Hexylene glycol



Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Hexylene glycol

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.



SUPPLIER

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SYNONYMS

C6-H14-O2, "2, 4-dihydroxy-2-methylpentane", Diolane, Isol, "2-methyl pentane-2, 4-diol", "2-methyl-2, 4-pentanediol", "alpha, alpha, alpha-trimethyltrimethylene glycol", "2, 4-pentanediol, 2-methyl-"



Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

HARMFUL - May cause lung damage if swallowed. Irritating to eyes and skin.

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).

Accidental ingestion of the material may be damaging to the health of the individual.

Symptoms of over-exposure to hexylene glycol include stimulation of the central nervous system followed by depression, drowsiness, vomiting, coma, respiratory failure, convulsions, renal damage and death.

Lethal doses in animals progress to a narcosis lasting for several days; death was delayed for 1-4 days.

Overexposure to non-ring alcohols causes nervous system symptoms.

These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma.

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

The material may accentuate any pre-existing dermatitis condition.

■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.

■ When hexylene glycol was applied as a dressing to paediatric burn patients, 36 out of 483 exhibited highly variable periods of coma (hours to weeks) with almost half of the comatose group eventually dying as a result of renal failure.

Most liquid alcohols appear to act as primary skin irritants in humans.

Significant percutaneous absorption occurs in rabbits but not apparently in man.

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.

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.

INHALED

The material is not thought to produce respiratory irritation (as classified using animal models).

Nevertheless inhalation of vapors, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

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

■ Aliphatic alcohols with more than 3-carbons cause headache, dizziness, drowsiness, muscle weakness and delirium, central depression, coma, seizures and behavioral changes.

Secondary respiratory depression and failure, as well as low blood pressure and irregular heart rhythms, may follow.

CHRONIC HEALTH EFFECTS

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

Animal feeding studies with hexylene glycol produce evidence of slight liver and kidney changes.

	Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS			
NAME	CAS RN	%		
hexylene glycol	107-41-5	>98		

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. · 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.

To treat poisoning by the higher aliphatic alcohols:

· Gastric lavage with copious amounts of water.

· It may be beneficial to instill 60 ml of mineral oil into the stomach.

Section 5 - FIRE FIGHTING MEASURES				
Vapor Pressure (mmHg):	0.075 @ 20 C.			
Upper Explosive Limit (%):	7.4 (estimated)			
Specific Gravity (water=1):	0.924 @ 15 C.			
Lower Explosive Limit (%):	1.3 calculated			

EXTINGUISHING MEDIA

· Alcohol stable foam.

· Dry chemical powder.

FIRE FIGHTING

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

 \cdot 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), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

FIRE INCOMPATIBILITY

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

PERSONAL PROTECTION

Glasses: Chemical goggles. Gloves: Respirator: Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

· Remove all ignition sources.

- · Clean up all spills immediately.
- MAJOR SPILLS
- Moderate hazard.
- \cdot 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

 \cdot DO NOT allow clothing wet with material to stay in contact with skin.

- · Avoid all personal contact, including inhalation.
- \cdot 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.
- 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
Canada - Alberta Occupational Exposure Limits	hexylene glycol (Hexylene glycol)					25	121		
Canada - British Columbia Occupational Exposure Limits	hexylene glycol (Hexylene glycol)					25			
US ACGIH Threshold Limit Values (TLV)	hexylene glycol (Hexylene glycol)					25			TLV Basis: eye & upper respiratory tract irritation
US NIOSH Recommended Exposure Limits (RELs)	hexylene glycol (Hexylene glycol)					25	125		
US - Minnesota Permissible Exposure Limits (PELs)	hexylene glycol (Hexylene glycol)					25	125		
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	hexylene glycol (Hexylene glycol)					25	125		
US - California Permissible Exposure Limits for Chemical Contaminants	hexylene glycol (Hexylene glycol)	25	125			С			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	hexylene glycol (Hexylene glycol)					25	125		
US - Hawaii Air Contaminant Limits	hexylene glycol (Hexylene glycol)					25	125		
US - Alaska Limits for Air Contaminants	hexylene glycol (Hexylene glycol)					25	125		

US - Washington Permissible exposure limits of air contaminants	hexylene glycol (Hexylene glycol)	25		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	hexylene glycol (Hexylene glycol)	25		
US - Michigan Exposure Limits for Air Contaminants	hexylene glycol (Hexylene glycol)	25	125	
Canada - Prince Edward Island Occupational Exposure Limits	hexylene glycol (Hexylene glycol)	25		TLV Basis: eye & upper respiratory tract irritation
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	hexylene glycol (Hexylene glycol)	25	121	
Canada - Northwest Territories Occupational Exposure Limits (English)	hexylene glycol (Hexylene glycol)	25	120	
Canada - Nova Scotia Occupational Exposure Limits	hexylene glycol (Hexylene glycol)	25		TLV Basis: eye & upper respiratory tract irritation

ENDOELTABLE

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.
- 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.
- \cdot 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. Mixes with water.			
State	Liquid	Molecular Weight	118.17
Melting Range (°F)	-40	Viscosity	36 cSt@40°C
Boiling Range (°F)	389	Solubility in water (g/L)	Miscible
Flash Point (°F)	199	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	583	Vapor Pressure (mmHg)	0.075 @ 20 C.
Upper Explosive Limit (%)	7.4 (estimated)	Specific Gravity (water=1)	0.924 @ 15 C.
Lower Explosive Limit (%)	1.3 calculated	Relative Vapor Density (air=1)	4.0
Volatile Component (%vol)	100	Evaporation Rate	0.01 BuAc=1

