



Material safety data sheet

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Catalog Numbers: 63135

Catalog Name: 2-Butanol

Company Identification:

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CREATION DATE: November 9, 2012

SECTION 2 HAZARDS IDENTIFICATION

Physical and chemical hazard

Flammable liquids	: Category 3
Pyrophoric liquids	: Out of category
Self-heating substances and mixtures	: Out of category
Corrosive to metals	: Out of category

Human health hazard

Acute toxicity Oral	: Out of category
Derma	: Out of category
Skin corrosion/Irritation	: Out of category
Serious eye damage/eye irritation	: Category 2A
Reproductive toxicity	: Category 2
Specific target organ systemic toxicity(single exposure)	: Category 3 (respiratory tract irritation, narcotic effects)

Environmental hazard

Hazardous to the aquatic environment-acute hazard	: Out of category
Hazardous to the aquatic environment-chronic hazard	: Out of category

Pictograms or symbol



Signal word : Warning

Hazard statement: Flammable liquid and vapour

Causes serious eye irritation

Suspected of damaging fertility or the unborn child

May cause respiratory irritation or may cause drowsiness and dizziness
(respiratory tract irritation, narcotic effects)

Cautions

Safety measurements:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces.-No smoking.
- Keep container tightly closed. Keep cool.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Avoid breathing mist/vapours/spray.
- Avoid contact during pregnancy/while nursing.
- Wash hands thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

First-aid measures:

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
- IF ON SKIN (or hair) : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If in eyes : Rinse cautiously with water for several minutes. Remove contact lenses ,if present and easy to do. Continue rinsing. Get medical advice/attention.
- If eye irritation persists: Get medical advice/attention.
- In case of fire: Use water spray, dry chemical powder, alcohol-resistant foam, carbon dioxide for extinction..
- IF exposed or concerned : Get medical advice/attention.

Storage

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

Disposal

- Dispose of contents and containers appropriately in accordance with related regulations.

SECTION 3 COMPOSITION, INFORMATION ON INGREDIENTS

Substance/Mixture : Substance

Component : 2-Butanol

Synonyms : sec-Butyl alcohol

Chemical formula : $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$

Cas number : 78-92-2

US TSCA inventory : Registered

EC number (EINECS): 201-158-5

JAPAN number (ENCS) : 2-3049
Percentage : (GR) 99.0 +% 、 (EP) 99.0 +%

SECTION 4 FIRST AID MEASURES

If inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

If on skin : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

If in eyes : Rinse cautiously with water for several minutes.
Remove contact lenses ,if present and easy to do. Continue rinsing.
If eyes irritation persists, get medical advice/attention.

If swallowed : Rinse mouth. Call a POISON CENTER or doctor/physician.

Potential acute health effects :
Inhalation ; Headache. Dizziness. Drowsiness.
Skin ; Dry skin.
Eyes ; Redness. Pain.
Ingestion ; Dizziness. Drowsiness.

Important signs and symptoms : The substance is irritating to the eyes. Exposure far above the OEL could cause lowering of consciousness. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

Extinguishing media : Water spray, dry chemical powder, alcohol-resistant foam, carbon dioxide

Prohibited extinguishing media : Straight streams of water

Particular fire fighting : Move containers form fire area if it can be done without risk, if not possible, apply water form a safe distance to cool and protect surrounding area.

Protection for firefighters : Firefighters should wear protective equipment.

SECTION 6 ACCIDENTAL RELEASE MEASURES

General Information : Use proper personal protective equipment as indicated in Section 8.

Cautions for environment : Avoid release to the rivers, lakes, ocean, groundwater.

Spills/Leak : Absorb spills with absorbent (vermiculite, sand , fuller's earth) and place into a suitable disposal container for later disposal.

SECTION 7 HANDLING AND STORAGE

Handling: : Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes.
Use only in a chemical fume hood.

Storage: : Store in a cool, dry place.
Store in a tightly closed container.
Store in well-ventilated place.
Keep away from strong oxidants.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering Controls : Use adequate ventilation to keep airborne concentrations low.

Occupational exposure limits

ACGIH (2010) : 100ppm (TLV-TWA)

OELs (2011) : 100ppm

Personal protective equipment :

Eye Protection : Goggles

Hand Protection : Protective gloves

Skin and body protection : Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection : Wear respiratory protection.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Physical State : Liquid

Appearance : Colorless

Odor : Strong vinous odor

pH : Not available

Freezing/Melting Point : -115°C

Boiling Point : 99 °C

Flash Point : 24°C (Closed Cup)

Explosion Limits, lower ~ upper : 1.7-9.8 vol% (at 100°C)

Vapor Pressure : 18.3 mm Hg / 25 °C

Vapor Density (Air = 1) : 2.6

Specific Gravity/Density : 0.808 (20/4°C)

Solubility in water : 125,000 mg/l water at 20 deg C

Octanol/Water Partition Coefficient : log Kow = 0.61

Autoignition Temperature : 406°C (in air)

Decomposition Temperature : Not available

Molecular Formula : C₄H₁₀O

Molecular Weight : 74.12

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability : Stable in ordinary handling conditions. The substance can form explosive peroxides. Vapors may form explosive mixtures with air.

