

Material Safety Data Sheet

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Version 1.5

According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

1 - Product and Company Information

Product Name	2-BUTOXYETHANOL, REAGENTPLUS, >=99.4%
Product Number	537551
Company	Sigma-Aldrich Pty. Ltd. 12 Anella Avenue Castle Hill NSW 2154 Australia
Technical Phone #	+61 2 9841 0555 (1800 800 097)
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Emergency Phone #	+44 8701906777 (1800 448 465)

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
2-BUTOXYETHANOL	111-76-2	203-905-0	603-014-00-0

Formula	C6H14O2
Molecular Weight	118.18 AMU
Synonyms	BUCS * Butoksyetylowy alkohol (Polish) * 2-Butossi-etanol (Italian) * 2-Butoxy-aethanol (German) * Butoxyethanol * n-Butoxyethanol * 2-Butoxyethanol * 2-Butoxy-1-ethanol * 2-Butoxyethanol (ACGIH:OSHA) * Butyl cellosolve (OSHA) * Butylcelosolv (Czech) * O-Butyl ethylene glycol * Butylglycol (French,German) * Butyl oxitol * Dowanol EB * Ektasolve EB * Ethylene glycol n-butyl ether * Ethylene glycol, monobutyl ether * Gafcol EB * Glycol butyl ether * Glycol ether EB * Glycol monobutyl ether * Jeffersol EB * Monobutyl ether of ethylene glycol * Monobutyl glycol ether * 3-Oxa-1-heptanol * Poly-Solv EB

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Harmful by inhalation, in contact with skin and if swallowed.
Irritating to eyes and skin.

4 - First Aid Measures

AFTER INHALATION

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

AFTER SKIN CONTACT

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

AFTER EYE CONTACT

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.

AFTER INGESTION

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

5 - Fire Fighting Measures

EXTINGUISHING MEDIA

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

SPECIAL RISKS

Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

Explosion Hazards: May form peroxides of unknown stability.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

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

METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

Directions for Safe Handling: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Conditions of Storage: Keep tightly closed.

Unsuitable: Minimize exposure to air. If peroxide formation is suspected, do not open or move container.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS	Country	Source	Type	Value
	Poland		NDS	98
	Poland		NDSch	200
	Poland		NDSP	-

EXPOSURE LIMITS - EUROPEAN UNION	Source	Type	Value
	OEL	OEL	98 mg/m3
			20 ppm

Remarks: Skin

EXPOSURE LIMITS - DENMARK	Source	Type	Value
	OEL	TWA	98 mg/m3
			20 ppm

Remarks: H

EXPOSURE LIMITS - GERMANY	Source	Type	Value
	TRGS 900	OEL	100 mg/m3
			20 ppm

Remarks: 4

Remarks: H,Y

EXPOSURE LIMITS - NORWAY	Source	Type	Value
		OEL	50 mg/m3
			10 ppm

Remarks: H

EXPOSURE LIMITS - SWEDEN	Source	Type	Value
		LLV (Level)	50 mg/m3
			10 ppm

Remarks: H

EXPOSURE LIMITS - SWITZERLAND	Source	Type	Value
	OEL	OEL	100 mg/m3
			20 ppm

Remarks: H M

EXPOSURE LIMITS - UNITED KINGDOM	Source	Type	Value
	OEL	OEL	123 mg/m3
			25 ppm

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Government approved respirator.

Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance	Physical State: Clear liquid
	Color: Colorless

Property	Value	At Temperature or Pressure
pH	9.5	

BP/BP Range	171 °C	743 mmHg
MP/MP Range	-75 °C	
Flash Point	67 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	245 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 1.1 % Upper: 10.6 %	
Vapor Pressure	< 1 mmHg	20 °C
SG/Density	0.9 g/cm3	
Partition Coefficient	Log Kow: 0.83	
Viscosity	N/A	
Vapor Density	4.1 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	27.4 mN/m	25 °C
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	Other Solvents: MOSTORGANIC SOLVENTS, MINERAL OIL	

10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: KJ8575000

ACUTE TOXICITY

LD50

Oral

Rat

> 5,000 mg/kg

LD50

Skin

Rabbit

2,000 mg/kg

LD50

Oral

Rat

470 mg/kg

LC50

Inhalation

Rat

450 ppm

4H

Remarks: Behavioral:Ataxia. Nutritional and Gross
Metabolic:Weight loss or decreased weight gain.

LD50
Intraperitoneal
Rat
220 MG/KG

LD50
Intravenous
Rat
307 MG/KG

LD50
Oral
Mouse
1230 mg/kg
Remarks: Behavioral:Altered sleep time (including change in
righting reflex). Behavioral:Somnolence (general depressed
activity). Skin and Appendages: Other: Hair.

LC50
Inhalation
Mouse
700 ppm
7H
Remarks: Behavioral:Analgesia. Lungs, Thorax, or
Respiration:Dyspnea. Kidney, Ureter, Bladder:Hematuria.

