

Dioxane

SECTION 1. IDENTIFICATION

Product Identifier	Dioxane
Other Means of Identification	p-Dioxane, Diethylene oxide
Product Code(s)	DI5810
Product Family	Organic solution
Recommended Use	Laboratory research purposes.
Restrictions on Use	None known.
Supplier Identifier	Alphachem Limited, 2485 Milltower Court, Mississauga, Ontario, L5N 5Z6, (905) 821-2995
Emergency Phone No.	CANUTEC CANADA, 613-996-6666, 24 Hours
SDS No.	1414

SECTION 2. HAZARD IDENTIFICATION

Classified according to Canada's Hazardous Products Regulations (WHMIS 2015) and the US Hazard Communication Standard (HCS 2012).

Classification

Flammable liquid - Category 2; Eye irritation - Category 2A; Carcinogenicity - Category 2; Specific target organ toxicity (single exposure) - Category 3; Specific target organ toxicity (repeated exposure) - Category 2

Label Elements



Signal Word:
Danger

Hazard Statement(s):

Highly flammable liquid and vapour.
Causes serious eye irritation.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Suspected of causing cancer.
May cause damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):

Prevention:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

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Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical, ventilating, and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands and skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:

IF ON SKIN: Wash with plenty of water.

If skin irritation occurs: Get medical advice/attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

If eye irritation persists: Get medical advice or attention.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

If exposed or concerned: Call a POISON CENTRE or doctor.

Storage:

Store in a dry place. Store in a closed container.

Disposal:

Dispose of contents and container in accordance with local, regional, national and international regulations.

Other Hazards

May form explosive peroxides.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance:

Chemical Name	CAS No.	%	Other Identifiers	Other Names
1,4-Dioxane	123-91-1	>= 99	p-Dioxane, Diethylene oxide	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Remove source of exposure or move to fresh air. If breathing has stopped, trained personnel should begin rescue breathing. Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor.

Skin Contact

Rinse with lukewarm, gently flowing water for 5 minutes. If skin irritation occurs, get medical advice or attention.

Eye Contact

Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Immediately call a Poison Centre or doctor. Specific treatment is required.

Ingestion

Rinse mouth with water. Do not induce vomiting. Immediately call a Poison Centre or doctor.

First-aid Comments

Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact.

All first aid procedures should be periodically reviewed by a doctor familiar with the material or its conditions of use in the workplace.

Most Important Symptoms and Effects, Acute and Delayed

If in eyes: if inhaled and/or swallowed and/or on skin: can irritate the nose and throat. Symptoms may develop hours after exposure and are made worse by physical effort.

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Immediate Medical Attention and Special Treatment

Special Instructions

General advice, consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog. Special "alcohol resistant fire-fighting foams".

Unsuitable Extinguishing Media

Water may be ineffective. Do not use a solid stream of water as it may scatter and spread fire.

Specific Hazards Arising from the Product

Highly flammable liquid and vapour. Can ignite at room temperature. Releases vapour that can form explosive mixture with air. May travel a considerable distance to a source of ignition and flash back to a leak or open container. Heating increases the release of toxic vapour. Closed containers may rupture violently when heated releasing contents. In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide; irritating chemicals.

Special Protective Equipment and Precautions for Fire-fighters

Evacuate area. Fight fire from a safe distance or a protected location. Approach fire from upwind to avoid hazardous vapours or gases. Knock down vapours or gases with water fog or fine water spray. Use water spray to dilute spills to non-flammable mixtures. Use water spray to flush spills away from ignition sources. For a massive fire, immediately evacuate the area and use unmanned hose holder or monitor nozzles. Dike and recover contaminated water for appropriate disposal.

Fire-fighters may enter the area if positive pressure SCBA and full Bunker Gear is worn.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Increase ventilation to area or move leaking container to a well-ventilated and secure area. Eliminate all ignition sources. Use grounded, explosion-proof equipment. Remove or isolate incompatible materials as well as other hazardous materials. Notify government occupational health and safety and environmental authorities.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway. If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

Methods and Materials for Containment and Cleaning Up

Stop or reduce leak if safe to do so. Contain and soak up spill with absorbent that does not react with spilled product. (e.g. earth, sand).

Small spills or leaks: contain and soak up spill with absorbent that does not react with spilled product. Place used absorbent into suitable, covered, labelled containers for disposal. Flush spill area.

Large spills or leaks: contact emergency services and manufacturer/supplier for advice.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Wear personal protective equipment to avoid direct contact with this chemical. Only use where there is adequate ventilation. Immediately report leaks, spills or failures of the safety equipment (e.g. ventilation system). Eliminate heat and ignition sources such as sparks, open flames, hot surfaces and static discharge. Post "No Smoking" signs. Do not breathe in this product. Avoid generating vapours or mists. Use non-sparking tools. Prevent accidental contact with incompatible chemicals. Keep containers tightly closed when not in use or empty.

