



Safety Data Sheet

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-2

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

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

Division: Safety Management Dept. of Chemicals

Telephone number: +81-6-6946-8061

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2. Hazards identification

GHS classification and label elements of the product

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 1(CNS)

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

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

Specific target organ toxicity – repeated exposure: Category 1(kidney; liver; CNS)

Specific target organ toxicity – repeated exposure: Category 2(thyroid gland; respiratory system)

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

Label elements



Signal word: Danger

HAZARD STATEMENT

Highly flammable liquid and vapor

Harmful if inhaled

Causes skin irritation

Causes serious eye irritation

May cause cancer

Causes damage to organs after single exposure(CNS)

May cause respiratory irritation

May cause drowsiness or dizziness

Causes damage to organs through prolonged or repeated exposure(kidney; liver; CNS)

May cause damage to organs through prolonged or repeated exposure(thyroid gland; respiratory system)

PRECAUTIONARY STATEMENT



0.1mol/L(N/10)-Perchloric acid (1,4-dioxane solution),A0155E-2,04/12/2020

Prevention

- Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Use only outdoors or in a well-ventilated area.
- Wash contaminated parts thoroughly after handling.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Do not eat, drink or smoke when using this product.

Response

- In case of fire: Use appropriate media other than water for extinction.
- Get medical advice/attention if you feel unwell.
- IF exposed or concerned: Get medical advice/attention.
- Call a POISON CENTER or doctor/physician if you feel unwell.
- IF exposed or concerned: Call a POISON CENTER or doctor/physician.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF ON SKIN: Wash with plenty of soap and water.
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If skin irritation occurs: Get medical advice/attention.
- Take off contaminated clothing and wash it before reuse.
- 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.

Storage

- Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Disposal

- Dispose of contents/container in accordance with local/national regulation.

Specific Physical and Chemical hazards

- Highly flammable liquid. Vapor/air mixture may explode.

3. Composition/information on ingredients

Mixture/Substance selection:

Mixture

Ingredient name:Perchloric acid

Content (%):0.97

Chemical formula:HClO₄

Chemicals No, Japan:1-221

CAS No.:7601-90-3

MW:100.46

ECNO:231-512-4

Ingredient name:1,4-Dioxane

Content (%):99

Chemical formula:C₄H₈O₂

Chemicals No, Japan:5-839

CAS No.:123-91-1

MW:88.11

ECNO:204-661-8

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



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products may exceed the figures shown above.

4. First-aid measures

Descriptions of first-aid measures

General measures

Get medical attention/advice if you feel unwell.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN (or hair)

Take off immediately all contaminated clothing. Rinse skin with water/shower.

Wash with plenty of soap and water.

If skin irritation or rash 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 SWALLOWED

Rinse mouth.

Call a POISON CENTER or doctor/physician if you feel unwell.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use water mist, foam, dry powder, CO₂ to extinguish.

Unsuitable extinguishing media

Indoor firefighting equipment or outdoor firefighting equipment

Sprinkler equipment

Dry-powder firefighting equipment – except for phosphate etc.,hydrogen carbonate etc.

Straight stream water extinguisher

Water mist extinguisher

Reinforcing liquid jet extinguisher

Dry-powder extinguisher – except for phosphate etc.,hydrogen carbonate etc.

Bucket of water or tank of water

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire/flame resistant/retardant clothing.

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

Firefighters should wear self-contained breathing apparatus with full face piece operated positive pressure mode.

6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses or low areas.

Methods and materials for containment and cleaning up

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



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container.

Preventive measures for secondary accident

Collect spillage.

7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

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

(Protective measures against fire and explosion)

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

(Exhaust/ventilator)

Exhaust/ventilator should be available.

(Safety treatments)

Avoid contact with skin.

Avoid contact with eyes.

Safety Measures

Use only outdoors or in a well-ventilated area.

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

When using do not eat, drink or smoke.

Any incompatibilities

See "10.Stability and Reactivity"

Advice on general occupational hygiene

Wash contaminated parts 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 in a cool, dry place. Do not store in direct sunlight.

Container and packaging materials for safe handling

Glass

8. Exposure controls/personal protection

Control parameters

Adopted value

(1,4-Dioxane)

ACGIH(1996) TWA: 20ppm (Liver dam)

Notation

(1,4-Dioxane)

Skin

OSHA-PEL

(1,4-Dioxane)

TWA: 100ppm, 360mg/m³

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.



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Washing facilities should be available.

Individual protection measures

Respiratory protection

Wear respiratory protection.

Hand protection

Wear protective gloves.

Eye protection

Wear eye/face protection.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Liquid

Color: Pale yellow

Odor: Characteristic odor

Melting point/Freezing point data is not available.

Boiling point or initial boiling point data is not available.

Boiling range data is not available.

Flammability (gases, liquids and solids) 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

n-Octanol/water partition coefficient 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.

No Particle characteristics data is not available.

10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Stable under normal storage/handling conditions.

Possibility of hazardous reactions

(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)

(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)

Conditions to avoid

Contact with incompatible materials.



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Contact with fire source.

