

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 17.07.2013

Revision: 04.07.2013

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

- **Trade name:** 1,4-dioxane
- **CAS Number:**
123-91-1
- **EC number:**
204-661-8
- **Index number:**
603-024-00-5
- **Registration number** 01-2119462837-26-0002
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
- **Sector of Use**
SU0 Other
SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8 Manufacture of bulk, large scale chemicals (including petroleum products)
SU9 Manufacture of fine chemicals
SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
- **Process category**
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15 Use as laboratory reagent
- **Environmental release category**
ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
- **Application of the substance / the preparation** Used as solvents
- **1.3 Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Kairav Chemofarbe Industries Ltd
502, Filix, LBS Marg,
Opposite Asian Paints
Bhandup(w) Mumbai 400078
- **Further information obtainable from:**
Ph: 022-25968361/62,
Fax: 25958586
- **1.4 Emergency telephone number:**
Contact details of European importer
Emergency telephone number:
Telephone number of EU importer:
Opening hours:
Other Comments (e.g. language(s) of the phone service): English



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SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**



GHS02 flame

Flam. Liq. 2 H225 Highly flammable liquid and vapour.



GHS08 health hazard

Carc. 2 H351 Suspected of causing cancer.



GHS07

Eye Irrit. 2 H319 Causes serious eye irritation.
STOT SE 3 H335 May cause respiratory irritation.

- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**



Xn; Harmful

R40: Limited evidence of a carcinogenic effect.



Xi; Irritant

R36/37: Irritating to eyes and respiratory system.



F; Highly flammable

R11: Highly flammable.

R19-66: May form explosive peroxides. Repeated exposure may cause skin dryness or cracking.

Carc. Cat. 3

- **Information concerning particular hazards for human and environment:**

At long or repeated contact with skin it may cause dermatitis due to the degreasing effect of the solvent.

- **2.2 Label elements**

- **Labelling according to Regulation (EC) No 1272/2008**

The substance is classified and labelled according to the CLP regulation.

- **Hazard pictograms**



GHS02 GHS07 GHS08

- **Signal word Danger**

- **Hazard statements**

H225 Highly flammable liquid and vapour.

H319 Causes serious eye irritation.

H351 Suspected of causing cancer.

H335 May cause respiratory irritation.

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· Precautionary statements

- P210 *Keep away from heat/sparks/open flames/hot surfaces. - No smoking.*
- P241 *Use explosion-proof electrical/ventilating/lighting/equipment.*
- P303+P361+P353 *IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*
- P305+P351+P338 *IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
- P405 *Store locked up.*
- P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

· Additional information:

- EUH019 May form explosive peroxides.*
- EUH066 Repeated exposure may cause skin dryness or cracking.*

· 2.3 Other hazards**· Results of PBT and vPvB assessment**

- PBT:** Not applicable.
- vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients**· 3.1 Chemical characterization: Substances****· CAS No. Description***123-91-1 1,4-dioxane***· Identification number(s)****· EC number:** 204-661-8**· Index number:** 603-024-00-5**· Additional information:***Molecular formula: C₄H₈O₂**Molecular weight range: 88.1051**Degree of purity: > 99.1 - < 99.9 w/w***· SVHC** The substance is not in the list of SVHC substances**SECTION 4: First aid measures****· 4.1 Description of first aid measures****· General information:** Consult a physician. Show this safety data sheet to the doctor in attendance.**· After inhalation:***If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.***· After skin contact:** Wash off with soap and plenty of water. Consult a physician.**· After eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.**· After swallowing:***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***Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur.***· 4.3 Indication of any immediate medical attention and special treatment needed***No further relevant information available.*

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SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:** Use water spray, alcohol resistant foam, dry chemical or carbon dioxide.
- **5.2 Special hazards arising from the substance or mixture** May produce Carbon oxides
- **5.3 Advice for firefighters**
- **Protective equipment:** Wear self contained breathing apparatus for fire fighting if necessary.
- **Additional 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 vapors, 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
- **6.2 Environmental precautions:**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
- **6.3 Methods and material 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
- **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

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
- **Information about fire - and explosion protection:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
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.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**
Keep container tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
- **7.3 Specific end use(s)** No further relevant information available.

