.7	5		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	hydrogen cyanide (Hydrogen cyanide - Skin)	10	11	15	16		
US - Washington Permissible exposure limits of air contaminants	hydrogen cyanide (Hydrogen cyanide)			4.7			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	hydrogen cyanide (Hydrogen cyanide and cyanide salts, (as CN) Hydrogen cyanide)					4.7	Skin
US - Oregon Permissible Exposure Limits (Z-1)	hydrogen cyanide (Hydrogen cyanide)	10	11				
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	hydrogen cyanide (Hydrogen cyanide)	10	11				
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	hydrogen cyanide (Hydrogen cyanide)					10	11
US OSHA Permissible Exposure Levels (PELs) - Table Z1	hydrogen cyanide (Hydrogen cyanide)	10	11				
Canada - Northwest Territories Occupational Exposure Limits (English)	hydrogen cyanide (Hydrogen cyanide - Skin)					10	11
Canada - Nova Scotia Occupational Exposure Limits	hydrogen cyanide (Hydrogen cyanide)					4.7	Measured as CN. TLV Basis upper respiratory tract irritation; headache; nausea; thyroid effects
Canada - Prince Edward Island Occupational	hydrogen cyanide (Hydrogen cyanide)					4.7	Measured as CN. TLV Basis upper respiratory tract

Exposure Limits

irritation;
headache;
nausea; thyroid
effects

PERSONAL PROTECTION



RESPIRATOR

•Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

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

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

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	160.17
Melting Range (°F)	-35	Viscosity	Not Available

Boiling Range (°F)	410- 419	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	225	pH (1% solution)	Not available
Decomposition Temp (°F)	Not available	pH (as supplied)	7 approx
Autoignition Temp (°F)	689	Vapor Pressure (mmHg)	0.105 @ 20 C
Upper Explosive Limit (%)	7.9	Specific Gravity (water=1)	1.09 @ 20C
Lower Explosive Limit (%)	0.9	Relative Vapor Density (air=1)	> 1.0
Volatile Component (%vol)	100	Evaporation Rate	Very Slow

APPEARANCE

Combustible liquid; slightly soluble in water. Ester like odor. Water solubility is 4.3 % @ 20C

log Kow -0.82- -0.66 log Kow 0.35-1.07

Material	Value
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Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

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

STORAGE INCOMPATIBILITY

! Dibasic esters

- react with strong oxidisers with risk of fire and/ or explosion
- are incompatible with strong acids, nitrates
- Esters react with acids to liberate heat along with alcohols and acids.
- Strong oxidizing acids may cause a vigorous reaction with esters that is sufficiently exothermic to ignite the reaction products.

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

Section 11 - TOXICOLOGICAL INFORMATION

dimethyl glutarate

TOXICITY AND IRRITATION

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

METHANOL

DIMETHYL GLUTARATE

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.

DIMETHYL GLUTARATE

TOXICITY	IRRITATION
Oral (rat) LD50 5000 mg/mg	Eye (rabbit) Irritant
Oral (mouse) LD50 2227 mg/kg	Skin (human) Irritant

[Manuf. DU]

The family of dibasic (methyl) esters (DBEs) comprise dimethyl succinate (DMS, CAS No. 106-65-0), dimethyl glutarate (DMG, CAS No. 1119-40-0), and dimethyl adipate (DMA, CAS No. 627-93-0), and their mixture DBE (CAS No. 95481-62-2). A crude dibasic ester mixture is distilled to produce DMS, DMG, and DMA and three other fractions that are mixtures of these esters generally composed of 10-25, 55-65, and 15-25% DMA, DMG, and DMS, respectively. The three discrete compounds are all short four-to six-carbon straight-chain dicarboxylic acid dimethyl esters differing incrementally by one carbon atom. The four members of the category produce similar levels of acute and repeated-dose toxicity in experimental animals

DBEs have very low acute oral toxicities with LD50 s in rats generally > 5,000 mg/kg (with two exceptions reported as >500 and <5,000 mg/kg b.wt. for DBE (the mixture) and DMS

By skin absorption, DBEs have a low order of acute toxicity to rabbits with dermal LD50s of 3,000 mg/kg . Based

upon the most recent GLP studies DBEs are not considered to produce primary dermal irritation as defined in EPA Guidelines . Earlier studies did show moderate irritation in one of six rabbits, but these results were not repeated in later studies. All four DBE materials are considered to produce eye irritation as defined by EPA Guidelines. Mild to moderate irritation involving the cornea was observed in rabbits with recovery by 7 days. DBEs are not skin sensitizers, and are not harmful via skin or inhalation exposures. DBE is slightly toxic by inhalation with 1-and 4-hour LC50s in rats of > 10.7 and > 11 mg/L, respectively. In subchronic inhalation studies with all four DBEs, degeneration of the olfactory epithelium of the nose was observed. This change in the nasal tissues is related to enzymatic hydrolysis of DBE within the nasal cavity. However, risk to human nasal tissue due to DBE toxicity is likely to be reduced when compared to rats since DBEs are hydrolysed more slowly in humans. No information is available on the carcinogenic potential of DBEs. A range of studies with DMS, DMG, DMA and DBE did not produce genetic damage in animals or bacterial cell cultures. DBE was positive in one study with cultured mammalian cells, but the positive findings were not apparent when the assay was repeated. Testing in rats indicates DBEs are not developmental or reproductive toxicants.

