1,4-DIOXANE
CAS NO 123-91-1
MATERIAL SAFETY DATA SHEET
SDS/MSDS

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

1.1 Product identifiers
Product name : 1,4-Dioxane
CAS-No. : 123-91-1

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Industrial & for professional use only.

1.3 Details of the supplier of the safety data sheet
Company : Central Drug House (P) Ltd
7/28 Vardaan House
New Delhi -110002
INDIA

Telephone : +91 11 49404040
Email : care@cdhfinechemical.com

1.4 Emergency telephone number
Emergency Phone # : +91 11 49404040 (9:00am - 6:00 pm) [Office hours]

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Eye irritation (Category 2), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements
Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word
Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378 In case of fire: Use dry powder or dry sand to extinguish.
P403 + P235 Store in a well-ventilated place. Keep cool.

Supplemental Hazard information (EU)
EUH019 May form explosive peroxides.
EUH066 Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms : Dioxane
Diethylene oxide

<table>
<thead>
<tr>
<th>Formula</th>
<th>(C_2H_6O_2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular weight</td>
<td>88.11 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>123-91-1</td>
</tr>
<tr>
<td>EC-No.</td>
<td>204-661-8</td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-024-00-5</td>
</tr>
</tbody>
</table>

Hazardous ingredients according to Regulation (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-Dioxane</td>
<td>Flam. Liq. 2; Eye Irrit. 2; Carc.</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

CAS-No. 123-91-1
EC-No. 204-661-8
Index-No. 603-024-00-5

H351, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available
SECTION 5: Firefighting measures

5.1 Extinguishing media
   Suitable extinguishing media
   Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
   Carbon oxides

5.3 Advice for firefighters
   Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
   Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
   Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
   Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
   For personal protection see section 8.

6.2 Environmental precautions
   Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
   Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
   For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
   Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
   Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
   For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
   Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
   Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
   Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

<table>
<thead>
<tr>
<th>Application Area</th>
<th>Exposure routes</th>
<th>Health effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term local effects</td>
<td>144 mg/m3</td>
</tr>
<tr>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>73 mg/m3</td>
</tr>
<tr>
<td>Workers</td>
<td>Skin contact</td>
<td>Long-term systemic effects</td>
<td>21 mg/m3</td>
</tr>
</tbody>
</table>
Predicted No Effect Concentration (PNEC)

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>0.153 mg/kg</td>
</tr>
<tr>
<td>Marine water</td>
<td>0.67 mg/l</td>
</tr>
<tr>
<td>Fresh water</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>37 mg/kg</td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>2700 mg/l</td>
</tr>
<tr>
<td>Aquatic intermittent release</td>
<td>10 mg/l</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

**Appropriate engineering controls**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal protective equipment**

**Eye/face protection**
Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use (US) or type ABEK (EN 14387) respirator cartridges as a backup to enginee protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) **Appearance**
Form: liquid
Colour: colourless

b) Odour
No data available

c) Odour Threshold
No data available

d) pH
6.0 - 8 at 500 g/l at 20 °C

e) Melting point/freezing point
Melting point/range: 10 - 12 °C - lit.

f) Initial boiling point and boiling range
100 - 102 °C - lit.

g) Flash point
12 °C - closed cup

h) Evaporation rate
No data available

i) Flammability (solid, gas)
No data available

j) Upper/lower flammability or explosive limits
Upper explosion limit: 22 %(V)
Lower explosion limit: 2 %(V)
k) Vapour pressure 27 mmHg at 20 °C
   40 mmHg at 25.20 °C
l) Vapour density 3.04 - (Air = 1.0)
m) Relative density 1.034 g/cm3 at 25 °C
n) Water solubility completely miscible
o) Partition coefficient: n-octanol/water log Pow: -0.27
p) Auto-ignition temperature 375 °C
q) Decomposition temperature No data available
r) Viscosity No data available
s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information
   Surface tension 36.9 mN/m at 25 °C
   Relative vapour density 3.04 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
   No data available

10.2 Chemical stability
   Stable under recommended storage conditions.
   Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
   No data available

10.4 Conditions to avoid
   Heat, flames and sparks.

10.5 Incompatible materials
   Oxygen, Oxidizing agents, Halogens, Reducing agents, Perchlorates., Trimethylaluminum

10.6 Hazardous decomposition products
   Hazardous decomposition products formed under fire conditions. - Carbon oxides
   Other decomposition products - No data available
   In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

   Acute toxicity
   LD50 Oral - Rat - 4,200 mg/kg(1,4-Dioxane)
   LC50 Inhalation - Rat - 2 h - 46,000 mg/m3(1,4-Dioxane)
   Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other.
   LD50 Dermal - Rabbit - 7,858 mg/kg(1,4-Dioxane)

   Skin corrosion/irritation
   Skin - Human(1,4-Dioxane)
   Remarks: Chronic exposure causes drying effect on the skin and eczema.
   Skin - Rabbit(1,4-Dioxane)
   Result: No skin irritation
**Serious eye damage/eye irritation**
Eyes - Rabbit (1,4-Dioxane)
Result: Eye irritation - 24 h

**Respiratory or skin sensitisation**
No data available (1,4-Dioxane)

**Germ cell mutagenicity**
Laboratory experiments have shown mutagenic effects (1,4-Dioxane)

**Carcinogenicity**
This product is or contains a component that has been reported to be possi classification (1,4-Dioxane)
Limited evidence of carcinogenicity in animal studies (1,4-Dioxane)
(IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)

**Reproductive toxicity**
No data available (1,4-Dioxane)

**Specific target organ toxicity - single exposure**
May cause respiratory irritation (1,4-Dioxane)

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available (1,4-Dioxane)

**Additional Information**
RTECS: JG8225000

Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur (1,4-Dioxane)
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated (1,4-Dioxane)

**SECTION 12: Ecological information**

12.1 **Toxicity**
Toxicity to fish: LC50 - Pimephales promelas (fathead minnow) - 985 mg/l - 96 h (1,4-Dioxane)
Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 8,450 mg/l - 24 h (1,4-Dioxane)
Toxicity to algae: EC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 72 h (1,4-Dioxane)

12.2 **Persistence and degradability**
Biodegradability: Result: < 5 % - Not readily biodegradable.

12.3 **Bioaccumulative potential**
Does not bioaccumulate.

12.4 **Mobility in soil**
No data available (1,4-Dioxane)

12.5 **Results of PBT and vPvB assessment**
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 **Other adverse effects**
No data available
SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1165 IMDG: 1165 IATA: 1165

14.2 UN proper shipping name
ADR/RID: DIOXANE IMDG: DIOXANE IATA: Dioxane

14.3 Transport hazard class(es)
ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group
ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH019 May form explosive peroxides.
EUH066 Repeated exposure may cause skin dryness or cracking.
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Further information
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. Central Drug House (P) Ltd and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.cdhfinechemical.com for additional terms and conditions of sale.