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SECTION 8: Exposure controls/personal protection

· 8.1 Control parameters

· Ingredients with limit values that require monitoring at the workplace:

123-91-1 1,4-dioxane

IOELV (EU) | 73 mg/m³, 20 ppm

· DNELs

1) DNELs for workers:

Long-term - systemic effects:

Dermal: 21 mg/kg bw/day

Inhalation : 73 mg/m³

Acute - local effects

Inhalation : 144 mg/m³

2) DNELs for the general population

Long-term - systemic effects: Dermal :

12 mg/kg bw/day Inhalation :

18.25 mg/m³

Oral : 0.24 mg/kg bw/day

Acute - local effects

Inhalation : 72 mg/m³

· PNECs

PNECs

Predicted No Effect Concentration (PNEC)

1) PNEC water

PNEC aqua (freshwater): 10 mg/L PNEC

aqua (marine water): 0.67 mg/L PNEC aqua

(intermittent releases): 10 mg/L

2) PNEC sediment

PNEC sediment (freshwater): 37 mg/kg sediment

dw 3) PNEC soil

PNEC soil: 0.153 mg/kg soil dw

4) PNEC sewage treatment plant

PNEC STP: 2700 mg/L

· **Additional information:** The lists valid during the making were used as basis.

· 8.2 Exposure controls

· Personal protective equipment:

· General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing

Wash hands before breaks and at the end of work.

Avoid contact with the eyes.

Avoid contact with the eyes and skin.

· Respiratory protection:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

· Protection of hands:



Protective gloves

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· **Viscosity:****Dynamic at 20 °C:**

1.31 mPas

· **9.2 Other information**1) **Surface tension**

In accordance with column 2 of REACH Annex VII, the surface tension of the substance does not need to be tested because due to its chemical structure, no surface activity is predicted.

2) **Granulometry**

In accordance with column 2 of REACH Annex VII, the study does not need to be conducted as the substance is marketed or used in a non-solid or granular form (1,4-dioxane is a liquid).

3) **Dissociation constant**

In accordance with section 1 of REACH Annex XI, the dissociation constant study does not need to be performed because the substance does not contain any ionic structure.

SECTION 10: Stability and reactivity· **10.1 Reactivity**· **10.2 Chemical stability**

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

· **10.3 Possibility of hazardous reactions** No dangerous reactions known.

· **10.4 Conditions to avoid** No further relevant information available.

· **10.5 Incompatible materials:** No further relevant information available.

· **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information· **11.1 Information on toxicological effects**· **Acute toxicity:**· **LD/LC50 values relevant for classification:**

Oral	LD50	ca. 5150 mg/kg bw (male/female) (rat)
Inhalative	LC0 (1 h)	ca. 155 mg/L air (nominal) (rat(Sprague-Dawley)male/female)

· **Primary irritant effect:**· **on the skin:**

Method:

rabbit (Vienna White)

Coverage: occlusive (shaved)

BASF Test

Before OECD Guideline 404 was established in 1982, skin irritation was tested using an internal method (BASF test). 2 white Vienna rabbits were treated for 1, 5 and 15 minutes and for 20 hours using occlusive conditions. Results:

Erythema score:

1 of max. 4 (mean (2 animals)) (Time point: 24-48-72 h) (not fully reversible within: 8 days) (desquamation, parchment-like necrosis)

1.34 of max. 4 (mean (2 animals))

(Time point: 24 -48-72 h) (not fully reversible within: 8 days) (desquamation, parchment-like necrosis)

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Edema score:

0 of max. 4 (mean (2 animals)) (Time point: 24-48-72 h) (no effects)

0.84 of max. 4 (mean (2 animals))

(Time point: 24 -48-72 h) (fully reversible within: 8 days) Inference : Not irritating

