

Safety Data Sheet

1. Chemical product and company identification

Product name : 2-Butanol

Company information

Name of manufacturer : KANTO CHEMICAL CO., INC.
 Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP
 Name of section : Business Administration Department, Reagent Division
 Telephone number : +81-3-6214-1090
 Facsimile number : +81-3-3241-1047
 Mail address : BC32@kanto.co.jp
 Reference No : 04458

Product numbers applied by the SDS : 04458, 04461

Recommended use : For research use only

Restrictions on use : Seek expert judgment when using the product for applications other than those recommended.

2. Hazards identification

GHS classification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity (inhalation:vapors)	Category 4
	Serious eye damage/eye irritation	Category 2A
	Reproductive toxicity	Category 2
	Specific target organ toxicity (single exposure)	Category 3 (narcosis)
	Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation.)

Hazard pictograms



Signal word : Warning

Hazard statements : Flammable liquid and vapor
 Causes serious eye irritation
 Harmful if inhaled
 May cause respiratory irritation
 May cause drowsiness or dizziness
 Suspected of damaging fertility or the unborn child

Precautionary statements

Prevention : Do not handle until all safety precautions have been read and understood.
 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. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take action to prevent static discharges. Avoid breathing mist/vapors. Wash hands, forearms and face thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.
Response	: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water . IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/attention. Call a POISON CENTER or doctor if you feel unwell. If eye irritation persists: Get medical advice/attention.
Storage	: Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
Disposal	: Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

3. Composition/information on ingredients

Distinction of substance or mixture	: Substance
Synonyms	: sec-Butyl alcohol, 2-Hydroxybutane

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
2-Butanol	≥ 99	C4H10O	Listed	201-158-5	78-92-2

4. First aid measures

First aid measures

First-aid measures after inhalation	: Remove the victim to fresh air, and make him blow his nose and gargle. If necessary, get medical treatment.
First-aid measures after skin contact	: Wash the affected areas under running water.
First-aid measures after eye contact	: Wash the affected areas under running water for at least 15 minutes. If necessary, get medical treatment.
First-aid measures after ingestion	: The chemical is volatile. Do not induce vomiting because it increases the risk of aspiration into the lungs. Get medical attention immediately. If necessary, rinse mouth with water.
Personal Protection in First Aid and Measures	: Rescuers should wear proper protective equipment like rubber gloves, goggles.

Most Important Symptoms/Effects

Symptoms/effects	: Inhalation causes cough, headache, feeling of fatigue, and lethargy.
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5. Fire fighting measures

- Suitable extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand, alcohol resistant foam
- Unsuitable extinguishing media : Foam extinguisher
- Firefighting instructions : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.
Fight fire from windward.
Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Alcohol-resistant foam extinguisher is effective for a large scale fire.
- Personal protection (Emergency response) : Wear breathing apparatus.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

- General measures : Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

Environmental precautions

- Environmental precautions : Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.

Methods and Equipment for Containment and Cleaning up

- For containment : Absorb spill with inert material (e.g. diatomaceous earth, sand) and flush spillage area with copious amounts of water.
- Prevention Measures for Secondary Accidents : Remove nearby sources of ignition and prepare extinguishing media.

7. Handling and storage

Handling

- Technical measures : Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited.
Ventilate well at working places.
Prevent build-up of electrostatic charges (e.g. by grounding) .
- Precautions for safe handling : Use with an enclosed system or a local exhaust ventilation.
Handle in a well-ventilated place. When outdoors, work is done from the windward.
Do not allow contact with oxidizing substances.

Storage

- Storage conditions : Store in a dark, cool place and tightly closed.
- Material used in packaging/containers : Glass, fluorine resin, stainless steel.
Do not use polyvinyl chloride resin, acrylic resin.

8. Exposure controls / Personal protection equipment

ACGIH TWA	100 ppm
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Appropriate engineering controls : Use with an enclosed system or a local exhaust ventilation.

Protective equipment

Respiratory protection : If necessary, wear gas mask for organic solvents or airline respirator.

Hand protection : Impervious protective gloves

Eye protection : Safety goggles

Skin and body protection : Protective clothing, protective boots

9. Physical and chemical properties

Physical state : Liquid

Color : Colorless.

Odor : Wine-like odor

pH : No data available

Melting point : -114.7 ° C

Freezing point : No data available

Boiling point : 99.5 ° C

Flash point : 24 ° C (C.C.)

Auto-ignition temperature : 390 ° C

Decomposition temperature : No data available

Flammability : Flammable

Vapor pressure : 17 hPa (20°C)

Relative density : No data available

Density : 0.806 - 0.808 g/cm³ (20°C)

Relative gas density : 2.55

Solubility : Organic solvents: Soluble in many kinds of organic solvents such as ethanol, diethyl ether, aromatic hydrocarbons.
Water: 12.5 % (20°C)

Partition coefficient n-octanol/water (log Pow) : 0.61

Explosive limits (vol %) : 1.7 - 9.8 vol %

Viscosity, kinematic : 5.22 mm²/s (20°C)

Particle characteristics : No data available

10. Stability and reactivity

Reactivity : May react with oxidizing substances.

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : Stable under normal conditions of use.

