



Safety Data Sheet

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

Product identifier:

Product name: 0.02mol/L(N/50)-Perchloric acid (acetic acid solution)

SDS No. : A0273E-2

Relevant identified uses of the substance or mixture and uses advised against
Research and Development**Details of the supplier of the safety data sheet**

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

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Section 2. Hazards identification

GHS classification and label elements of the product**Classification of the substance or mixture****PHYSICAL AND CHEMICAL HAZARDS**

Flammable liquids: Category 3

HEALTH HAZARDS

Acute toxicity (Dermal): Category 4

Skin corrosion/irritation: Category 1

Serious eye damage/eye irritation: Category 1

Specific target organ toxicity – single exposure: Category 1 (blood; respiratory system/system)

ENVIRONMENT HAZARDS

Hazardous to the aquatic environment, short-term (acute): Category 3

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

Label elements

Signal word: Danger

HAZARD STATEMENT

Flammable liquid and vapor

Harmful in contact with skin

Causes severe skin burns and eye damage

Causes serious eye damage

Causes damage to organs (blood; respiratory system/system)

Harmful to aquatic life

PRECAUTIONARY STATEMENT**Prevention**

Avoid release to the environment.

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

Keep container tightly closed.

Ground and bond container and receiving equipment.



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- Use explosion-proof electrical/ventilating/lighting equipment.
- Use non-sparking tools.
- Take action to prevent static discharges.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- 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 to extinguish.
- Call a POISON CENTER/doctor/physician if you feel unwell.
- IF exposed or concerned: Call a POISON CENTER/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 or shower.
- Wash contaminated clothing before reuse.
- 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 SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Storage

- Store in a well-ventilated place. Keep cool.

Disposal

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

Specific Physical and Chemical hazards

- Flammable liquid. Vapor/air mixture may explode.

Section 3. Composition/information on ingredients

Mixture/Substance selection:

Mixture

Ingredient name:Perchloric acid
Content (%):0.19
Chemical formula:HClO₄
Chemicals No, Japan:1-221
CAS No.:7601-90-3
MW:100.46
ECNO:231-512-4

Ingredient name:Acetic acid
Content (%):99
Chemical formula:C₂H₄O₂
Chemicals No, Japan:2-688
CAS No.:64-19-7
MW:60.05
ECNO:200-580-7

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

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

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

IF ON SKIN (or hair)

Take off immediately all contaminated clothing. Rinse skin with water or 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. Do NOT induce vomiting.

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

Section 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 – other (except for phosphate etc.,hydrogen carbonate etc.)

Straight stream water extinguisher

Water mist extinguisher

Reinforcing liquid jet extinguisher

Dry-powder extinguisher – other (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 resistant or flame 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.

Section 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 container.

Preventive measures for secondary accident

Collect spillage.

**Section 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, 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.

(Exhaust/ventilator)

Exhaust/ventilator should be available.

(Safety treatments)

Avoid contact with skin.

Avoid contact with eyes.

Safety Measures

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

Section 8. Exposure controls/personal protection

Control parameters

Adopted value

(Acetic acid)

ACGIH(2003) TWA: 10ppm;

STEL: 15ppm (URT & eye irr; pulm func)

OSHA-PEL

(Acetic acid)

TWA: 10ppm, 25mg/m³

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.

Washing facilities should be available.

Individual protection measures

Respiratory protection

Wear respiratory protection.

Hand protection

Wear protective gloves.



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Eye protection

Wear eye/face protection.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Liquid

Color: Colorless

Odor: Irritant 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: (Acetic acid)41°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: 1.05

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

Particle characteristics data is not available.