· **on the eye:****Method:**

rabbit (Vienna White)

equivalent or similar to OECD Guideline 405 (Acute Eye Irritation / Corrosion)

Result :**Cornea score:**

1 of max. 2 (mean) (Time point: 24-72 h) (fully reversible)

Conjunctivae score:

1 of max. 2 (mean) (Time point: 24 - 72 h) (not fully reversible within: 8 days)

Chemosis score:

0.8 of max. 2 (mean) (Time point: 24 -72 h) (fully reversible)

Inference : Irritating

· **Sensitization:****Method :**

guinea pig (Dunkin-Hartley) female

Guinea pig maximisation test

Induction: intradermal and epicutaneous

Challenge: epicutaneous, occlusive

EU Method B.6 (Skin Sensitisation)

Results:

not sensitising

No. with positive reactions:

1st reading: 0 out of 10 (test group);

24 h after chall.; dose: 100%

1st reading: 0 out of 5 (negative control); 24 h after chall.; dose: 0%

1st reading: 20 out of 20 (positive control); 24 h after chall.; dose: 1%

· **Toxicokinetics, metabolism and distribution**

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1) Method :

rat (Sprague-Dawley) male

inhalation: vapour

Exposure regime: once for 6 hr Doses/conc.:

50 ppm equivalent or similar to OECD

Guideline 417 (Toxicokinetics) Results :

Metabolites identified: yes

Details on metabolites: The amounts of 1,4-dioxane and β -hydroxyethoxyacetic acid (HEAA) in urine during exposure (0- 6 h) were 5.1 and 7613 μ g, respectively, and afterwards (6-48 h) 1.7 and 13659 μ g, respectively. Hence, more than 99.9% of the total urinary excretion of the inhaled 1,4-dioxane was HEAA.

2) Method:

rat (Sprague- Dawley)

male oral: gavage

Exposure regime: single and repeated (17 daily doses)

dosing Doses/conc.: single

dosing: 10, 100 or 1000 mg/kg

repeated dosing: 10 and 1000 mg/kg equivalent or similar to

OECD Guideline 417 (Toxicokinetics)

Results:

Metabolites identified: yes

Details on metabolites: β -hydroxyethoxyacetic acid (urine) CO₂ (expired air)**Repeated dose toxicity****1) Repeated Dose Toxicity : Oral**

Method :

rat (Sherman) male/female

combined repeated dose and carcinogenicity (oral: drinking water)

0.01, 0.1 or 1% (equal to 9.6, 94 or 1015 mg/kg bw/day for males and 19, 148 or 1599 mg/kg bw/day for females) (actual ingested)

Exposure: 716 days (continuous)

Results :

NOAEL: 9.6 mg/kg bw/day

(actual dose received) (male) (liver and kidney effects)

NOAEL: 19 mg/kg bw/day

(actual dose received) (female) (liver and kidney effects)

2) Repeated Dose Toxicity : Inhalation

Method :

rat (Wistar) male/female

chronic (inhalation: vapour) (whole body)

0.4 mg/l (111 ppm) (SD = 0.018 mg/l (5 ppm)) (analytical conc.) Vehicle: unchanged (no vehicle)

Exposure: 2 years (7 hours/day, 5 days/week)

A lifetime 2-year study with rats, with a treated and a control group

Results:

NOAEC: > 400 mg/m³ air

(male/female) (no adverse health effects were observed)

3) Repeated dose toxicity: dermal

In accordance with column 2 of REACH Annex IX, testing shall be performed using the most appropriate route of administration. No dermal repeated toxicity study is required as data for the oral and inhalation route are available (inhalation is the most likely route of human exposure for 1,4-dioxane).