Conditions to avoid : Light, heat.

Incompatible materials : Oxidizing substances.

Hazardous decomposition products : Carbon monoxide.



11. Toxicological information

Acute toxicity (oral)	:	No classification rat LD50=2193mg/kg
Acute toxicity (dermal)	:	No classification rat LD50>2000mg/kg
Acute toxicity (inhalation)	:	No classification (gas) Harmful if inhaled (vapor) rat LC50=8000-16000ppm/4h Classification not possible (dust, mist)
Skin corrosion/irritation	:	No classification There is a report that in a skin irritation test (OECD TG 404) with rabbits, the primary irritation score was 0, and it was not irritating, and there are descriptions that it was not irritating to the skin, and that it was very slightly irritating.
Serious eye damage/irritation	:	Causes serious eye irritation It is described that in an eye irritation test with rabbits (OECD TG 405), since moderate conjunctival inflammation, transient injury in the iris and corneal opacity were observed, and the symptoms did not disappear on the 7th day in 1 animal, it was corrosive. In addition, there are descriptions that the vapour of this substance caused severe corneal injury, and that it was moderately irritating. From the above results, although there are descriptions of "corrosive," it was a report with only 1 animal, and the reversibility after 21 days was unknown. Moreover, it was judged to be moderately to severely irritating in each evaluation document. Therefore, it was classified into category 2A.
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	No classification There is a report that in a sensitization test with guinea pigs (OECD TG 406, GLP-compliant), no sensitization was observed, and reaction to the positive control group was appropriate. Moreover, there are reports that also in other sensitization tests (Freund's complete adjuvant test, Maximization test), no sensitization was observed in 20 animals tested.
Germ cell mutagenicity	:	Classification not possible There was no in vivo data. As for in vitro, it was negative in bacterial reverse mutation tests and a chromosomal aberration test with cultured mammalian cells.
Carcinogenicity	:	Classification not possible
Reproductive toxicity	:	Suspected of damaging fertility or the unborn child In a two-generation reproduction toxicity study with rats by the oral route, although mild toxicity due to stress was observed in parental animals at a very high dose, there were no effects on the fertility, and only minimum effects were observed. On the other hand, in a teratogenicity test with rats by the inhalation route, at a dose where maternal toxicities were observed, although a reduced number of live fetuses, increased embryo resorptions and reduced fetal body weights were observed, no teratogenicity was observed. Therefore, it was classified into category 2.

- STOT-single exposure : May cause drowsiness or dizziness
 May cause respiratory irritation
 This substance was irritating to the respiratory tract. In humans, it caused headaches, nausea, dizziness and deep narcotic effects at high concentrations. As for experimental animals, by inhalation exposure to rats and mice at high concentrations there are reports of central nervous system depression effects or deep narcotic effects, such as gait abnormalities, ataxia, collapse, decreased respiratory rate, coma and prostration. However, it was judged to be narcotic effects at high concentrations. From the above, it was classified into category 3 (respiratory tract irritation, narcosis).
- STOT-repeated exposure : Classification not possible
 There were no findings from repeated exposure in humans. Also, in experimental animals, there were no standard repeated-dose toxicity study reports available for classification. Therefore, classification was not possible due to lack of data. However, it is described that in a two-generation reproduction toxicity study with rats, by oral administration to F1 generation 12 weeks after weaning, slight effects on the kidney were observed at a concentration of 20000 ppm, and NOAEL was corresponding to 10000 ppm. Therefore, it is considered that the toxicity was low by the oral route. In addition, by the inhalation route, there is a description that when mice were exposed by inhalation to the vapour of this substance at a high concentration of 20000 ppm for 117 hours, there were no death animals, and narcotic effects were observed.
- Aspiration hazard : Classification not possible

12. Ecological information

Ecotoxicity

- Aquatic acute : No classification
 Pimephales promelas LC50=3670mg/L/96h
- Aquatic chronic : No classification

Persistence and degradability

Readily biodegradable
 BOD : 73.5%

Bioaccumulative potential

Low bioconcentration
 BCF : 3

Mobility in soil

High mobility
 Koc : 50

Hazardous to the ozone layer

- Ozone : Classification not possible

13. Disposal considerations

- Ecological waste information : Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies

with the disposal.

Contaminated container and packaging : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG) : 1120
 Proper Shipping Name (IMDG) : BUTANOLS
 Packing group (IMDG) : III
 Transport hazard class(es) : 3

(IMDG)

Air transport(IATA)

UN-No. (IATA) : 1120
 Proper Shipping Name (IATA) : Butanols
 Packing group (IATA) : III
 Transport hazard class(es) : 3

(IATA)

Marine pollutant : Not applicable

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

Pollutant category : Z
 MFAG-No : 129

15. Regulatory information

Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

16. Other information

Data sources : Solvents Handbook, T, Asahara et al, Kodansha Scientific Ltd. (1976) .
 Dictionary of Organic Compounds, The society of Synthetic Organic Chemistry, Kodansha Ltd. (1985) .
 Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .
 Handbook of 17322 Chemical Products, The Chemical Daily Co. (2022) .
 NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet(SDS) is prepared based on JIS Z7253.

