

## MATERIAL SAFETY DATA SHEET

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Version 1.5

## Section 1 - Product and Company Information

Product Name 2-BUTANOL, REAGENTPLUS(TM), 99%  
Product Number B85919  
Brand ALDRICH

Company Sigma-Aldrich  
Street Address 3050 Spruce Street  
City, State, Zip, Country SAINT LOUIS MO 63103 US  
Technical Phone: 314 771 5765  
Emergency Phone: 414 273 3850 Ext. 5996  
Fax: 800 325 5052

## Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
(+/-)-2-BUTANOL	78-92-2	Yes

Formula C4H10O  
Synonyms Alcool butylique secondaire (French) \* s-Butanol  
\* sec-Butanol (ACGIH) \* Butan-2-ol \* Butanol-2 \*  
DL-Butan-2-ol \* (+)-2-Butanol \* Butanol  
secondaire (French) \* s-Butyl alcohol \* sec-Butyl  
alcohol (OSHA) \* 2-Butyl alcohol \* Butylene  
hydrate \* CCS 301 \* Ethylmethyl carbinol \*  
2-Hydroxybutane \* Methyleneethylcarbinol \*  
dl-Methyleneethylcarbinol \* 1-Methyl propanol \*  
1-Methyl-1-propanol \* 1-Methylpropyl alcohol \*  
Racemic-2-butanol \* S.B.A.

RTECS Number: E01750000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Flammable. Irritant.

Vapors may cause drowsiness and dizziness. Irritating to eyes and respiratory system.

## HMIS RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 0

## NFPA RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

## Section 4 - First Aid Measures

## ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

#### INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

#### EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

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### Section 5 - Fire Fighting Measures

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#### FLAMMABLE HAZARDS

Flammable Hazards: Yes

#### EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

#### FLASH POINT

80 °F 27 °C Method: closed cup

#### EXPLOSION LIMITS

Lower: 1.7 % Upper: 9.8 %

#### AUTOIGNITION TEMP

405 °C

#### FLAMMABILITY

N/A

#### EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

#### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

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### Section 6 - Accidental Release Measures

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#### PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

#### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is

complete.

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## Section 7 - Handling and Storage

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### HANDLING

User Exposure: Avoid contact with eyes, skin, and clothing. Do not breathe vapor. Avoid prolonged or repeated exposure.

### STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

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## Section 8 - Exposure Controls / PPE

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### ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Government approved respirator.  
Hand: Compatible chemical-resistant gloves.  
Eye: Chemical safety goggles.

### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

### EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	100 PPM
USA	MSHA Standard-air	TWA	150 PPM (450 MG/M3)
USA	OSHA.	PEL	8H TWA 150 PPM (450 MG/M3)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	100 PPM
		STEL	150 PPM

### EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	300 MG/M3
Poland		NDSch	450 MG/M3
Poland		NDSP	-

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## Section 9 - Physical/Chemical Properties

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Appearance	Physical State: Liquid	
Property	Value	At Temperature or Pressure
Molecular Weight	74.12 AMU	
pH	N/A	
BP/BP Range	98 °C	760 mmHg
MP/MP Range	-115 °C	
Freezing Point	N/A	
Vapor Pressure	12.5 mmHg	20 °C
Vapor Density	2.6 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.808 g/cm3	
Bulk Density	N/A	
Odor Threshold	43 ppm	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	

Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	0.004 Pas	15 °C
Surface Tension	23 mN/m	20 °C
Partition Coefficient	Log Kow: 0.61	
Decomposition Temp.	N/A	
Flash Point	80 °F 27 °C	Method: closed cup
Explosion Limits	Lower: 1.7 % Upper: 9.8 %	
Flammability	N/A	
Autoignition Temp	405 °C	
Refractive Index	1.397	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:soluble Other Solvents: BENZENE, ALCOHOLS, ETHER ACETONE	

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Materials to Avoid: Acids, Acid chlorides, Acid anhydrides,  
Oxidizing agents, Halogens, Peroxides.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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## Section 11 - Toxicological Information

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### ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to  
mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

### SIGNS AND SYMPTOMS OF EXPOSURE

Exposure can cause: Nausea, dizziness, and headache. To the best  
of our knowledge, the chemical, physical, and toxicological  
properties have not been thoroughly investigated.

### TOXICITY DATA

Oral

Rat

2193 mg/kg

LD50

Remarks: Behavioral:Somnolence (general depressed activity).  
Behavioral:Ataxia. Behavioral:Coma.

Skin

Rat

> 2000 mg/kg

LD50

Intraperitoneal  
Rat  
1193 MG/KG  
LD50

Intravenous  
Rat  
138 MG/KG  
LD50

Intraperitoneal  
Mouse  
771 MG/KG  
LD50

Intravenous  
Mouse  
764 MG/KG  
LD50

Oral  
Rabbit  
4893 mg/kg  
LD50

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Corneal damage. Cardiac:Pulse rate. Lungs, Thorax, or Respiration:Dyspnea.

Intraperitoneal  
Rabbit  
277 MG/KG  
LD50

Intraperitoneal  
Guinea pig  
1067 MG/KG  
LD50

Intraperitoneal  
Hamster  
1218 MG/KG  
LD50

#### CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 5000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (1-19D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat  
Dose: 7000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (1-19D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).  
Effects on Embryo or Fetus: Fetal death. Specific Developmental Abnormalities: Musculoskeletal system.

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## Section 12 - Ecological Information

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### ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: 2,300 mg/l

Test Type: EC100 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: 5,000 mg/l

Test Type: LC50 Fish  
Species: Leuciscus idus  
Time: 48 h  
Value: 3,520 mg/l

Test Type: EC50 Algae  
Time: 24 h  
Value: 3,400 mg/l

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## Section 13 - Disposal Considerations

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### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

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. Observe all federal, state, and local environmental regulations.

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## Section 14 - Transport Information

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### DOT

Proper Shipping Name: Butanols  
UN#: 1120  
Class: 3  
Packing Group: Packing Group III  
Hazard Label: Flammable liquid  
PIH: Not PIH

### IATA

Proper Shipping Name: Butanols  
IATA UN Number: 1120  
Hazard Class: 3  
Packing Group: III

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## Section 15 - Regulatory Information

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### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: Xi  
Indication of Danger: Irritant.  
R: 10 36/37 67  
Risk Statements: Flammable. Irritating to eyes and respiratory system. Vapors may cause drowsiness and dizziness.  
S: 7/9 13 24/25 26 46  
Safety Statements: Keep container tightly closed and in well-ventilated place. Keep away from food, drink, and animal feedingstuffs. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and

seek medical advice. If swallowed, seek medical advice immediately and show this container or label.

#### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable. Irritant.

Risk Statements: Irritating to eyes and respiratory system.

Vapors may cause drowsiness and dizziness.

Safety Statements: Keep container tightly closed and in well-ventilated place. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. If swallowed, seek medical advice immediately and show this container or label.

#### UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

DEMINIMIS: 1 %

NOTES: This product is subject to SARA section 313 reporting requirements.

TSCA INVENTORY ITEM: Yes

#### CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

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#### Section 16 - Other Information

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#### DISCLAIMER

For R&D use only. Not for drug, household or other uses.

#### WARRANTY

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. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.