

## MATERIAL SAFETY DATA SHEET

Date Printed: 05/24/2004

Date Updated: 04/11/2004

Version 1.6

## Section 1 - Product and Company Information

Product Name TERT-BUTANOL, 99.3+% (TEBOL 99)  
Product Number B85927  
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-METHYL-2-PROPANOL	75-65-0	Yes

Formula C4H10O  
Synonyms Alcool butylique tertiaire (French) \* Arconol \*  
t-Butanol \* tert-Butanol \* Butanol tertiaire  
(French) \* tert-Butyl alcohol (OSHA) \* t-Butyl  
hydroxide \* 1,1-Dimethylethanol \* Methanol,  
trimethyl- \* 2-Methyl-2-propanol \*  
2-Methylpropan-2-ol \* NCI-C55367 \* 2-Propanol,  
2-methyl- \* Trimethylcarbinol \* Trimethyl methanol

RTECS Number: EO1925000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Harmful.  
Harmful by inhalation. Risk of serious damage to eyes.  
Target organ(s): Central nervous system. Kidneys.

## HMIS RATING

HEALTH: 2\*  
FLAMMABILITY: 3  
REACTIVITY: 0

## NFPA RATING

HEALTH: 2  
FLAMMABILITY: 3  
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.

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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 can occur under fire conditions. In advanced or massive fires the area should be evacuated and the fire should be fought from a remote explosion-resistant location.

#### FLASH POINT

51.8 °F 11 °C Method: closed cup

#### EXPLOSION LIMITS

Lower: 2.4 % Upper: 8 %

#### AUTOIGNITION TEMP

480 °C

#### FLAMMABILITY

N/A

#### EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam. Use water spray to cool fire-exposed containers. Unsuitable: Water may be effective for cooling, but may not effect extinguishment.

#### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Vapor may travel considerable distance to source of ignition and flash back. 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.

#### 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.

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

Section 8 - Exposure Controls / PPE

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. Wash contaminated clothing before reuse.

EXPOSURE LIMITS, RTECS

Table with 4 columns: Country, Source, Type, Value. Includes rows for USA (ACGIH, MSHA Standard-air, OSHA), New Zealand OEL, and USA (NIOSH).

EXPOSURE LIMITS

Table with 4 columns: Country, Source, Type, Value. Includes rows for Poland (NDS, NDSP) and Poland (NDSch).

Section 9 - Physical/Chemical Properties

Table with 2 columns: Property, Value. At Temperature or Pressure. Includes rows for Appearance, Physical State, Color, Molecular Weight, pH, BP/BP Range, MP/MP Range, Freezing Point, Vapor Pressure, Vapor Density, Saturated Vapor Conc.

SG/Density	0.79 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	< 0.1 %	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	51.8 °F 11 °C	Method: closed cup
Explosion Limits	Lower: 2.4 % Upper: 8 %	
Flammability	N/A	
Autoignition Temp	480 °C	
Refractive Index	1.387	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents Copper, Copper alloys, Alkali metals, Aluminum.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Peroxides.

### 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 severe eye irritation.

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

Ingestion: May be harmful if swallowed.

### TARGET ORGAN(S) OR SYSTEM(S)

Central nervous system. Kidneys. Liver. Bladder. Thyroid.

### SIGNS AND SYMPTOMS OF EXPOSURE

Can cause CNS depression. Exposure can cause: Gastrointestinal disturbances. Drying, cracking, or irritation of the skin.

### TOXICITY DATA

Oral

Rat

2743 mg/kg

LD50

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and

Taste):Eye:Lacrimation. Lungs, Thorax, or  
Respiration:Respiratory depression. Gastrointestinal:Other  
changes.

Inhalation

Rat

> 10,000 ppm

LC50

Remarks: Behavioral:Ataxia. Lungs, Thorax, or  
Respiration:Dyspnea. Lungs, Thorax, or Respiration:Pulmonary  
emboli.

Intraperitoneal

Mouse

399 MG/KG

LD50

Remarks: Liver:Other changes.

Intravenous

Mouse

1538 MG/KG

LD50

Oral

Rabbit

3559 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.

Skin

Rabbit

> 2000 mg/kg

LD50

Remarks: Skin and Appendages:Skin: After systemic exposure:  
Dermatitis, other

#### IRRITATION DATA

Skin

Rabbit

0.5 ml

24H

Remarks: Mild irritation effect

Eyes

Rabbit

0.1 ml

24H

Remarks: Severe irritation effect

#### CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not  
classifiable as to its carcinogenicity based on its IARC, ACGIH,  
NTP, or EPA classification.

Species: Rat

Route of Application: Oral

Dose: 146 GM/KG

Exposure Time: 2Y

Frequency: C

Result: Tumorigenic:Neoplastic by RTECS criteria. Kidney, Ureter, Bladder:Kidney tumors.

Species: Mouse  
Route of Application: Oral  
Dose: 1540 GM/KG  
Exposure Time: 2Y  
Frequency: C  
Result: Tumorigenic:Neoplastic by RTECS criteria.  
Endocrine:Thyroid tumors.

#### NTP CARCINOGEN LIST

Rating: Some evidence.  
Species: Mouse/rat  
Route: Drinking

#### ACGIH CARCINOGEN LIST

Rating: A4

#### CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 2000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (1-19D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat  
Dose: 3500 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (1-19D PREG)  
Result: Specific Developmental Abnormalities: Musculoskeletal system.

#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

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

Species: Mouse  
Dose: 103 GM/KG  
Route of Application: Oral  
Exposure Time: (6-20D PREG)  
Result: Effects on Newborn: Stillbirth. Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse  
Dose: 135 GM/KG  
Route of Application: Oral  
Exposure Time: (6-20D PREG)  
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).

Species: Mouse  
Dose: 20240 MG/KG  
Route of Application: Oral  
Exposure Time: (6-18D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

## Section 12 - Ecological Information

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### ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 6,140 mg/l

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 48 h  
Value: 933 mg/l

Test Type: IC50 Algae  
Time: 72 h  
Value: > 1,000 mg/l

### ELIMINATION

Elimination: 99.9 %

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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 II  
Hazard Label: Flammable liquid  
PIH: Not PIH

### IATA

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

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## Section 15 - Regulatory Information

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### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F Xn  
Indication of Danger: Highly Flammable. Harmful.  
R: 11 20  
Risk Statements: Highly flammable. Harmful by inhalation.  
S: 9 16  
Safety Statements: Keep container in a well-ventilated place.  
Keep away from sources of ignition - no smoking.

### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU).  
Harmful.  
Risk Statements: Harmful by inhalation. Risk of serious damage

to eyes.

Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

US Statements: Target organ(s): Central nervous system. Kidneys.

#### 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 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.