

GPS Safety Summary

This Product Safety Summary is intended to provide a brief overview of the information on the risk assessment results of the chemical product that we manufacture based on the chemical industry's Global Product Strategy (GPS) to the general public as a social responsibility of a company that manufacture chemical substances.

This summary is not intended to provide technical information including effects on human health and the environment and details of risk assessment. In addition, it is not intended to be prepared as a document to replace a Safety Data Sheet (SDS) or a risk assessment report like a Chemical Safety Report under the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) (REACH CSR). Although the summary is prepared based on the laws, materials, information and data that are available at the present moment, it does not provide any assurances.

SUBSTANCE NAME

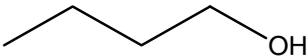
n-butanol (n-butyl alcohol, CAS No. 71-36-3)

GENERAL STATEMENT

n-butanol is a colorless flammable liquid with a specific odor. Generally, it is widely used as a solvent in the processes of chemical synthesis and fiber production or as a raw material for producing other chemical products. n-butanol is also used as a vehicle for paint or as a base for brake fluid or fragrances.

In case of swallowing, skin or eye contact or inhalation of n-butanol, it has adverse effects on health. Therefore, users of n-butanol are advised to wear protectors such as gloves and masks and handle it in a place equipped with a ventilator or local exhaust ventilation. To minimize the adverse effects of n-butanol on environmental organisms and control its release into the environment, the drainage equipment should be monitored regularly and the drainage treatment facility should be maintained and inspected in the factory.

CHEMICAL IDENTITY

Item	Contents
Generic name	n-butanol
Trade name	Normal Butanol
Chemical name	1-butanol(IUPAC name: 1-butanol)
CAS No.	71-36-3
Other numbers	Reference No. listed in the official gazettes (Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.) (2)-3049 Reference No. listed in the official gazettes (Industrial Safety and Health Act) 2-(8)-299 EC No. 200-751-6
Molecular formula	C ₄ H ₁₀ O
Structural formula	
Other information	None in particular

USES AND APPLICATIONS

Main uses of our product Paint vehicle, raw material for other chemical products (shaped resin modifier, adhesive, raw material for paint, solvent, coating agent)

PHYSICAL/CHEMICAL PROPERTIES

A colorless flammable liquid with a specific odor.

Appearance (physical state)	Liquid
Color	Colorless
Odor	Specific odor
Density	0.81 g/cm ³
Melting point/boiling point	-90°C/118°C
Combustibility/flammability	Flammable liquid
Flash point	29°C (closed cup)
Upper/lower limit of explosion	11.2 vol % / 1.4 vol %
Auto ignition temperature	345°C
Vapor pressure	550 Pa(20°C)
Molecular weight	74.12
Water solubility	63.2 g/L (25°C)
Octanol-water partition coefficient	LogKow: 088

HEALTH EFFECTS

N-butanol is harmful if swallowed, causes skin irritation, cause serious eye irritation, has risk of respiratory irritation, may cause drowsiness or dizziness, and may be harmful if swallowed and enters airways, and cause damages to organs (central nervous system) through prolonged or repeated exposure.

Effect assessment	Results (GHS ^{*1} hazard classification)
Acute toxicity (oral ingestion)	Causes injury if swallowed (Class 4)
Acute toxicity (inhalation-gas)	Not applicable ^{*2}
(Inhalation-vapor)	Not classified ^{*3}
(Inhalation-dust/mist)	Classification not possible (No toxicity report information)
Acute toxicity (dermal)	Not classified
Skin corrosion/irritation	Skin irritation (Class 2)
Serious eye damage/eye irritation	Strong eye irritation (Class 2A)
Respiratory sensitization	Classification not possible (No toxicity report information)
Skin sensitization	Classification not possible (No toxicity report information)
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ toxicity (Single exposure)	Risk of respiratory irritation, drowsiness and dizziness (Class 3)
Specific target organ toxicity	Risk of injury to organs (central nervous system) due to

(Repeated exposure) long-term or repeated exposure (Class 1)
 Aspiration hazard Risk of injury if it is swallowed and enters the airway (Class 2)

Source/remarks

*1 GHS: Globally Harmonized System of Classification and Labelling of Chemicals. This system enables us to classify chemicals by hazard type and degree according to globally harmonized rules.
 *2 Not applicable: Because the physical properties defined by GHS are not met, the chemical is not included in the target chemicals of the classification.
 *3 Not classified: Sufficient information has been obtained for classification. In the process of classification, however, evidence fully supporting that the substance concerned was classified into the lowest class in the hazard rating specified by GHS was not confirmed.

ENVIRONMENTAL EFFECTS

N-butanol is sufficiently biodegradable and easily moves in the atmosphere or water. Its bioaccumulation is low.

Effect assessment	Results (GHS hazard classification)
Hazardous to the aquatic environment (acute)	Not classified
Hazardous to the aquatic environment (chronic)	Not classified

Environmental fate/dynamics	Results
Transfer in the environment	Easily transfer to the atmosphere or water.
Biodegradability	Biodegradability is reported to be readily biodegradable.
Bioaccumulation	Bioaccumulation is reported to be low.
Conclusion of PBT/vPvB	Not judged to be PBT* and vPvB**.

*PBT: Persistent, bioaccumulative and toxic (Remaining in the environment and having high bioaccumulative and strong toxic properties)

* vPvB: very Persistent and very Bioaccumulative (Readily remaining in the environment and having very high bioaccumulative property)

EXPOSURE

Because consumers do not use n-butanol, workers and the environment are mainly exposed to it.