Conditions to Avoid : Contact with sparks, open flames or strong oxidizing agents.

Incompatibilities with Other Materials : Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide.

Hazardous Polymerization : Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute toxicity:

Oral : Classified into out of category based on rat LD₅₀=6,500mg/kg (EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003), PATTY (4th, 1994) and 2,200mg/kg (DFGOT

vol.19 (2003)) .

Dermal : Classified into out of category based on the description that death was not observed at 2,000mg/kg in the dermal administration test using rabbits (DFGOT vol.19 (2003)).

Gas : Not applicable (GHS definition).

Vapours : Not possible to classify because of insufficient data.

Dusts and mists: Not possible to classify because of no data.

Skin corrosion/Irritation: Classified into out of category based on the description that there was no skin irritation in the test using the rabbit, and there was no report that indicated skin irritation in the example of human exposure (EHC 65 (1987), ACGIH (2002), DFGOT vol.19 (2003), and PATTY (4th, 1994)).

Serious eye damage/eye irritation: Classified into category 2A based on the description that the disorder was acknowledged in the conjunctiva, iris and cornea by the rabbit study and the symptoms did not recover in one animal on the Day 7 (DFGOT vol.19 (2003)).

Respiratory sensitization: Not possible to classify because of no data.

Skin sensitization: Not possible to classify because of insufficient data.

Mutagenicity: Not possible to classify because of insufficient data.

Carcinogenic effects: Not possible to classify because of no data.

Effects on the reproductive system: Classified into category 2 based on the description that reduction of live newborns and increase of embryo absorption were observed at the dose in which dam toxicity is observed in the test which carried out inhalation exposure in the gestational age of the rat.

On the other hand, in the two-generation reproduction study by the drinking water medication in rat of ACGIH (2002), DFGOT vol.19 (2003), and the PATTY (4th, 1994), there is no effect on reproductive potential, only the minimum influence (growth retardation of a pup) was observed.

Specific target organ systemic toxicity single exposure: Classified into category 3 (respiratory tract irritation, narcotic effects) based on the description that nasal and throat are stimulated in humans in high exposure levels in ACGIH (2002), DFGOT vol.19 (2003), PATTY (4th, 1994), and Society for Occupational Health Recommendation of Occupational Exposure, and the description that anesthetic actions is seen in humans and mice according to EHC 65 (1987), and in rats and mice inhalation exposure according to DFGOT vol.19 (2003) and PATTY (4th, 1994).

Specific target organ systemic toxicity repeated exposure

: Not possible to classify because of no data.

Aspiration hazard : Not possible to classify because of no data.

SECTION 12 ECOLOGICAL INFORMATION

Ecotoxicity:

Hazardous to the aquatic environment (acute) : Classified into out of category based on 24-hour $EC_{50}=2,300\text{mg/L}$ of Crustacea (Daphnia magna) (EHC65, 1987).

Hazardous to the aquatic environment (chronic) : Classified into out of category based on aqueous solubility($1.81 \times 10^5\text{mg/L}$) (PHYSPROP Database, 2005) , and low acute toxicity.

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose of in a manner consistent with federal, state, and local regulations.

SECTION 14 TRANSPORT INFORMATION

IATA Shipping Name: Butanols
 Hazard Class: 3 (Flammable liquid)
 UN Number: 1120
 Packing Group: III
IMO Shipping Name: BUTANOLS
 Hazard Class: 3 (Flammable liquid)
 UN Number: 1120
 Packing Group: III
RID/ADR Shipping Name: Butanols
 Hazard Class: 3 (Flammable liquid)
 UN Number: 1120
 Packing Group: III

SECTION 15 REGULATORY INFORMATION

Fire Service Act
 : Article 2, Category IV inflammable liquid
Industrial Safety and Health Act
 : Article 18-2, Attached Table 9-477 of Cabinet order
 Article 18, 29_4 of Cabinet order
Ordinance for Enforcement of the Civil Aeronautics Act
 : Article 194 in Regulation 3 inflammable liquid(flash point ; not more than 60 °C)
Regulations for the carriage and storage of dangerous goods in ship
 : Article 2 No.1 (1) inflammable liquids

Substance Registration :
 Australia (AICS) : Registration
 Canada(DSL) : Registration
 Korea number (ECL) : KE-03868
 China(IECSC) : Registration

SECTION 16 OTHER INFORMATION

REFERENCES:

- The Merck Index 14 edition, Monographs No. 1541
- Chemical Risk Information Platform (CHRIP)
- Information about the status of the implementation of GHS in Japan (ID= 913)
- GHS Classification Guidance for the Japanese Government 2nd revised (March, 2010)
- Registry of Toxic Effects of Chemical Substances, No. EO1750000
- International Chemical Safety Cards (ICSC) No. 0112
- Hazardous Substances Data Bank (HSDB)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.

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