

Material Safety Data Sheet

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Version 1.6

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	TERT.-BUTANOL
Product Number	24127
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2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
2-METHYL-2-PROPANOL	75-65-0	200-889-7	603-005-00-1

Formula	C4H10O
Molecular Weight	74.12 AMU
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

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Highly flammable. Harmful by inhalation.

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: 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.

SPECIAL RISKS

Specific Hazard(s): Flammable liquid. Vapor may travel considerable distance to source of ignition and flash back. Emits toxic fumes under fire conditions.

Explosion Hazards: 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.

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. 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

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

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

STORAGE

Conditions of Storage: Keep container closed. Keep away from heat, sparks, and open flame.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

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

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

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

EXPOSURE LIMITS - DENMARK			
	Source	Type	Value
	OEL	TWA	150 mg/m3
			50 ppm

Remarks: LH

EXPOSURE LIMITS - GERMANY			
	Source	Type	Value
	TRGS 900	OEL	300 mg/m3
			100 ppm

Remarks: 4

EXPOSURE LIMITS - NORWAY			
	Source	Type	Value
		OEL	75 mg/m3
			25 ppm

EXPOSURE LIMITS - SWEDEN			
	Source	Type	Value
		LLV (Level)	150 mg/m3
			50 ppm

Remarks: H

EXPOSURE LIMITS - SWITZERLAND			
	Source	Type	Value
	OEL	OEL	300 mg/m3
			100 ppm

EXPOSURE LIMITS - UNITED KINGDOM			
	Source	Type	Value
	OEL	OEL	308 mg/m3
			100 ppm
	OEL	STEL	462 mg/m3
			150 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: Solid	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	82 - 83 °C	
MP/MP Range	25 - 26 °C	
Flash Point	11 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	480 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 2.4 %	
	Upper: 8 %	

Vapor Pressure	31 mmHg	20 °C
SG/Density	0.775 g/cm3	
Partition Coefficient	N/A	
Viscosity	0.003 Pas	30 °C
Vapor Density	2.5 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	< 0.1 %	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

10 - Stability and Reactivity

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

11 - Toxicological Information

RTECS NUMBER: EO1925000

ACUTE TOXICITY

LD50

Oral

Rat

2743 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Lungs, Thorax, or Respiration:Respiratory depression. Gastrointestinal:Other changes.

LC50

Inhalation

Rat

> 10,000 ppm

4H

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

LD50

Intraperitoneal

Mouse

399 MG/KG

Remarks: Liver:Other changes.

LD50

Intravenous

Mouse
1538 MG/KG

LD50
Oral
Rabbit
3559 mg/kg

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

LD50
Skin
Rabbit
> 2000 mg/kg

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

SIGNS AND SYMPTOMS OF EXPOSURE

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

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 INFORMATION

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

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.

Rat
Route of Application: Oral
Exposure Time: 2Y
Result: Tumorigenic:Neoplastic by RTECS criteria. Kidney, Ureter, Bladder:Kidney tumors.

Mouse
Route of Application: Oral
Exposure Time: 2Y
Result: Tumorigenic:Neoplastic by RTECS criteria.

Endocrine:Thyroid tumors.

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).

12 - Ecological Information

ELIMINATION

Elimination: 99.9 %

ECOTOXICOLOGICAL EFFECTS

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

13 - Disposal Considerations

SUBSTANCE DISPOSAL

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.

14 - Transport Information

RID/ADR

UN#: 1120
Class: 3
PG: II
Proper Shipping Name: Butanols

IMDG

UN#: 1120
Class: 3
PG: II
Proper Shipping Name: Butanols
Marine Pollutant: No
Severe Marine Pollutant: No

IATA

UN#: 1120
Class: 3
PG: II
Proper Shipping Name: Butanols
Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 603-005-00-1
INDICATION OF DANGER: F Xn
Highly Flammable. Harmful.
R-PHRASES: 11 20
Highly flammable. Harmful by inhalation.
S-PHRASES: 9 16
Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking.

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 1

SWITZERLAND

SWISS POISON CLASS: 4

NORWAY

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

YL-tall m3/l: 14746

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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