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- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**

TDLo - Lowest published toxic dose : 32500 mg/kg bw (total dose)

Sex:female

Species:Rat

Carc. 2

SECTION 12: Ecological information

- **12.1 Toxicity**

- **Aquatic toxicity:**

<i>EC50 (3 d)</i>	<i>1450 mg/l (Lactuca sativa)</i>
<i>EC50 (48 h)</i>	<i>> 1000 mg/L (Daphnia magna) (OECD Guideline 202)</i>
<i>EC50 (72 h) (static)</i>	<i>> 1000 mg/L (Pseudokirchneriella subcapitata) (OECD Guideline 201)</i>
<i>LC50 (21 d)</i>	<i>> 100 mg/L test mat. (nominal) (Oryzias latipes) (OECD Guideline 204)</i>
<i>LC50 (96 h) (static)</i>	<i>6700 mg/L test mat. (nominal) (Menidia beryllina) (Method by Dawson)</i>
<i>NOEC (21 d)</i>	<i>1000 mg/L (Daphnia magna) (OECD Guideline 211)</i>
<i>NOEC (32 d)</i>	<i>> 103 mg/L (Fish Pimephales promelas)</i>
<i>NOEC (72 h)</i>	<i>1000 mg/L (Pseudokirchneriella subcapitata) (OECD Guideline 201)</i>
<i>TTC (16 h) (static)</i>	<i>2700 mg/L (Pseudomonas putida)</i>

- **12.2 Persistence and degradability**

Biodegradation in water

Test type: ready biodegradability

activated sludge, domestic, non-adapted

OECD Guideline 301 F (Ready Biodegradability: Manometric Respirometry Test)

Results :

poorly biodegradable

% Degradation of test substance: < 10 after 29 d (O2 consumption)

- **12.3 Bioaccumulative potential**

Bioconcentration Factor:

BCF: 0.45 (L/kg ww or dimensionless)

- **12.4 Mobility in soil**

Adsorption/desorption

Koc at 20 °C: 1

- **Additional ecological information:**

- **General notes:**

Water hazard class 2 (German Regulation) (Assessment by list): hazardous for

water Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

- **12.5 Results of PBT and vPvB assessment**

- **PBT:** Not applicable.

- **vPvB:** Not applicable.

- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**

- **Recommendation**

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

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- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

· 14.1 UN-Number	
· ADR, IMDG, IATA	UN1165
· 14.2 UN proper shipping name	
· ADR	1165 DIOXANE
· IMDG, IATA	DIOXANE
· 14.3 Transport hazard class(es)	
· ADR, IMDG, IATA	
	
· Class	3 Flammable liquids.
· Label	3
· 14.4 Packing group	
· ADR, IMDG, IATA	II
· 14.5 Environmental hazards:	
· Marine pollutant:	No
· 14.6 Special precautions for user	Warning: Flammable liquids.
· Danger code (Kemler):	33
· EMS Number:	F-E,S-D
· 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· ADR	
· Limited quantities (LQ)	1L
· Transport category	2
· Tunnel restriction code	D/E
· UN "Model Regulation":	UN1165, DIOXANE, 3, II

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Labelling according to Regulation (EC) No 1272/2008**
- **Hazard pictograms** Please refer section 2
- **Signal word** Danger
- **Hazard statements** Please refer section 2
- **Precautionary statements** Please refer section 2
- **Chemical safety assessment**
The CSR has been completed

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Please refer to Annex I for risk management measures and exposure scenario.

- **National regulations:**
- **Other regulations, limitations and prohibitive regulations**
- **Substances of very high concern (SVHC) according to REACH, Article 57**
The substance is not listed as SVHC.
- **15.2 Chemical safety assessment:**
The CSR has been completed.
A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing MSDS:** Product safety department.
- **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
- **Sources** CHEMICAL SAFETY REPORT (CSR) CAS Number: 123-91-1
- *** Data compared to the previous version altered.**
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 - Section 4: First-aid measures
 - Section 5: First-fighting measures
 - Section 6: Accidental release measures
 - Section 7: Handling and storage.
 - Section 8: Exposure controls/Personal Protection.
 - Section 9: Physical and Chemical properties.
 - Section 10: Stability and Reactivity.
 - Section 11: Toxicology Information
 - Section 12: Ecological Information
 - Section 13: Disposable consideration
 - Section 14: Transport Information
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