Section 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)

(Acetic acid)

The substance is a weak acid. Reacts violently with strong oxidants. This generates fire and explosion hazard. Reacts violently with strong bases, strong acids and many other compounds. Attacks some forms of plastic, rubber and coatings. (ICSC 0363)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

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

Hazardous decomposition products

Carbon oxides, Hydrogen

**Section 11. Toxicological Information**

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Data for components of the product]

[GHS Cat. Japan, base data]

(Perchloric acid)

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

(Acetic acid)

rat LD50=3310mg/kg (PATTY 5th, 2001)

Acute toxicity (Dermal)

[Data for components of the product]

[GHS Cat. Japan, base data]

(Acetic acid)

rabbit LD50=1060mg/kg (PATTY 5th, 2001)

Irritant properties

Skin corrosion/irritation

[Data for components of the product]

[GHS Cat. Japan, base data]

(Perchloric acid)

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

(Acetic acid)

rabbit/guinea pig severe burn (PATTY 5th, 2001 et al)

Serious eye damage/irritation

[Data for components of the product]

[GHS Cat. Japan, base data]

(Perchloric acid)

skin corrosive/irritation class 1

(Acetic acid)

rabbit permanent corneal damage (IUCLID, 2000 et al)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenicity

[Data for components of the product]

[GHS Cat. Japan, base data]

(Perchloric acid)

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

Reproductive toxicity

[Data for components of the product]

[GHS Cat. Japan, base data]

(Perchloric acid)

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

Specific target organ toxicity (STOT)

STOT-single exposure

[Data for components of the product]

[cat.1]

[GHS Cat. Japan, base data]

(Acetic acid)

blood; respiratory system/system (ACGIH, 2004)

[cat.3 (respiratory tract irritation)]

[GHS Cat. Japan, base data]

(Perchloric acid)

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



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STOT-repeated exposure data is not available.

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)

[GHS Cat. Japan, base data]

(Acetic acid)

Crustacea (Daphnia magna) EC50=65mg/L/48hr (Aquire, 2010)

(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 (chronic)

[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

(Acetic acid)

miscible (ICSC, 2010)

(Perchloric acid)

miscible (ICSC, 2000)

Persistence and degradability

[Data for components of the product]

(Acetic acid)

BOD_Degradation : 74% (Registered chemicals data check & review)

Bioaccumulative potential

[Data for components of the product]

(Acetic acid)

log Pow=-0.17 (PHYSPROP DB, 2005)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

Section 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

Avoid release to the environment.

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

Section 14. Transport Information

UN Number or ID Number : 2789

UN Proper Shipping Name :

ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass

Class or division (Transport hazard class) : 8

Subsidiary hazard(s) : 3

Packing group : II



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ERG GUIDE No.: 132

IMDG Code (International Maritime Dangerous Goods Regulations)

UN Number or ID Number : 2789

UN Proper Shipping Name :

ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass

Class or division (Transport hazard class) : 8

Subsidiary hazard(s) : 3

Packing group : II

IATA (Dangerous Goods Regulations)

UN Number or ID Number : 2789

UN Proper Shipping Name :

ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass

Class or division (Transport hazard class) : 8

Subsidiary hazard(s) : 3

Hazard labels : Corrosive & Flamm.liquid

Packing group : II

Environmental hazards

Marine pollutants (yes/no) : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Noxious Liquid Substances ; Cat. Z

Acetic acid

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

Acetic acid; Perchloric acid

Other regulatory information

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

Section 16. Other information

GHS classification and labelling

Flammable liquids, Category 3: H226 Flammable liquid and vapour

Acute toxicity, Category 4: H312 Harmful in contact with skin

Skin corrosion/irritation, Category 1: H314 Causes severe skin burns and eye damage

Serious eye damage/eye irritation, Category 1: H318 Causes serious eye damage

STOT – single exposure, Category 1: H370 Causes damage to organs

Hazardous to the aquatic environment, short-term (acute), Category 3: H402 Harmful to aquatic life

References and sources for data

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 21th edit., 2019 UN

IMDG Code, 2020 Edition (Incorporating Amendment 40–20)

IATA Dangerous Goods Regulations (62nd Edition) 2021

2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2022 TLVs and BEIs. (ACGIH)

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



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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 2021).