

# SAFETY DATA SHEET

**1. Identification**

**Product identifier:** 1,4-Dioxane

**Other means of identification**

**Product No.:** 9196, 4937, 9231

**Recommended use and restriction on use**

**Recommended use:** Not determined.

**Restrictions on use:** Not determined.

**Details of the supplier of the safety data sheet**

	Avantor Performance Materials, LLC.
	3477 Corporate Parkway
	Center Valley, PA 18034
Telephone:	
	Customer Service: 855-282-6867
Fax:	610-573-2610
Contact Person:	Environmental Health & Safety
E-mail:	info@avantormaterials.com

**Emergency telephone number:**

CHEMTREC: 1-800-424-9300 within US and Canada

**2. Hazard(s) identification**

**Hazard Classification**

**Physical Hazards**

Flammable liquids	Category 2
Static-accumulating flammable liquid	Category 1

**Health Hazards**

Serious Eye Damage/Eye Irritation	Category 2A
Carcinogenicity	Category 2
Specific Target Organ Toxicity - Single Exposure	Category 3 <sup>1</sup>
Specific Target Organ Toxicity - Repeated Exposure	Category 2 <sup>2</sup>

**Target Organs**

- 1.Narcotic effect., Respiratory tract irritation.
- 2.Liver, Kidneys, Central nervous system

**Unknown toxicity - Health**

Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	100 %

**Unknown toxicity - Environment**

Acute hazards to the aquatic environment	0 %
Chronic hazards to the aquatic environment	100 %

**Label Elements**

**Hazard Symbol:**



**Signal Word:** Danger

**Hazard Statement:** Highly flammable liquid and vapor.  
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 Statements**

**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. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof [electrical/ventilating/lighting] equipment. Use non-sparking tools. Take action to prevent static discharges. Do not breathe dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling.

**Response:** In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. IF exposed or concerned: Get medical advice/attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. 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/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell. Specific treatment (see on this label).

**Storage:** Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.

**Disposal:** Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other hazards which do not result in GHS classification:** Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment.

### 3. Composition/information on ingredients

#### Substances

Chemical name	Common name and synonyms	CAS number	Content in percent (%)*
DIOXANE		123-91-1	99 - 100%

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

### 4. First-aid measures

<b>General information:</b>	Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.
<b>Ingestion:</b>	Immediately call a POISON CENTER/doctor. Rinse mouth. Do NOT induce vomiting.
<b>Inhalation:</b>	Move to fresh air. Call a POISON CENTER/doctor if you feel unwell.
<b>Skin Contact:</b>	Wash skin thoroughly with soap and water. If skin irritation occurs: Get medical advice/attention.
<b>Eye contact:</b>	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately.

#### Most important symptoms/effects, acute and delayed

<b>Symptoms:</b>	Harmful if swallowed. Irritating to eyes, respiratory system and skin. Narcotic effect.
<b>Hazards:</b>	None known.

#### Indication of immediate medical attention and special treatment needed

<b>Treatment:</b>	Treat symptomatically. Symptoms may be delayed.
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### 5. Fire-fighting measures

<b>General Fire Hazards:</b>	Flammable liquid and vapor.
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#### Suitable (and unsuitable) extinguishing media

<b>Suitable extinguishing media:</b>	Water spray, foam, dry powder or carbon dioxide.
<b>Unsuitable extinguishing media:</b>	Avoid water in straight hose stream; will scatter and spread fire.

<b>Specific hazards arising from the chemical:</b>	Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. Heat may cause the containers to explode.
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#### Special protective equipment and precautions for firefighters

**Special fire fighting procedures:** Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk.

**Special protective equipment for fire-fighters:** Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

**6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures:** ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the SDS for Personal Protective Equipment.

**Methods and material for containment and cleaning up:** In case of leakage, eliminate all ignition sources. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

**Notification Procedures:** Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

**Environmental Precautions:** Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

**7. Handling and storage**

**Precautions for safe handling:** DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take precautionary measures against static discharges. Ground and bond container and receiving equipment. Use explosion-proof [electrical/ventilating/lighting] equipment. Use non-sparking tools. Wear protective gloves/protective clothing/eye protection/face protection. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash hands thoroughly after handling.

