

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 1-Butanol  
Product Number : 537993  
Brand : Aldrich  
Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA  
Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # : (314) 776-6555

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : n-Butanol  
Butyl alcohol  
Formula : C<sub>4</sub>H<sub>10</sub>O  
Molecular Weight : 74.12 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>n-Butanol</b>			
71-36-3	200-751-6	603-004-00-6	-

### 3. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Flammable Liquid  
Target Organ Effect  
Harmful by ingestion.  
Irritant

##### Target Organs

Central nervous system, ears, Liver, Kidney, Blood

#### HMIS Classification

Health Hazard: 2

Chronic Health Hazard: \*

Flammability: 3

Physical hazards: 1

#### NFPA Rating

Health Hazard: 2

Fire : 3

**Reactivity Hazard:** 1

**Potential Health Effects**

<b>Inhalation</b>	Vapours may cause drowsiness and dizziness. May be harmful if inhaled. May cause respiratory tract irritation.
<b>Skin</b>	May be harmful if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.
<b>Ingestion</b>	Harmful if swallowed.

**4. FIRST AID MEASURES**

**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

**In case of skin contact**

Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**5. FIRE-FIGHTING MEASURES**

**Flammable properties**

Flash point 35 °C (95 °F) - closed cup

Ignition temperature 343 °C (649 °F)

**Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

**Specific hazards**

Flash back possible over considerable distance.

**Special protective equipment for fire-fighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Further information**

Use water spray to cool unopened containers. In case of fire: Evacuate area and fight fire remotely due to the risk of explosion.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions**

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

**Environmental precautions**

Do not let product enter drains.

**Methods for cleaning up**

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

**7. HANDLING AND STORAGE**

**Handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

**Storage**

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

Handle and store under inert gas. hygroscopic

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Update	Basis
n-Butanol	71-36-3	TWA	20 ppm	2002-01-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs ) and Biological Exposure Indices (BEIs)
Remarks	2002 Adoption.				
		CEIL	50 ppm 150 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	100 ppm 300 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

**Personal protective equipment****Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**

Handle with gloves.

**Eye protection**

Safety glasses

**Skin and body protection**

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

**Hygiene measures**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form	liquid, clear
Colour	colourless

### Safety data

pH	no data available
Melting point	-90 °C (-130 °F)
Boiling point	117.7 °C (243.9 °F) at 1,013 hPa (760 mmHg)
Flash point	35 °C (95 °F) - closed cup
Ignition temperature	343 °C (649 °F)
Lower explosion limit	1.4 %(V)
Upper explosion limit	11.2 %(V)
Vapour pressure	5 hPa (4 mmHg) at 20 °C (68 °F)
Density	0.811 g/cm <sup>3</sup>
Water solubility	soluble
Relative vapour density	2.56 - (Air = 1.0)

## 10. STABILITY AND REACTIVITY

### Storage stability

Stable under recommended storage conditions.

### Conditions to avoid

Heat, flames and sparks.  
Exposure to moisture.

### Materials to avoid

Oxidizing agents, Alkali metals, Bases, Strong acids, Halogens

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

### Hazardous reactions

Vapours may form explosive mixture with air.

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

LD50 Oral - rat - 790 mg/kg

Remarks: Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes. Blood:Other changes.

LC50 Inhalation - rat - 4 h - 8000 ppm

LD50 Dermal - rabbit - 3,400 mg/kg

### Irritation and corrosion

Skin - rabbit - Skin irritation - 24 h

Eyes - rabbit - Eye irritation

### Sensitisation

no data available

### Chronic exposure

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### Signs and Symptoms of Exposure

drying, cracking of the skin, Skin irritation

### Potential Health Effects

<b>Inhalation</b>	Vapours may cause drowsiness and dizziness. May be harmful if inhaled. May cause respiratory tract irritation.
<b>Skin</b>	May be harmful if absorbed through skin. May cause skin irritation.
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<b>Target Organs</b>	Central nervous system, ears, Liver, Kidney, Blood,

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## 12. ECOLOGICAL INFORMATION

### Elimination information (persistence and degradability)

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 0.38
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### Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 1,840 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 1,983 mg/l - 48 h

### Further information on ecology

no data available

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## 13. DISPOSAL CONSIDERATIONS

### Product

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

### Contaminated packaging

Dispose of as unused product.

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## 14. TRANSPORT INFORMATION

### DOT (US)

UN-Number: 1120 Class: 3  
Proper shipping name: Butanols

Packing group: III

**IMDG**

UN-Number: 1120 Class: 3  
Proper shipping name: BUTANOLS  
Marine pollutant: No

Packing group: III

EMS-No: F-E, S-D

**IATA**

UN-Number: 1120 Class: 3  
Proper shipping name: Butanols

Packing group: III

**15. REGULATORY INFORMATION**

**OSHA Hazards**

Flammable Liquid, Target Organ Effect, Harmful by ingestion., Irritant

**TSCA Status**

On TSCA Inventory

**DSL Status**

All components of this product are on the Canadian DSL list.

**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

	CAS-No.	Revision Date
n-Butanol	71-36-3	1987-01-01

**SARA 311/312 Hazards**

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
n-Butanol	71-36-3	1987-01-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
n-Butanol	71-36-3	1987-01-01

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
n-Butanol	71-36-3	1987-01-01

**California Prop. 65 Components**

This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

**16. OTHER INFORMATION**

**Further information**

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