Details	No.	Possibility of exposure to n-butanol in the process of use of our products (exposure route)
Workers	1-1	Operations of manufacturing/purification, transferring, mixing and painting
Consumers	2-1	Because consumers do not use n-butanol, their risk of being exposed to it is low.
Environment	3-1	Manufacturing (purification, synthetic reaction, mixing reaction), blending (mixing), use (painting)
Warnings		The possibility of exposure to n-butanol may exist in the process of using our products for other purposes. In this case, appropriate action should be taken in consideration of the risk management recommendations.

RISK MANAGEMENT RECOMMENDATIONS

To minimize health hazards resulting from swallowing of, skin or eye contact with or inhalation of n-butanol, dermal exposure to it during transferring or painting and inhalation exposure during manufacturing, transferring or painting should be prevented. Installation of ventilators or local exhaust ventilation is recommended. Workers are advised to wear appropriate protectors including gloves and masks.

A factory should not release n-butanol into the atmosphere or water to minimize its effect on environmental organisms. Thus, the drainage equipment should be monitored regularly and the drainage treatment facility should be maintained and inspected in the factory.

Details	No.	Management recommendations based on our risk assessment results
Measures for protecting workers from being exposed to n-butanol	1-1	Wear appropriate protectors that prevent dermal absorption, skin or eye contact and inhalation of vapor before you use the products containing n-butanol. Use local ventilating apparatus to assure sufficient ventilation while using them in a room. Instruct workers on how to select and use the appropriate protective equipment properly and how to manage the workplace with ventilators.
Measures for protecting consumers from being exposed to n-butanol	2-1	None
Measures for protecting the environment from being exposed to n-butanol	3-1	Regularly check the environment for discharge of n-butanol. Appropriately treat wastewater and regularly maintain and inspect the drainage treatment facility. If n-butanol leaks into the environment, quickly control the spread of contamination and collect leakage. Discard the collected leakage in compliance with the local regulations.
Other warnings		Because n-butanol is extremely combustible and flammable, ignition sources such as heated substances, sparks, open flames and hot substances should not be brought close to it. Wear conductive shoes during operation to prevent static electricity.
Warnings		For the measures and actions to be taken for regular handling, emergency situations, disposal and transportation.

(Note) The numbers displayed in the table correspond to the measures and actions for 'Possibilities of Exposure' described in the section of 'Exposure.'

STATE AGENCY REVIEW

Hazard assessment	Review condition
Ministry of Environment - Preliminary Risk Assessment	http://www.env.go.jp/chemi/risk/index.html
OECD HPV	http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
US HPV	http://www.epa.gov/hpvis/
REACH	http://apps.echa.europa.eu/registered/registered-sub.aspx

REGULATORY INFORMATION / LABELLING INFORMATION

Regulatory information

Law	Regulatory condition
Industrial Safety and Health Act	Order for Enforcement Separate Table 1-4 Flammable Substances Article 57 Labeled Substances Article 57, Paragraph 2 Substances Requiring Notification Ordinance on the Prevention of Organic Solvent Poisoning Class 2 Organic Solvents, etc.
Fire Service Act	Hazardous Materials Class 4, Class 2 Petroleum, Non-aqueous, Hazard Class III
Ship Safety Act Civil Aeronautics Act Act on Port Regulations	Hazardous Substance List, Separate Table 1 Flammable Liquids Substances Approved for Transportation, 3. Flammable Liquids Ordinance for Enforcement Article 12, Hazardous Substance List, Flammable Liquids
Act for the Prevention of Marine Pollution and Maritime Disasters UN class UN No.	Marine Pollutants in the case of Bulk Transportation (Class Z) 3 UN1120 "BUTANOLS"

Labelling information

Pictograms or symbols	
Warning word	Danger
Hazard statement	<ul style="list-style-type: none"> • H226: Flammable liquid and vapor • H302: Harmful if swallowed • H315: Causes skin irritation • H319: Causes serious eye irritation • H335: Risk of respiratory irritation • H336: May cause drowsiness or dizziness • H372: Causes damages to organs(central nervous system) through prolonged or repeated exposure • H305: May be harmful if swallowed and enters airways
Precautionary statement	[Prevention] <ul style="list-style-type: none"> • P210: Keep away from heat/sparks/open flames/hot surfaces. — No smoking • P240: Ground/bond container and receiving equipment. • P241: Use explosion-proof electrical/ventilating/lighting/equipment. • P242: Use only non-sparking tools. • P243: Take precautionary measures against static discharge. • P280: Wear protective gloves/protective clothing/eye protection/face protection. • P233: Keep container tightly closed.

- P264: Wash thoroughly after handling.
- P270: Do not eat, drink or smoke when using this product.
- P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
- P271: Use only outdoors or in a well-ventilated area.
- P264: Wash hands thoroughly after handling.

[Response]

- P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- Use suitable extinguishing media
- P321: Specific treatment.
- P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
- P312: Call a POISON CENTER or doctor/physician if you feel unwell.
- P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
- P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P332 + P313: If skin irritation occurs: Get medical advice/attention.
- P362: Take off contaminated clothing and wash it before reuse.
- P337 + P313: If eye irritation persists: Get medical advice/attention.
- P314: Get medical advice/attention if you feel unwell.
- P331: Do NOT induce vomiting.

[Storage]

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

[Disposal]

- P501: Dispose of contents/container to the local Governor.

CONTACT INFORMATION WITHIN COMPANY

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Revised:
None

Special remarks:
None