**Conditions for safe storage, including any incompatibilities:** Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

**8. Exposure controls/personal protection**

**Control Parameters**

**Occupational Exposure Limits**

Chemical Identity	Type	Exposure Limit Values	Source
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DIOXANE	TWA	20 ppm 72 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2) (07 2009)
DIOXANE	TWA	20 ppm	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
DIOXANE	TWA	20 ppm	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2011)
DIOXANE	TWA	20 ppm	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
DIOXANE	8 HR ACL	20 ppm	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
	15 MIN ACL	30 ppm	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
DIOXANE	TWA	20 ppm 72 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)
DIOXANE	TWA	20 ppm	US. ACGIH Threshold Limit Values (2011)

**Appropriate Engineering Controls**

No data available.

**Individual protection measures, such as personal protective equipment**

**General information:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

**Eye/face protection:** Wear safety glasses with side shields (or goggles) and a face shield.

**Skin Protection**

**Hand Protection:** Wear protective gloves.

**Other:** Wear suitable protective clothing.

**Respiratory Protection:** If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

**Hygiene measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

**9. Physical and chemical properties**
**Appearance**

**Physical state:** Liquid Liquid

**Form:** Liquid

**Color:** Colorless

**Odor:** Slight

**Odor threshold:** No data available.

**pH:** No data available.

**Melting point/freezing point:** 11,8 °C

<b>Initial boiling point and boiling range:</b>	101 °C (101,325 kPa)
<b>Flash Point:</b>	12 °C (Pensky-Martens Closed Cup)
<b>Evaporation rate:</b>	2,7 (butyl acetate=1)
<b>Flammability (solid, gas):</b>	Class IB Flammable Liquid
<b>Upper/lower limit on flammability or explosive limits</b>	
<b>Flammability limit - upper (%):</b>	No data available.
<b>Flammability limit - lower (%):</b>	No data available.
<b>Explosive limit - upper (%):</b>	No data available.
<b>Explosive limit - lower (%):</b>	No data available.
<b>Vapor pressure:</b>	4,9 kPa (25 °C)
<b>Vapor density:</b>	3,03 (Air=1)
<b>Density:</b>	1,03 g/ml (20 °C)
<b>Relative density:</b>	1,03 (20 °C)
<b>Solubility(ies)</b>	
<b>Solubility in water:</b>	Miscible with water.
<b>Solubility (other):</b>	aromatic hydrocarbons: Miscible
<b>Partition coefficient (n-octanol/water):</b>	-0,27
<b>Auto-ignition temperature:</b>	356 °F
<b>Decomposition temperature:</b>	No data available.
<b>Viscosity:</b>	No data available.
<b>Other information</b>	
<b>Molecular weight:</b>	88,1 g/mol (C <sub>4</sub> H <sub>8</sub> O <sub>2</sub> )

## 10. Stability and reactivity

<b>Reactivity:</b>	No dangerous reaction known under conditions of normal use.
<b>Chemical Stability:</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions:</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid:</b>	Heat, sparks, flames. Sunlight.
<b>Incompatible Materials:</b>	Strong oxidizing agents. Strong acids. Halogens.
<b>Hazardous Decomposition Products:</b>	Thermal decomposition may release oxides of carbon.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation:</b>	May cause irritation to the respiratory system. May cause drowsiness or dizziness.
<b>Skin Contact:</b>	Causes mild skin irritation.
<b>Eye contact:</b>	Causes serious eye irritation.
<b>Ingestion:</b>	May be harmful if swallowed.

**Information on toxicological effects**

**Acute toxicity (list all possible routes of exposure)**

**Oral**

**Product:** LD 50 (Rabbit): 2.000 mg/kg

**Dermal**

**Product:** LD 50 (Rabbit): 7.600 mg/kg

**Inhalation**

**Product:** LC 50 (Rat): 46 mg/l  
LC 50 (Mouse): 37 mg/l

**Repeated dose toxicity**

**Product:** No data available.

**Skin Corrosion/Irritation**

**Product:** Causes mild skin irritation.

**Serious Eye Damage/Eye Irritation**

**Product:** Causes serious eye irritation.

**Respiratory or Skin Sensitization**

**Product:** Not a skin sensitizer.

**Carcinogenicity**

**Product:** Suspected of causing cancer.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**

DIOXANE Overall evaluation: 2B. Possibly carcinogenic to humans.