Conditions for Safe Storage

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Store in an area that is: cool, dry, well-ventilated, out of direct sunlight and away from heat and ignition sources, separate from incompatible materials (see Section 10: Stability and Reactivity). Protect from conditions listed in Conditions to Avoid in Section 10 (Stability and Reactivity). Clear of combustible and flammable materials (e.g. old rags, cardboard). Keep amount in storage to a minimum.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
1,4-Dioxane	20 ppm A3 Skin		100 ppm Skin			

A3 = Animal carcinogen.

Appropriate Engineering Controls

Use stringent control measures such as process enclosure to prevent product release into the workplace. Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. Provide eyewash in work area, if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles and face shield when contact is possible.

Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.

Suitable materials are: butyl rubber, Barrier® (PE/PA/PE), Silver Shield®, Microchem® 4000, Tychem® CPR 3, Tychem® ThermoPro, Tychem® BR/LV, Tychem® Responder® CSM, Tychem® TK, Tychem® Reflector.

The following materials should NOT be used: natural rubber, neoprene rubber, nitrile rubber, polyvinyl alcohol, polyvinyl chloride, Viton®.

Respiratory Protection

For non-routine or emergency situations: wear a NIOSH approved air-purifying respirator with an organic vapour cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Clear colourless liquid.
Odour	Alcoholic
Odour Threshold	0.8 - 172 ppm (detection)
pH	6.8 - 8.0
Melting Point/Freezing Point	11.8 °C (53.2 °F) (melting); 11.8 °C (53.2 °F) (freezing)
Initial Boiling Point/Range	101.32 °C (214.38 °F)
Flash Point	12 °C (54 °F) (closed cup)
Evaporation Rate	2.17
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	22.0% (upper); 2.0% (lower)
Vapour Pressure	4.13 kPa (30.98 mm Hg) at 20 °C
Vapour Density (air = 1)	3.04 (calculated)
Relative Density (water = 1)	1.03 at 25 °C
Solubility	Soluble in all proportions in water; Soluble in all proportions in common organic solvents.

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Partition Coefficient, n-Octanol/Water (Log Kow)	-0.27
Auto-ignition Temperature	180 °C (356 °F)
Decomposition Temperature	Not available
Viscosity	1.19 mm ² /s at 20 °C (kinematic); 1.23 mPa.s at 20 °C (dynamic)
Other Information	
Physical State	Liquid
Molecular Weight	88.11

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use. Test for peroxide formation before distillation or evaporation.

Chemical Stability

Stable if inhibited.

Possibility of Hazardous Reactions

Reacts in the presence of air. May cause an explosion.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources. Exposure to air. Light. Depletion of inhibitor. Moisture.

Incompatible Materials

Strong oxidizing agents (e.g. perchloric acid), strong acids (e.g. hydrochloric acid), halogens (e.g. chlorine), reducing agents (e.g. hydroquinone).

Hazardous Decomposition Products

Shock-sensitive peroxides; irritating chemicals; very toxic carbon monoxide, carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation; skin contact; eye contact; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
1,4-Dioxane	46 mg/L (rat) (2-hour exposure)	2 mg/kg (rat)	7.6 mg/kg (rabbit)

Skin Corrosion/Irritation

Human experience shows mild irritation.

Serious Eye Damage/Irritation

Animal tests show serious eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Causes nose and throat irritation, lung injury. Symptoms may include headache, nausea, dizziness, drowsiness and confusion.

Ingestion

May be harmful based on animal tests.

Aspiration Hazard

No information was located.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause effects on the central nervous system, harmful effects on the liver, harmful effects on the kidneys. May

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cause damage to organs through prolonged or repeated exposure.

Respiratory and/or Skin Sensitization

Not a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
1,4-Dioxane	Group 2B	A3	Reasonably anticipated	Not Listed

Group 2B – Possibly carcinogenic to humans. A3 – Confirmed animal carcinogen.

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

Conclusions cannot be drawn from the limited studies available.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

This section is not required by WHMIS. This section is not required by OSHA HCS 2012.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of contents and container in accordance with local, regional, national and international regulations.

SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
IMO (Marine)	UN1165	Dioxane	3	II
IATA (Air)	UN1165	Dioxane	3	II
US DOT	UN1165	Dioxane	3	II
Canadian TDG	UN1165	Dioxane	3	II

Special Precautions Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

Listed on the DSL.

USA

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Toxic Substances Control Act (TSCA) Section 8(b)

Listed on the TSCA Inventory.

SECTION 16. OTHER INFORMATION

NFPA Rating	Health - 2	Flammability - 3	Instability - 1
SDS Prepared By	Alphachem Limited		
Phone No.	(905)-821-2995		
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References	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS).		
Disclaimer	This document is offered only as a guide in the safe handling of the above product, and has been prepared from the best information currently available. It is not intended to be all-inclusive and the conditions of use may involve other additional considerations. Since Alphachem Limited cannot anticipate or control the conditions under which the product may be used, it will not be liable for any claims, damages or losses which may result from the use or reliance on any information herein.		

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