LD50
Intraperitoneal
Mouse
536 MG/KG

LD50
Intravenous
Mouse
1130 MG/KG

LD50
Oral
Rabbit
300 mg/kg

LD50
Skin
Rabbit
220 mg/kg

LD50
Intraperitoneal
Rabbit
220 MG/KG

LD50
Intravenous
Rabbit
252 MG/KG

LD50
Oral
Guinea pig

1200 mg/kg

Remarks: Behavioral:General anesthetic. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Other changes.

LD50

Skin

Guinea pig

230 UL/KG

IRRITATION DATA

Skin

Rabbit

72 H

Remarks: Mild irritation effect

Eyes

Rabbit

24 H

Remarks: Mild irritation effect

Skin

Rabbit

500 mg

Remarks: Open irritation test

Eyes

Rabbit

100 mg

Remarks: Severe irritation effect

Eyes

Rabbit

100 mg

24H

Remarks: Moderate irritation effect

SIGNS AND SYMPTOMS OF EXPOSURE

Human exposure above 200 ppm can be expected to cause narcosis, damage to the kidney and liver and present an abnormal blood picture showing erythropenia, reticulocytosis, granulocytosis, leukocytosis, and would be likely to cause fragility of erythrocytes and hematuria. Swallowing of 2-butoxyethanol results in a sour taste that turns to a burning sensation and is followed by numbness of the tongue which indicates paralysis of the sensory nerve endings. Causes central nervous system (CNS) depression, loss of taste, numbness of the tongue, headaches, and stupor. Narcotic effect.

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: Toxic if absorbed through skin. Readily absorbed through skin.

Eye Contact: Causes severe eye irritation.

Inhalation: Harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: Harmful if swallowed.

TARGET ORGAN INFORMATION

Blood. Kidneys. Liver. Central nervous system. Testes.

CHRONIC EXPOSURE - CARCINOGEN

Rat

Route of Application: Inhalation
Exposure Time: 6H/2Y
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS
criteria. Endocrine:Tumors.

Mouse

Route of Application: Inhalation
Exposure Time: 6H/2Y
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 25 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal
system.

Species: Rabbit
Dose: 100 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular
(circulatory) system.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: Overexposure may cause reproductive disorder(s) based on
tests with laboratory animals.

Species: Rat
Dose: 6279 MG/KG
Route of Application: Oral
Exposure Time: (13W MALE)
Result: Paternal Effects: Spermatogenesis (including genetic
material, sperm morphology,motility, and count).

Species: Rat
Dose: 200 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Maternal Effects: Uterus, cervix, vagina. Effects on
Fertility: Post-implantation mortality (e.g., dead and/or
resorbed implants per total number of implants). Effects on
Fertility: Litter size (e.g.; # fetuses per litter; measured
before birth).

Species: Rat
Dose: 12 MG/KG/4H
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).

Species: Rat
Dose: 200 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Maternal Effects: Other effects. Effects on Fertility:
Post-implantation mortality (e.g., dead and/or resorbed implants
per total number of implants). Specific Developmental
Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 9440 MG/KG
Route of Application: Oral
Exposure Time: (7-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Mouse
Dose: 7 GM/KG
Route of Application: Oral
Exposure Time: (8-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Mouse
Dose: 9440 MG/KG
Route of Application: Oral
Exposure Time: (6-13D PREG)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rabbit
Dose: 200 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Maternal Effects: Uterus, cervix, vagina. Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 1,815 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 1,490 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 1,690 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 210 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 1,574 mg/l

Test Type: LC50 Fish
Species: other fish

Time: 96 h
Value: 210 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 610 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 270 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 220 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 48 h
Value: 410 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 399 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 220 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 220 mg/l

Test Type: LC50 Fish
Species: other fish
Time: 96 h
Value: 350 mg/l

ADDITIONAL ECOLOGICAL INFORMATION

BOD: 88 %

13 - Disposal Considerations

SUBSTANCE DISPOSAL

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR

Non-hazardous for road transport.

IMDG

Non-hazardous for sea transport.

IATA

Non-hazardous for air transport.

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 603-014-00-0

INDICATION OF DANGER: Xn

Harmful.

R-PHRASES: 20/21/22 36/38

Harmful by inhalation, in contact with skin and if swallowed.

Irritating to eyes and skin.

S-PHRASES: 36/37 46

Wear suitable protective clothing and gloves. If swallowed, seek medical advice immediately and show this container or label.

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 1

SWITZERLAND

SWISS POISON CLASS: 4

NORWAY

Labelling for organic solvents where the package is 1 liter or more.

YL-tall m3/l: 5400

YL-group: 5

Safety phrases: 38 42 210

In case of insufficient ventilation, wear suitable respiratory equipment. During fumigation/spraying wear suitable respiratory equipment. Use compressed air- or fresh air line breathing apparatus in confined spaces.

16 - Other Information

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.

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