

Revision date: 10/25/16

Version: 5

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name/designation:	1,4-Dioxane
Product No.:	BDH83628
Other means of identification: Diethylene Dioxide; Dioxyethylene Ether; p-Dioxane; Diox, Diethylene Ether, Glycol Ethylene Ether	

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

1.3. Details of the supplier of the safety data sheet

Company VWR International, LLC
Radnor Corporate Center
100 Matsonford Road
Radnor, PA 19087-8660

Telephone 610.386.1700
Email SDS@vwr.com

1.4. Emergency Telephone number

CHEMTREC 800.424.9300
CANUTEC 613.992.4624

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

For the full text of the H-Statement(s) and R-phrases(s) mentioned in this Section, see Section 16.

Hazard classes and hazard categories	Hazard statements
Flammable Liquids: GHS Category 2	H225
Eye Irritation: GHS Category 2A	H319
Carcinogenicity: GHS Category 2	H351
Specific Target Organ Toxicity, single exposure: GHS Category 3	H335

2.2. GHS Label elements, including precautionary statements



Pictograms:

Signal word: DANGER!

Hazard statements	
H225	Highly flammable liquid and vapor
H351	Suspected of causing cancer.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Precautionary statements	
P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243	Take precautionary measures against static discharge.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P403+P235	Store in a well-ventilated place. Keep cool.

2.3. Hazards not otherwise classified (HNOC) or not covered by GHS

None

SECTION 3: Composition / information on ingredients

3.1. Hazard components

Chemical name	Formula	Molecular weight	CCAS#	WWeight%
1,4-Dioxane	(CH ₂) ₄ O ₂	88.11	123-91-1	100

SECTION 4: First aid measures

4.1. General information

In case of inhalation

If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. If not breathing, begin artificial respiration. Get medical aid.

In case of skin contact

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

In case of eye contact

Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

In case of ingestion

If swallowed, get medical attention immediately; DO NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

4.2. Most important symptoms and effects, both acute and delayed

May be harmful if absorbed through the skin. Causes irritation to eyes and respiratory tract. May cause cancer based on animal studies. Target Organs: Kidneys, liver, respiratory system, eyes and skin.

4.3. Indication of any immediate medical attention and special treatment needed

SECTION 5: Firefighting measures

5.1. Extinguishing media

Use water spray, dry chemical, carbon dioxide, or alcohol-resistant foam.

5.2. Special hazards arising from the substance or mixture

May form explosive peroxides of unknown stability

5.3. Special protective equipment for firefighters

As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear.

5.4. Hazardous combustion products

May decompose into carbon monoxide, carbon dioxide, or other noxious or toxic fumes in fire conditions.

5.5. Advice for firefighters

Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. May accumulate static electrical charge and ignite its own vapors. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

5.6. Additional information

None

6.1. Personal precautions, protective equipment and emergency procedures

Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Use spark-proof tools and proper personal protective equipment as described in section 8.

6.2. Environmental precautions

Avoid run-off into storm sewers and ditches which lead to waterways.

6.3. Methods and material for containment and cleaning up

Clean up spills immediately. Provide ventilation to the affected area and remove all ignition sources. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth.

6.4. Additional information

None

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from heat, sparks, and flame in a flammables area. Store in a cool place in the original container and protect from sunlight and moisture. Keep under a nitrogen blanket. Keep from contact with oxidizing materials. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

7.3. Specific end use(s)

This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chemical Name	Limit value type & Country of Origin	Exposure Limit value	Source
---------------	--------------------------------------	----------------------	--------

1,4-Dioxane	TWA	20 ppm; Skin – potential significant contribution to overall exposure by cutaneous route	ACGIH
	IDLH	500 ppm	NIOSH
	PEL	25 ppm, 90 mg/m ³	OSHA

8.2. Exposure controls

Appropriate engineering controls

Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal protection equipment

Eye/face protection

Wear protective chemical goggles or other appropriate eye protection.

Skin protection

Use appropriate protective gloves and protective clothing to prevent skin exposure.

Respiratory protection

A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Hygiene measures

Wash hands, forearms, and exposed skin after handling.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

- a) Appearance:
Physical state: Liquid
Color: Clear, colorless
- b) Odor: Ethereal-like odor
- c) Odor Threshold: 24 ppm
- d) pH: Not available
- e) Melting point/freezing point:
- f) Initial boiling point
and boiling range: 101° C @ 760 mm Hg
- g) Flash point: 12° C (53.6° F)
- h) Evaporation rate: 5.8
- i) Flammability (solid, gas): Not available

- j) Upper/lower flammability
or explosive limits: Lower Limit – 2.0 vol %, Upper Limit – 22.0 vol %
- k) Vapor pressure: 29 mm Hg @ 20° C
- l) Vapor density: 3
- m) Relative density: 1.03
- n) Solubilities: Soluble
- o) Partition coefficient (n-Octanol/Water): log Pow: -0.27
- p) Auto-ignition temperature: 180° C (356° F)
- q) Decomposition temperature: Not available
- r) Viscosity: 0.012 cP 25° C
- s) Explosive properties: Not available
- t) Oxidizing properties: Not available

9.2. Other information

Conductivity: Nonconductive; Conductivity = 0.1 pS/m; Dielectric Constant = 2.2; Relaxation Time Constant = ~100 seconds (dissipation)

SECTION 10: Stability and reactivity

10.1. Reactivity

Not available

10.2. Chemical stability

Prolonged exposure to air may form peroxides. Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock.