**US. National Toxicology Program (NTP) Report on Carcinogens:**

DIOXANE Hazard Designation: Reasonably Anticipated to be a Human Carcinogen.

**ACGIH Carcinogen List:**

No carcinogenic components identified

**Germ Cell Mutagenicity**

**In vitro**

**Product:** No mutagenic components identified

**In vivo**

**Product:** No mutagenic components identified

**Reproductive toxicity**

**Product:** No components toxic to reproduction

**Specific Target Organ Toxicity - Single Exposure**

**Product:** Inhalation - vapor: Narcotic effect. Respiratory tract irritation.

**Specific Target Organ Toxicity - Repeated Exposure**

**Product:** Liver, Kidney, Central nervous system. - May cause damage to organs through prolonged or repeated exposure.

**Aspiration Hazard Product:** Not classified

**Other effects:** None known.

## 12. Ecological information

### Ecotoxicity:

#### Acute hazards to the aquatic environment:

**Fish Product:** No data available.

**Aquatic Invertebrates Product:** No data available.

#### Chronic hazards to the aquatic environment:

**Fish Product:** No data available.

**Aquatic Invertebrates Product:** No data available.

**Toxicity to Aquatic Plants Product:** No data available.

### Persistence and Degradability

**Biodegradation Product:** There are no data on the degradability of this product.

**BOD/COD Ratio Product:** No data available.

### Bioaccumulative potential

**Bioconcentration Factor (BCF) Product:** No data available on bioaccumulation.

### Partition Coefficient n-octanol / water (log Kow)

**Product:** Log Kow: -0,27

**Mobility in soil:** The product is water soluble and may spread in water systems.

**Other adverse effects:** No data available.

## 13. Disposal considerations

**Disposal instructions:** Discharge, treatment, or disposal may be subject to national, state, or local laws. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.



**Contaminated Packaging:** Since emptied containers retain product residue, follow label warnings even after container is emptied.

<b>14. Transport information</b>
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**TDG**

UN Number:	UN 1165
UN Proper Shipping Name:	DIOXANE
Transport Hazard Class(es)	
Class:	3
Label(s):	3
Packing Group:	II
Marine Pollutant:	No
Special precautions for user:	Not determined.

**IMDG**

UN Number:	UN 1165
UN Proper Shipping Name:	DIOXANE
Transport Hazard Class(es)	
Class:	3
Label(s):	3
EmS No.:	F-E, S-D
Packing Group:	II
Marine Pollutant:	No
Special precautions for user:	Not determined.

**IATA**

UN Number:	UN 1165
UN Proper Shipping Name:	Dioxane
Transport Hazard Class(es):	
Class:	3
Label(s):	3
Packing Group:	II
Marine Pollutant:	No
Special precautions for user:	Not determined.
Cargo aircraft only:	Allowed.

**Transport in bulk according to Annex II of MARPOL and the IBC Code:** Not applicable

<b>15. Regulatory information</b>
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**Canada Federal Regulations**

**List of Toxic Substances (CEPA, Schedule 1)**

**Export Control List (CEPA 1999, Schedule 3)**

**National Pollutant Release Inventory (NPRI)**

**Greenhouse Gases**

**Controlled Drugs and Substances Act**

**Precursor Control Regulations**

**International regulations**

**Montreal protocol**

Not applicable

**Stockholm convention**

Not applicable

**Rotterdam convention**

Not applicable

**Kyoto protocol**

Not applicable

**Inventory Status:**

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EU EINECS List:	On or in compliance with the inventory
EU ELINCS List:	Not in compliance with the inventory.
Japan (ENCS) List:	Not in compliance with the inventory.
EU No Longer Polymers List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	On or in compliance with the inventory
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

<b>16. Other information, including date of preparation or last revision</b>
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**Revision Date:** 17.05.2018

**Version #:** 1.1

**Further Information:** No data available.

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