



Safety Data Sheet

Section 1. Identification of the substance/mixture and of the company/undertaking

Product identifier:

Product name: 0.1mol/L(N/10)-Perchloric acid (1,4-dioxane solution)

SDS No. : A0155E-3

Recommended use of the chemical and restrictions on use

Research and Development

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

Address: 3-1, Honmachibashi, Chuo-ku, Osaka, JAPAN

Division: Chemical Safety Management Department

Telephone number: +81-6-6946-8061

FAX: +81-6-6946-1607

Section 2. Hazards identification

Classification of the substance or mixture

PHYSICAL AND CHEMICAL HAZARDS

Flammable liquids: Category 2

HEALTH HAZARDS

Acute toxicity (Inhalation): Category 4

Skin corrosion/irritation: Category 2

Serious eye damage/eye irritation: Category 2

Carcinogenicity: Category 1B

Specific target organ toxicity – single exposure: Category 3 (Respiratory tract irritation)

Specific target organ toxicity – single exposure: Category 3 (Narcotic effects)

Specific target organ toxicity – repeated exposure: Category 1 (liver, central nervous system, respiratory system, kidneys)

Specific target organ toxicity – repeated exposure: Category 2 (thyroid)

(Note) GHS classification without description: Not classified/Classification not possible

Label elements

Hazard pictograms:



Signal word: Danger

Hazard statements

H225 Highly flammable liquid and vapor

H332 Harmful if inhaled

H315 Causes skin irritation

H319 Causes serious eye irritation

H350 May cause cancer

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H372 Causes damage to organs through prolonged or repeated exposure (liver, central nervous system, respiratory system, kidneys)



H373 May cause damage to organs through prolonged or repeated exposure (thyroid)

Precautionary statements

Prevention

- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use explosion-proof electrical/ventilating/lighting equipment.
- P242 Use non-sparking tools.
- P243 Take action to prevent static discharges.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P271 Use only outdoors or in a well-ventilated area.
- P264 Wash hands thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P270 Do not eat, drink or smoke when using this product.

Response

- P370 + P378 In case of fire: Use appropriate media to extinguish.
- P314 Get medical advice/attention if you feel unwell.
- P308 + P313 IF exposed or concerned: Get medical advice/attention.
- P312 Call a POISON CENTER/doctor if you feel unwell.
- P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P302 + P352 IF ON SKIN: Wash with plenty of water.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
- P332 + P313 If skin irritation occurs: Get medical advice/attention.
- P362 + P364 Take off contaminated clothing and wash it before reuse.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337 + P313 If eye irritation persists: Get medical advice/attention.

Storage

- P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
- P403 + P235 Store in a well-ventilated place. Keep cool.
- P405 Store locked up.

Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Specific danger/hazard

Health hazard

See "11. Toxicological Information".



Section 3. Composition/information on ingredients

Substance/mixture:

Mixture

Ingredient name	Content (%)	CAS RN	ENCS	Chemical formula
1,4-Dioxane	99	123-91-1	5-839	C ₄ H ₈ O ₂
Perchloric acid	0.97	7601-90-3	1-221	HClO ₄

Note : The figures shown above are not the specifications of the product. The content of products may exceed the figures shown above.

Section 4. First aid measures

Descriptions of first aid measures

General measures

Get medical advice/attention if you feel unwell.

IF INHALED

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Call a POISON CENTER/doctor if you feel unwell.

IF INHALED: Call a POISON CENTER/doctor if you feel unwell.

IF ON SKIN

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.

IF ON SKIN: Wash with plenty of water.

If skin irritation or rash occurs: Get medical advice/attention.

IF IN EYES

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 SWALLOWED

Rinse mouth.

IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media suitable for surrounding facilities.

In case of fire, use spraying loaded liquid, foam (water-soluble liquid: alcohol-resistant foam), inactive gases, dry powder, dry sand to extinguish.

*Fire Service Act Group 4 Hazardous Materials

Unsuitable extinguishing media

Indoor Fire Plug System or Outdoor Fire Plug System

Sprinkler System

Dry Chemical Extinguishing System-Others (except for phosphates etc., Hydrogen Carbonates etc.)

Fire Extinguisher Discharging Jet Water/Spraying Water

Fire Extinguisher Discharging Jet Loaded Liquid



Fire Extinguisher Discharging Dry Extinguishing agents-Others (except for phosphates etc., Hydrogen Carbonates etc.)

Water Bucket or Water Tank

*Cabinet Order Concerning the Control of Hazardous Materials (Attached Table 5) Group 4 Hazardous Materials

Specific hazards arising from the substance or mixture

Fire may produce irritating, corrosive and/or toxic gases.

Runoff from fire control or dilution water may cause pollution.

See "10.Stability and Reactivity".

Advice for firefighters

Special extinguishing method

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire resistant or flame retardant clothing.

Wear protective gloves/protective clothing/eye protection/face protection.

Firefighters should wear self-contained breathing apparatus with a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unauthorized personnel away.

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses, low areas or rivers. To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for containment and cleaning up

Liquid: Absorb spill with inert material (dry sand, earth, et al), then place in a chemical waste container.

