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-10002
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.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
F Highly flammable R11, R19
   R40
Xi Irritant R36/37
   R66

For the full text of the R-phrases 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) | Highly flammable liquid and vapour.
H225

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.
P261 | Avoid breathing vapours.
P281 | Use personal protective equipment as required.
P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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>C₄H₈O₂</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>
<tr>
<td>Registration number</td>
<td>01-2119462837-26-XXXX</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>
<tr>
<td>CAS-No.</td>
<td>123-91-1</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>204-661-8</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-024-00-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H335, H351, EUH019, EUH066</td>
<td></td>
</tr>
</tbody>
</table>

Hazardous ingredients according to Directive 1999/45/EC

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,4-Dioxane</td>
<td>F, Xn, Carc.Cat.3, R11 - R19 -</td>
<td>&lt;= 100 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>123-91-1</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>204-661-8</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-024-00-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R36/37 - R40 - R66</td>
<td></td>
</tr>
</tbody>
</table>

For the full text of the H-Statements and R-Phrases 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

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Derived No Effect Level (DNEL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Area</td>
</tr>
<tr>
<td>Workers</td>
</tr>
<tr>
<td>Workers</td>
</tr>
<tr>
<td>Workers</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 a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of 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  36 hPa at 20 °C
  53 hPa 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  300 °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
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
LC50 Inhalation - Rat - 2 h - 46.000 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Other.
LD50 Dermal - Rabbit - 7.858 mg/kg
**Skin corrosion/irritation**
- **Skin - Human**
  Remarks: Chronic exposure causes drying effect on the skin and eczema.
- **Skin - Rabbit**
  Result: No skin irritation

**Serious eye damage/eye irritation**
- **Eyes - Rabbit**
  Result: Eye irritation - 24 h

**Respiratory or skin sensitisation**
No data available

**Germ cell mutagenicity**
Laboratory experiments have shown mutagenic effects.

**Carcinogenicity**
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
May cause respiratory irritation.

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

**Aspiration hazard**
No data available

**Additional Information**
RTECS: JG8225000
Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

**SECTION 12: Ecological information**

12.1 **Toxicity**

| Toxicity to fish | LC50 - Pimephales promelas (fathead minnow) - 985 mg/l - 96 h |
| Toxicity to daphnia and other aquatic invertebrates | EC50 - Daphnia magna (Water flea) - 8.450 mg/l - 24 h |
| Toxicity to algae | EC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 72 h |
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

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 but exert extra care in igniting as this material is 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
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
No data available

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.
Carc. Carcinogenicity
EUH019 May form explosive peroxides.
EUH066 Repeated exposure may cause skin dryness or cracking.
Eye Irrit.  Eye irritation
Flam. Liq.  Flammable liquids
H225  Highly flammable liquid and vapour.
H319  Causes serious eye irritation.
H335  May cause respiratory irritation.
H351  Suspected of causing cancer.
STOT SE  Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3
F  Highly flammable
Xn  Harmful
R11  Highly flammable.
R19  May form explosive peroxides.
R36/37  Irritating to eyes and respiratory system.
R40  Limited evidence of a carcinogenic effect.
R66  Repeated exposure may cause skin dryness or cracking.

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.