10.3. Possibility of hazardous reactions

Peroxides

10.4. Conditions to avoid

This material is most hazardous when peroxide levels are concentrated by distillation or evaporation. This material should never be distilled to dryness. Light, ignition sources, moisture, excess heat, evaporation to near dryness, confined spaces, electrical sparks.

10.5. Incompatible materials

Strong oxidizing agents, strong acids.

10.6. Hazardous decomposition products

Carbon monoxide, carbon dioxide.

SECTION 11: Toxicology

11.1. Information on toxicological effects

Acute toxicity

Oral LD₅₀

Oral, mouse: LD50 = 5300 mg/kg; Oral, rabbit: LD50 = 2 g/kg; Oral, rat: LD50 = 4200 mg/kg

Inhalation LC₅₀

Inhalation, mouse: LC50 = 37 g/m³/2H; Inhalation, rat: LC50 = 46 g/m³/2

Dermal LD₅₀

Rabbit, skin: LD50 = 7600 uL/kg

Other information on acute toxicity

None

Skin corrosion/irritation

Not available

Serious eye damage/eye irritation

Draize test, rabbit, eye: 100 mg Severe; Draize test, rabbit, eye: 100 mg/24 hr Moderate

Respiratory or skin sensitization

Not available

Germ cell mutagenicity

Not available

Carcinogenicity

ACGIH: animal carcinogen with unknown relevance to humans. California: carcinogen, initial date 1/1/88; NTP: Suspect carcinogen; IARC: Group 2B carcinogen.

Reproductive toxicity

Not available

Specific target organ toxicity-single exposure

Not available

Specific target organ toxicity-repeated exposure

Not available

Aspiration hazard

Not available

Additional information

Not available

SECTION 12: Ecological information

12.1. Ecotoxicity

Fish: Bluegill/sunfish: LC50 = >10,000 mg/L; 96 Hr; static conditions, 23 degrees C; Water flea Daphnia: EC50 = 163 mg/L; 48 Hr; static conditions; 20-21 degrees C, no data

12.2. Persistence and degradability

1,4-Dioxane has been found to be resistant to biodegradation and has been classified as relatively undegradable. 1,4-Dioxane is not expected to biodegrade rapidly on the environment. Aquatic: Will not hydrolyze but may volatilize. Atmospheric: Half-life of 7-9.6 hours. Experimental results of sunlight irradiated mixtures of dioxane/NO suggest similar half-lives. The reaction products of ethers with hydroxyl radicals are aldehydes and ketones.

12.3. Bioaccumulative potential

Will not bioconcentrate

12.4. Mobility in soil

Mobile in soil and will leach into groundwater.

12.5. Results of PBT and vPvB assessment

Not available

12.6. Other adverse effects

Not available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is a "U" listed waste (U108).

Contaminated packaging

Handle contaminated packaging as if it was discarded product.

SECTION 14: Transport information

Land Transport DOT (U.S.)

UN Number: UN1165
Proper Shipping name: Dioxane
Transport Hazard Classes
Class: 3
Hazard Label(s): 3
Packing Group: II
Environmental hazard(s): None
Special precautions for user: None

Sea Transport IMDG

UN Number: UN1165
Proper Shipping name: Dioxane
Transport Hazard Classes
Class: 3
Hazard Label(s): 3
EMS- No.: F-E, S-D
Packing Group: II
Environmental hazard(s): None
Segregation Group: None
Special precautions for user: None

Air Transport IATA

UN Number: UN1165
Proper Shipping name: Dioxane
Transport Hazard Classes
Class: 3
Hazard Label(s): 3
Packing Group: II
Environmental hazard(s): None
Special precautions for user: None

SECTION 15: Regulatory information

OSHA Hazards

Not considered extremely hazardous by OSHA.

SARA 302 Extremely Hazardous Substances

Does not have a TPQ.

SARA 313 (TRI reporting)

100 % Dioxane (CAS# 123-91-1) is subject to reporting under Section 313 of SARA Title III and 40 CFR 373.

SARA 311/312 Hazardous Chemicals

Delayed, fire

Massachusetts Right-To-Know Substance List

1,4-Dioxane, 123-91-1, 7-1-2007

Pennsylvania Right-To-Know Hazardous substances

1,4-Dioxane, 123-91-1, 7-1-2007

New Jersey Worker and Community Right-To-Know Components

1,4-Dioxane, 123-91-1, 7-1-2007

California Proposition 65

WARNING! This product contains 1,4-Dioxane, a chemical known to the State of California to cause cancer.

Inventory status:

Canada DSL/NDSL Inventory List: Yes

US TSCA Inventory List: Yes

EINECS, ELINCS or NLP: 204-661-8

SECTION 16: Other information

Full text of H-Statement(s) and R-phrase(s)

See Section 2

Canadian Carcinogenicity hazard class: Not available

PHNOC hazard class: B2

HHNOC hazard class: D2A, D2B

Biohazardous Infectious Materials hazard class: None

NFPA Rating:

Health: 2

Flammability: 3

Reactivity: 1

Special Hazard:



DISCLAIMER

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. VWR International and its Affiliates shall not be held liable for any damage resulting from handling.