APPEARANCE

Colourless, nearly odourless combustible liquid. Mixes with water, lower aliphatic hydrocarbons and fatty acids.

log Kow -0.14 Hexylene glycol is a liquid, melting point – 50 C, boiling point 197.5 C, vapour pressure 0.07 hPa at 20 C, it is fully miscible in water and has a calculated n-octanol water partition coefficient (log Kow) of 0.58. Hexylene glycol is predicted to distribute in the environment primarily to water or water and soil. Based on a calculated log Kow of 0.58 which suggests a log Koc of <1, hexylene glycol has low potential to bioaccumulate (BCF=3) and low potential for sorption to soil. In water, hydrolysis and photodegradation are not expected to occur. Hexylene glycol is at least inherently biodegradable.

Material

Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of incompatible materials.

· Product is considered stable.

STORAGE INCOMPATIBILITY

Hexylene glycol:

· is incompatible with strong oxidisers, sulfuric acid, nitric acid, caustics, aliphatic amines, isocyanates. Avoid storage with strong acids, acid chlorides, acid anhydrides, oxidizing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

hexylene glycol

TOXICITY AND IRRITATION

HEXYLENE GLYCOL:					
unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.					
TOXICITY	IRRITATION				
Oral (rat) LD50: 3700 mg/kg	Skin (rabbit):465 mg open-Mild				
Inhalation (human) TCLo: 50 ppm/15m	Skin (rabbit):465mg/24hr-Moderate				

Inhalation (human) TCLo: 50 ppm

Dermal (rabbit) LD50: 8560 mg/kg

For hexylene glycol

Acute toxicity: Hexylene glycol is of relatively low acute toxicity to mammals, the acute oral LD50 is >2000 and <5000 mg/kg (range >2000-4700 mg/kg) while the dermal LD50 is >2000 mg/kg (range >1.84-12.3 g/kg). The acute inhalational LC50 is ³ the saturated vapour concentration. Skin and eye irritation guideline studies indicate that hexylene glycol has low potential to irritate the skin and is slightly irritating to the eye. Skin and eye effects are reversible. Hexylene glycol is not a skin sensitiser.

Repeat dose toxicity: Repeated exposure by oral gavage to rats at 50, 150 or 450 mg/kg/day hexylene glycol for 90 days, with additional animals at the top dose also allowed a 4 week exposure-free recovery period, resulted in hepatocellular hypertrophy and increased liver weight, male rat specific nephropathy and inflammatory changes in the forestomach and to a lesser extent the glandular stomach. The liver changes were reversible and considered an adaptive physiological response to increased metabolic demand. The male rat nephropathy was partially reversible and associated with an increased severity of acidophilic globules, subsequently identified by specific staining (Masson's trichrome) as alpha-2-microglobulins, and considered of questionable biological significance to humans. Changes in the stomach (reversible) and forestomach (partially reversible) were considered attributable to local irritation induced by the gavage

procedure. The NOAEL for this local effect being 50 mg/kg/day. The systemic NOAEL for this guideline study is considered to be 450 mg/kg/day with a no effect level for local irritation to the stomach and forestomach of 50 mg/kg/day.

Genotoxicity: Hexylene glycol is not genotoxic in either mammalian or non-mammalian cells in vitro.

Reproductive and developmental toxicity: No standard fertility studies are available. No effects on the gonads were observed in a good quality 90-day oral gavage study in rats, which were, administered hexylene glycol at doses up to 450 mg/kg/day by oral gavage.

In a good quality developmental toxicity study, in which rats received 30, 300 or 1000 mg/kg/day hexylene glycol by oral gavage, the LOAEL for maternal toxicity was 1000 mg/kg/day, based on slightly reduced weight gain at this top dose level. Greater pre-implantation loss observed at this dose level may be regarded of questionable biological significance. This dose level was also the LOAEL for foetotoxicity based on a, slight delay in ossification, a greater number of foetuses with extra thoraco-lumbar ribs, and a slight decrease (not statistically significant) in foetal body weight. There was no evidence of teratogenicity up to the limit dose of 1000 mg/kg.

CARCINOGEN

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

Section 12 - ECOLOGICAL INFORMATION

No data

Ecotoxicity						
Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility		
		No Data Available	LOW	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 _____

____ ___ ___ ___ ___ ___ ___ ___ ___ Hexylene 859 388 0 0 R 0 0 0 0 (2) 2 2 D 2 glycol / CAS:107- 41- 5 /

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.

| 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.

 \cdot 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

hexylene glycol (CAS: 107-41-5,99210-90-9) 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 Domestic Substances List (DSL)", "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 18: List of products to which the Code does not apply","IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances","International Council of Chemical Associations (ICCA) - High Production Volume List","International Fragrance Association (IFRA) Survey: Transparency List","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 - 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 - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US -Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants"."US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants"."US -Washington Permissible exposure limits of air contaminants", "US ACGIH Threshold Limit Values (TLV)", "US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe as used", "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 NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion", "US NIOSH Recommended Exposure Limits (RELs)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation and/or ingestion may produce health damage*.
- Cumulative effects may result following exposure*.
- Repeated exposure potentially causes skin dryness and cracking*.
- Vapours potentially cause drowsiness and dizziness*.
- * (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name CAS hexylene glycol 107-41-5, 99210-90-9

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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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