TOXICITY	IRRITATION
METHANOL	
Oral (human) LDLo 143 mg/kg	Skin (rabbit) 20 mg/24 h-Moderate
Oral (man) LDLo 6422 mg/kg	Eye (rabbit) 40 mg-Moderate
Oral (man) TDLo 3429 mg/kg	Eye (rabbit) 100 mg/24h-Moderate
Oral (rat) LD50 5628 mg/kg	
Inhalation (human) TClO 86000 mg/m ³	
Inhalation (human) TClO 300 ppm	
Inhalation (rat) LC50 64000 ppm/4h	
Dermal (rabbit) LD50 15800 mg/kg	

HYDROGEN CYANIDE

Oral (human) TDLo 0.57 mg/kg	Nil Reported
Inhalation (man) LCLo 400 mg/m ³ /2m	
Inhalation (human) TClO 500 mg/m ³ /3m	
Inhalation (human) TClO 200 mg/m ³ /10m	
Inhalation (human) TClO 120 mg/m ³ /1h	
Inhalation (rat) LC50 484 ppm/5m	

CARCINOGEN

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

SKIN

methanol	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
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methanol	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
methanol	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
methanol	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis headache; eye damage. BEI
methanol	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes
methanol	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
methanol	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
methanol	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
methanol	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
methanol	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
methanol	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
methanol	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
methanol	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
methanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
methanol	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
methanol	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1
hydrogen cyanide	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin	Skin Designation	X
hydrogen cyanide	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
hydrogen cyanide	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
hydrogen cyanide	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
hydrogen cyanide	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	Measured as CN. TLV Basis upper respiratory tract irritation; headache; nausea; thyroid effects
hydrogen cyanide	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes

hydrogen cyanide	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELS) - Skin	Skin	X
hydrogen cyanide	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELS) - Skin	Skin	X
hydrogen cyanide	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
hydrogen cyanide	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
hydrogen cyanide	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
hydrogen cyanide	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
hydrogen cyanide	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
hydrogen cyanide	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
hydrogen cyanide	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
hydrogen cyanide	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
hydrogen cyanide	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

No data

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															

Dimethyl glutara te / CAS:111 9- 40- 0 /	670	265	0	0	R	3	NI	0	0	2	3	2	A	SD	3
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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=Acute mammalian 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

B. Component Waste Numbers

When methanol 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 U154 (waste code I).

When hydrogen cyanide 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 P063 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

‡ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION

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

Section 15 - REGULATORY INFORMATION

dimethyl glutarate (CAS: 1119-40-0) is found on the following regulatory lists;

"GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Fragrance Association (IFRA) Survey: Transparency List", "US DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes", "US EPA High Production Volume Program Chemical List", "US EPA Master Testing List - Index I Chemicals Listed", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Section 4/12 (b) - Sunset Date/Status"

Regulations for ingredients

methanol (CAS: 67-56-1) 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 - 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 Other Liquid Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELS)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut - Regulations Concerning the Designation of Controlled Drugs - Volatile substances","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","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 Permissible Exposure Limits (Z-1)","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","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 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 CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe, with qualifications","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 DOT Coast Guard Bulk Hazardous Materials - List of Flammable and Combustible Bulk Liquid Cargoes","US EPA Acute Exposure Guideline Levels (AEGs) - Interim","US EPA High Production Volume Program Chemical List","US EPCRA Section 313 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 List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 30A Typical Flammable and Combustible Liquids Found at Motor Fuel Dispensing Facilities","US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion","US NIOSH Recommended Exposure Limits (RELS)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

hydrogen cyanide (CAS: 74-90-8) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Chemical Weapons Schedule 3 (English)","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)","Canada Transport Dangerous Goods - Schedule 3","Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (English)","International Air Transport Association (IATA) Dangerous Goods Regulations","International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List","International Council of Chemical Associations (ICCA) - High Production Volume List","International Maritime Dangerous Goods Requirements (IMDG Code) - Goods Forbidden for Transport","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 - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US -

Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Hazardous Materials", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous Constituents", "US - Vermont Hazardous Waste - Acutely Hazardous Wastes", "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 - ""P"" 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 ACGIH Threshold Limit Values (TLV)", "US CERCLA Priority List of Hazardous Substances", "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 Department of Transportation (DOT) Marine Pollutants - Appendix B", "US Department of Transportation (DOT), Hazardous Material Table", "US Department of Transportation (DOT), Hazardous Material Table : Goods Forbidden for Transport", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA Acute Exposure Guideline Levels (AEGs) - Final", "US EPA High Production Volume Chemicals Additional List", "US EPA Master Testing List - Index I Chemicals Listed", "US EPCRA Section 313 Chemical List", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US 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 Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation and/or skin contact may produce health damage*.
- Cumulative effects may result following exposure*.
- May produce discomfort of the eyes, respiratory tract and skin*.
- Repeated exposure potentially causes skin dryness and cracking*.
- Vapours potentially cause drowsiness and dizziness*.

* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
dimethyl glutarate	1119- 40- 0	Mut3; R68
methanol	67- 56- 1	Mut3; R68
hydrogen cyanide	74- 90- 8	Mut3; R68

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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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