Incompatible materials

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

Hazardous decomposition products

Carbon oxides, Hydrogen, Explosive peroxides

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[GHS Cat. Japan, base data]

(Perchloric acid)

rat LD50=1100mg/kg (MOE assessment vol.9, 2011)

Acute toxicity (Dermal)

[GHS Cat. Japan, base data]

(1,4-Dioxane)

rat LD50=2100mg/kg (CERI/NITE risk assessment, 2006)

Acute toxicity (Inhalation)

[GHS Cat. Japan, base data]

(1,4-Dioxane)

vapor: rat LC50=9158ppm/4hr (CERI/NITE risk assessment, 2006)

Irritant properties

Skin corrosion/irritation

[GHS Cat. Japan, base data]

(Perchloric acid)

human corrosive (MOE risk assessment vol.9, 2011; NICNAS IMAP, Accessed Oct. 2018)

(1,4-Dioxane)

rabbit moderate irritation (CERI/NITE risk assessment, 2006)

Serious eye damage/irritation

[GHS Cat. Japan, base data]

(Perchloric acid)

skin corrosive/irritation class 1

(1,4-Dioxane)

human/rabbit (EU-RAR No.21, 2002 et al)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenicity

[GHS Cat. Japan, base data]

(Perchloric acid)

cat.2; (MOE risk assessment vol.9, 2011)

(1,4-Dioxane)

cat.1B; (MHLW carcinogenicity examination, 1990)

(1,4-Dioxane)

IARC-Gr.2B : Possibly carcinogenic to humans

(1,4-Dioxane)

ACGIH-A3(1996) : Confirmed Animal Carcinogen with Unknown Relevance to Humans

(1,4-Dioxane)

EU-Category 2; Substances suspected human carcinogens

Reproductive toxicity

[GHS Cat. Japan, base data]

(Perchloric acid)

cat. 2; rat : MOE risk assessment vol.9, 2011



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STOT

STOT-single exposure

[cat.1]

[GHS Cat. Japan, base data]

(1,4-Dioxane)

CNS (MOE risk assessment vol.2, 2003)

[cat.3 (resp. irrit.)]

[GHS Cat. Japan, base data]

(Perchloric acid)

respiratory tract irritation (MOE risk assessment vol.9, 2011)

(1,4-Dioxane)

respiratory tract irritation (ATSDR, 2007)

[cat.3 (drow./dizz.)]

[GHS Cat. Japan, base data]

(1,4-Dioxane)

narcotic effect (ATSDR, 2007)

STOT-repeated exposure

[cat.1]

[GHS Cat. Japan, base data]

(Perchloric acid)

thyroid gland (MOE risk assessment vol.9, 2011)

(1,4-Dioxane)

kidney; liver; CNS (CERI/NITE risk assessment, 2004)

[cat.2]

[GHS Cat. Japan, base data]

(1,4-Dioxane)

respiratory system (MOE risk assessment vol.2, 2003)

Aspiration hazard data is not available.

12. Ecological Information

Ecotoxicity

Aquatic toxicity

Hazardous to the aquatic environment (Acute)

[GHS Cat. Japan, base data]

(1,4-Dioxane)

Fish (top minnow) LC50 > 100mg/L/96hr (MOE Japan, 1995)

(Perchloric acid)

Crustacea (Daphnia magna) LC50 = 495mg/L/48hr [490mg ClO4-/L/48hr cal.] (MOE risk assessment vol.9, 2011)

Hazardous to the aquatic environment (Long-term)

[GHS Cat. Japan, base data]

(Perchloric acid)

Fish (fat head minnow) NOEC ≥ 495 mg/L/35days (≥ 490mg ClO4-/L/35days cal.)(MOE risk assessment vol.9, 2011)

Water solubility

(1,4-Dioxane)

100 g/100 ml (PHYSPROP_DB, 2005)

(Perchloric acid)

miscible (ICSC, 2000)

Persistence and degradability

Persistence and degradability data is not available.

Bioaccumulative potential

(1,4-Dioxane)



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log Pow=-0.27 (ICSC, 2008)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

13. Disposal considerations

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging

Waste treatment methods

Dispose of contents/container in accordance with local/national regulation.

14. Transport Information

UN No.: 1165

Proper Shipping Name :

DIOXANE

Class or division : 3

Packing group : II

ERG GUIDE No.: 127

IMDG Code (International Maritime Dangerous Goods Regulations)

UN No.: 1165

Proper Shipping Name :

DIOXANE

Class or division : 3

Packing group : II

IATA Dangerous Goods Regulations

UN No.: 1165

Proper Shipping Name :

DIOXANE

Class or division : 3

Hazard labels : Flamm.liquid

Packing group : II

Environmental hazards

MARPOL Annex III – Prevention of pollution by harmful substances

Marine pollutants (yes/no) : no

MARPOL Annex V – Prevention of pollution by garbage discharge

Carcinogenicity: cat.1, 1A, 1B

1,4-Dioxane

Specific target organ toxicity – repeated exposure: cat.1

1,4-Dioxane

Transport in bulk according to Annex II of MARPOL73/78 and IBC Code

Noxious Liquid ; Cat. Y

1,4-Dioxane

15. Regulatory Information

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

US Federal Regulations

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



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regulations.

16. Other information

GHS classification and labelling

Flam. Liq. 2: H225 Highly flammable liquid and vapor

Acute Tox. 4: H332 Harmful if inhaled

Skin Irrit. 2: H315 Causes skin irritation

Eye Irrit. 2: H319 Causes serious eye irritation

Carc. 1B: H350 May cause cancer

STOT SE 1: H370 Causes damage to organs after single exposure

STOT SE 3: H335 May cause respiratory irritation

STOT SE 3: H336 May cause drowsiness or dizziness

STOT RE 1: H372 Causes damage to organs through prolonged or repeated exposure

Reference Book

Globally Harmonized System of classification and labelling of chemicals, (7th revised edition, 2017), UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 20th edit., 2017 UN

IMDG Code, 2018 Edition (Incorporating Amendment 39-18)

IATA Dangerous Goods Regulations (61th Edition) 2020

Classification, labelling and packaging of substances and mixtures (Table 3 ECNO6182012)

2016 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2020 TLVs and BEIs. (ACGIH)

<http://monographs.iarc.fr/ENG/Classification/index.php>

Supplier's data/information

General Disclaimer

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 Japan official data (NITE published in 2019).