Solid: Sweep up, place in a bag and hold for waste disposal.

Preventive measures for secondary accident

Collect spillage.

Section 7. Handling and storage

Handling

Engineering measures

(Measures to prevent operator exposure)

Do not breathe dust/fume/gas/mist/vapors/spray.

(Measures to prevent fire and explosion)

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Ground and bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment.

Use non-sparking tools.

Take action to prevent static discharges.

(Local ventilation/general ventilation)

Exhaust/ventilator should be available.

**(Precautions)**

Avoid contact with skin.

Avoid contact with eyes.

Advice on safe handling

Do not handle until all safety precautions have been read and understood.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

Wash hands and contaminated parts thoroughly after handling.

When using do not eat, drink or smoke.

Avoidance of contact

See "10.Stability and Reactivity".

Advice on general occupational hygiene

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Take off contaminated clothing and wash it before reuse.

Storage**Conditions for safe storage**

Keep container tightly closed.

Store locked up. (P405)

Store in a cool, dry place. Do not store in direct sunlight.

Storage in accordance with local/national regulation.

Safe packaging material

Use closed unbreakable containers.

Section 8. Exposure controls/personal protection**Permissible concentration****Administrative Control Levels and Concentration standard value**

(1,4-Dioxane)

Japan control value 10ppm

Occupational exposure limit values**The Japan Society for Occupational Health**

(1,4-Dioxane)

1ppm; 3.6mg/m³ (skin)

ACGIH

(1,4-Dioxane)

TWA: 1ppm (Liver dam; URT dam)

Notation

(1,4-Dioxane)

Skin

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.

Washing facilities should be available.

Personal protective equipment

Recommend to use protective equipment in conformity with the standards.

Use appropriate protective equipment in accordance with local/national regulation.

Respiratory protection

Wear respiratory protection (dust-proof mask/gas mask). Select chemical cartridge



corresponding to type of gases when using a gas mask.

Hand protection

Wear impervious protective glove.

Eye/face protection

Wear eye/face protection. Wear safety goggles in cases gas is generated.

Skin and body protection

Wear protective clothing.

Section 9. Physical and Chemical Properties

Physical state: Liquid

Color: Pale yellow

Odor: Characteristic odor

Melting point/Freezing point data is not available.

Boiling point, initial boiling point, or boiling range data is not available.

Flammability data is not available.

Lower and upper explosion limit/flammability limit data is not available.

Flash point: (1,4-Dioxane)12°C

Auto-ignition temperature data is not available.

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: Soluble

Solubility in solvent data is not available.

Partition coefficient n-octanol/water data is not available.

Vapor pressure data is not available.

Density and/or relative density: 1.04

Relative vapor density (Air=1) data is not available.

Particle characteristics data is not available.

Other information

Other information is not available.

Section 10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Stable under normal storage/handling conditions.

Possibility of hazardous reactions

(1,4-Dioxane)

The vapour is heavier than air and may travel along the ground; distant ignition possible.

The substance can form explosive peroxides on exposure to air. Reacts with oxidants and strong acids. Reacts violently with some catalysts. (ICSC 0041)

(Perchloric acid)

May explode on heating. Decomposes on heating. This produces toxic and corrosive fumes. The substance is a strong oxidant. It reacts violently with combustible and reducing materials, organic materials and strong bases. This generates fire and explosion hazard. Attacks many metals. This produces flammable/explosive gas (hydrogen). The acid is unstable if the



concentration is over 72%; may explode by shock or concussion when dry or drying. Mixtures with combustible material (such as paper) may ignite spontaneously at room temperature. (ICSC 1006)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

Strong acids, Strong bases, Oxidizing agents, Reducing agents, Metals, Combustible materials, Organic materials

Hazardous decomposition products

Carbon oxides, Explosive peroxides, Hydrogen

Section 11. Toxicological Information**Information on toxicological effects****Acute toxicity****Acute toxicity (Oral)**

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

rat LD50: 5170 mg/kg (source: NITE)

(Perchloric acid)

rat LD50: 1100 mg/kg (source: NITE)

Acute toxicity (Dermal)

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

rat LD50: 2100 mg/kg (source: NITE)

Acute toxicity (Inhalation)

[Product]

Category 4, Harmful if inhaled

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

vapor: rat LC50: 14250 ppm (4-hour) (source: NITE)

dust/mist: rat : 0 out of 12 animals died at 37000 ppm (133 mg/L) (1-hour), 6 out of 6

animals died at 37000 ppm (133 mg/L) (2-hour), 6 out of 6 animals died at 37000 ppm (133 mg/L) (4-hour) (source: NITE)

Skin corrosion/irritation

[Product]

Category 2, Causes skin irritation

[Data for components of the product]

[NITE-CHRIP]

(Perchloric acid)

Category 1 (source: NITE)

Serious eye damage/irritation

[Product]

Category 2, Causes serious eye irritation

[Data for components of the product]



[NITE-CHRIP]

(1,4-Dioxane)

Category 2 (source: NITE)

(Perchloric acid)

