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SIGMA-ALDRICH

Material Safety Data Sheet

Date Printed: 03/09/2005
Date Updated: 09/21/2004
Version 1.70

Section 1 - Product and Company Information

Product Name: 2-Butoxyethanol, ReagentPlus™, ≥99.4%
 Product Number: 537551
 Brand: Aldrich Chemical

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

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313	EC no	Annex I Index Number
2-BUTOXYETHANOL	111-76-2	Yes	203-905-0	603-014-00-0

Formula: C6H14O2
 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, Galcol 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

Section 3 - Hazards Identification

Emergency Overview

Toxic.
 Toxic in contact with skin. Harmful by inhalation and if swallowed. Risk of serious damage to eyes. Irritating to respiratory system and skin. May form explosive peroxides.
 Combustible. Readily absorbed through skin. Target organ(s): Blood. Kidneys.

HMIS Rating
 Health: 2* Flammability: 2 Reactivity: 0

NFPA Rating
 Health: 2 Flammability: 2 Reactivity: 0

*additional chronic hazards present.

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.

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.

Section 5 - Fire Fighting Measures

Explosion Hazards

May form peroxides of unknown stability.

Flash Point: 152 °F 67 °C

Explosion Limits: Lower: 1.1 % Upper: 10.6 %

Autoignition Temp: 245 °C

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)

Combustible liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure 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.

Section 7 - Handling and Storage

Handling

User Exposure

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

Storage

Suitable

Keep tightly closed.

Unsuitable

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

Section 8 - Exposure Controls / PPE

Engineering Controls

Safely shower and eye bath, Mechanical exhaust required.

Personal Protective Equipment

Respiratory

Government approved respirator.

Hand

Compatible chemical-resistant gloves.

Eye

Chemical safety goggles.

General Hygiene Measures

Wash contaminated clothing before reuse. Wash thoroughly after handling.

Exposure Limits

Country	Type	Value
Poland	NDS	98
Poland	NDSCh	200
Poland	NDSP	-

Exposure Limits, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	20 PPM
USA	MSHA Standard-air	TWA	50 PPM (240 MG/M3) (SKIN) 8H TWA 50 PPM (240 MG/M3) (SKI)
USA	OSHA.	PEL	
New Zealand	OEL		
USA	NIOSH	TWA	5 PPM (SK)

Section 9 - Physical/Chemical Properties

Appearance

Physical State	Color
Clear liquid	Colorless

Molecular Weight: 118.18 AMU

Property Value At Temperature or Pressure

BP/BP Range	171 °C	743 mmHg
MP/MP Range	-75 °C	
Freezing Point		
Vapor Pressure	< 1 mmHg	20 °C
Vapor Density	4.1 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.9 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	

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Surface Tension	27,4 mN/m	25 °C
Partition Coefficient	Log Kow: 0.83	
Decomposition Temp.	N/A	
Flash Point °F	152 °F	
Flash Point °C	67 °C	
Explosion Limits	Lower: 1.1 % 1.1 % Upper: 10.6 % 12.7 %	
Flammability	N/A	
Autoignition Temp	245 °C	
Refractive Index	1.42	
Solubility		

Other Solvents: MOST ORGANIC SOLVENTS,, MINERAL OIL.

N/A = not available

Section 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.

Section 11 - Toxicological Information

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(s) or System(s)

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

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.

RTECS Number: KJ8575000

Toxicity Data

Skin - Rabbit: 2,000 mg/kg(LD50)

Oral - Rat: 470 mg/kg (LD50)

Inhalation - Rat: 450 ppm (LC50)

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

Intraperitoneal - Rat: 220 MG/KG (LD50)

Intravenous - Rat: 307 MG/KG (LD50)

Oral - Mouse: 1230 mg/kg (LD50)

Remarks: Behavioral:Altered sleep time (including change in righting reflex).
Behavioral:Somnolence (general depressed activity).
Skin and Appendages: Other: Hair.

Inhalation - Mouse: 700 ppm (LC50)

Remarks: Behavioral:Analgesia.
Lungs, Thorax, or Respiration:Dyspnea.
Kidney, Ureter, Bladder:Hematuria.

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 (LD50)

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

Skin - Guinea pig: 230 UL/KG (LD50)

Irritation Data

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

Chronic Exposure - Carcinogen

Rat - Inhalation: 125 PPM 6H/2Y 1

Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Endocrine:Tumors.

Mouse - Inhalation: 250 PPM 6H/2Y 1

Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

NTP Carcinogen List

Rating

Some evidence.

Equivocal evidence.

Route

Inhalation

Inhalation

Chronic Exposure - Teratogen

<u>Species</u>	<u>Dose</u>	<u>Route of Application</u>	<u>Exposure Time</u>
Rat	25 PPM/6H	Inhalation	(6-15D PREG)

Result:Specific Developmental Abnormalities: Musculoskeletal system.

Rabbit	100 PPM/6H	Inhalation	(6-18D PREG)
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Result:Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Chronic Exposure - Reproductive Hazard

<u>Species</u>	<u>Dose</u>	<u>Route of Application</u>	<u>Exposure Time</u>
Rat	6279 MG/KG	Oral	(13W MALE)

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Rat	200 PPM/6H	Inhalation	(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).			
Rat	12 MG/KG/4H	Inhalation	(1-19D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			
Rat	200 PPM/6H	Inhalation	(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.			
Mouse	9440 MG/KG	Oral	(7-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			
Mouse	7 GM/KG	Oral	(8-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).			
Mouse	9440 MG/KG	Oral	(6-13D PREG)
Result: Effects on Fertility: Litter size (e.g., # fetuses per litter; measured before birth).			
Rabbit	200 PPM/6H	Inhalation	(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).			

Section 12 - Ecological Information

Physical Properties Affecting Ecotoxicity

BOD: BOD after 5 Days:

Acute Ecotoxicity Tests

Test Type

EC50 Daphnia

Species

Daphnia magna

Time:

Value:

24.0 h

1,815 mg/l

Test Type

LC50 Fish

Species

Lepomis macrochirus (Bluegill)

Time:

Value:

96.0 h

1,490 mg/l

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation

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.

Section 14 - Transport Information

DOT

Proper Shipping Name: Combustible liquid, n.o.s.

UN#: NA1993

Class: COMBUSTIBLE LIQUID

Packing Group: Packing Group III

Hazard Label: None

PIH: Not PIH

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU Directives Classification

Symbol of Danger: Xn

Indication of Danger

Harmful.

Risk Statements R: 20/21/22 36/38

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

Safety Statements S: 36/37 46

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

US Classification and Label Text

Indication of Danger

Toxic.

Risk Statements

Toxic in contact with skin. Harmful by inhalation and if swallowed. Risk of serious damage to eyes. Irritating to respiratory system and skin. May form explosive peroxides.

Safety Statements

Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Wear suitable protective clothing, gloves, and eye/face protection.

US Statements

Combustible. Readily absorbed through skin. Target organ(s): Blood. Kidneys.

United States Regulatory Information

SARA Listed: Yes

Demimis: 1.0 %

Notes: This product is subject to SARA section 313 reporting requirements - glycol ethers.

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

Section 16 - Other Information

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.

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