Category 1 (source: NITE)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenicity

[Product]

Category 1B, May cause cancer

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

Category 1B (source: NITE)

(Perchloric acid)

Category 2 (source: NITE)

[IARC]

(1,4-Dioxane)

Group 2B : Possibly carcinogenic to humans

[ACGIH]

(1,4-Dioxane)

A3: Confirmed Animal Carcinogen with Unknown Relevance to Humans

[JSOH]

(1,4-Dioxane)

Group 2B: The agents which are probably or possibly carcinogenic to humans

[NTP]

(1,4-Dioxane)

RAHC : Reasonably Anticipated to be Human Carcinogens

[EU]

(1,4-Dioxane)

Category 1B; Substances presumed to have carcinogenic potential for humans

Reproductive toxicity

[Data for components of the product]

[NITE-CHRIP]

(Perchloric acid)

Category 2 (source: NITE)

Specific target organ toxicity – single exposure

[Product]

Category 3, May cause respiratory irritation

Category 3, May cause drowsiness or dizziness

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

Category 3 (Respiratory tract irritation), Category 3 (Narcotic effects) (source: NITE)

(Perchloric acid)

Category 3 (Respiratory tract irritation) (source: NITE)

Specific target organ toxicity – repeated exposure

[Product]

Category 1, Causes damage to organs through prolonged or repeated exposure



Category 2, May cause damage to organs through prolonged or repeated exposure

[Data for components of the product]

[NITE-CHRIP]

(1,4-Dioxane)

Category 1 (liver, central nervous system, respiratory system, kidneys) (source: NITE)

(Perchloric acid)

Category 1 (thyroid) (source: NITE)

Aspiration hazard data is not available.

Section 12. Ecological Information

Toxicity

Aquatic toxicity

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[NITE-CHRIP]

(1,4-Dioxane)

Fish (*Oryzias latipes*) 96-hour LC50: > 100 mg/L (source: NITE)

Crustacea (*Daphnia magna*) 48-hour EC50: > 1000 mg/L (source: NITE)

Algae (*Pseudokirchneriella subcapitata*) 72-hour ErC50: > 1000 mg/L (source: NITE)

(Perchloric acid)

Crustacea (*Daphnia magna*) 48-hour LC50: 495 mg/L (converted value 490 mg ClO₄⁻/L) (source: NITE)

Fish (*Danio rerio*) 96-hour LC50: 1131 mg/L (converted value 1120 mg ClO₄⁻/L) (source: NITE)

Hazardous to the aquatic environment, long-term (chronic)

[NITE-CHRIP]

(Perchloric acid)

Crustacea (*Ceriodaphnia dubia*) 7-day NOEC (reproduction inhibition): 10.1 mg/L (converted value 10 mg ClO₄⁻/L) (source: NITE)

Fish (*Pimephales promelas*) 35-day NOEC (growth, survival): >= 495 mg/L (converted value >= 490 mg ClO₄⁻/L) (source: NITE)

Water solubility

(1,4-Dioxane)

not poorly water-soluble (1000000 mg/L) (source: NITE)

Persistence and degradability

Persistence and degradability data is not available.

Bioaccumulative potential

[Data for components of the product]

(1,4-Dioxane)

log Pow: -0.27 (source: ICSC, 2008)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

Section 13. Disposal considerations

Waste from residues

Dispose of contents/container as industrial waste. Accordance with local/national



regulation.

Section 14. Transport Information**UNRTDG**

UN number : UN1165

UN Proper Shipping Name : DIOXANE

Transport hazard class(es) : 3

Packing group : II

IMDG Code (International Maritime Dangerous Goods Regulations)

UN number : UN1165

UN Proper Shipping Name : DIOXANE

Transport hazard class(es) : 3

Packing group : II

IATA (Dangerous Goods Regulations)

UN number : UN1165

UN Proper Shipping Name : DIOXANE

Transport hazard class(es) : 3

Hazard labels : Flamm. liquid

Packing group : II

Environmental hazards

Marine pollutants (yes/no) : no

Environmentally hazardous substance/mixture (yes/no) : no

ERG GUIDE No.: 127

Section 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Toxic Substances Control Act (TSCA) Inventory

Chemicals listed in TSCA Inventory

1,4-Dioxane; Perchloric acid

Other regulatory information

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

Section 16. Other information

References and sources for data

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 23rd edit., 2023 UN

IMDG Code, 2024 Edition (Incorporating Amendment 42-24)

IATA Dangerous Goods Regulations (67th Edition) 2026

2024 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2026 TLVs and BEIs. (ACGIH)

JIS Z 7252 : 2019

JIS Z 7253 : 2019

Recommendation of occupational exposure limits (2024-2025) (JSOH)

Supplier's data/information

General Disclaimer



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Unauthorized translation or modification is prohibited.

Please provide SDS to customers for selling or transferring.

All chemicals have unknown hazard. Handle the product with care.

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties.

The GHS classification data given here is based on current Data published in Japan (National Institute of Technology and Evaluation (NITE) Chemical Risk Information Platform (NITE-CHRIIP), up to FY2024).