

ALFAAA18658

(+/-)-2-Butanol

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

产品说明: (+/-)-2-丁醇
Product Description: (+/-)-2-Butanol

Cat No. : A18658
Synonyms sec-Butyl alcohol, 2-Butanol
CAS No 78-92-2
Molecular Formula C4 H10 O

Supplier Avocado Research Chemicals Ltd.
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CHEMTREC Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

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Recommended Use Laboratory chemicals.
Uses advised against No Information available

SECTION 2. HAZARD IDENTIFICATION

Physical State
Liquid

Appearance
Colorless

Odor
sweet

Emergency Overview

Highly flammable liquid and vapor. May be harmful if swallowed. Causes serious eye irritation. May cause respiratory irritation.
May cause drowsiness and dizziness.

Classification of the substance or mixture

Flammable liquids.	Category 3
Acute Oral Toxicity	Category 5
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity - (single exposure)	Category 3

Label Elements



Signal Word**Warning****Hazard Statements**

H226 - Flammable liquid and vapor
H303 - May be harmful if swallowed
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation
H336 - May cause drowsiness or dizziness

Precautionary Statements**Prevention**

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P240 - Ground and bond container and receiving equipment
P241 - Use explosion-proof electrical/ ventilating/ lighting equipment
P242 - Use non-sparking tools
P243 - Take action to prevent static discharges
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection

Response

P312 - Call a POISON CENTER or doctor if you feel unwell
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Physical and Chemical Hazards

Highly flammable. Vapors may cause flash fire or explosion.

Health Hazards

May be harmful if swallowed. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness.

Environmental hazards

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants. . Will likely be mobile in the environment due to its water solubility. The product is water soluble, and may spread in water systems.

This product does not contain any known or suspected endocrine disruptors.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Weight %
sec-Butyl alcohol	78-92-2	>95

SECTION 4. FIRST AID MEASURES**Eye Contact**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Inhalation

Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention.

Ingestion

Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects

Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Self-Protection of the First Aider

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Notes to Physician

Treat symptomatically. Symptoms may be delayed.

SECTION 5. FIRE-FIGHTING MEASURES**Suitable Extinguishing Media**

Water spray, carbon dioxide (CO₂), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons

No information available.

Specific Hazards Arising from the Chemical

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES**Personal Precautions**

Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Avoid release to the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up

Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.

Refer to protective measures listed in Sections 8 and 13.

SECTION 7. HANDLING AND STORAGE**Handling**

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. May form explosive peroxides on prolonged storage.

Specific Use(s)

(+/-)-2-Butanol

Use in laboratories

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Control Parameters**

Component	China	Taiwan	Thailand	Hong Kong
sec-Butyl alcohol	-	TWA: 150 ppm TWA: 454 mg/m ³	TWA: 150 ppm	TWA: 100 ppm TWA: 303 mg/m ³

Component	ACGIH TLV	OSHA PEL	NIOSH	The United Kingdom	European Union
sec-Butyl alcohol	TWA: 100 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 305 mg/m ³ TWA: 150 ppm TWA: 450 mg/m ³	IDLH: 2000 ppm TWA: 100 ppm TWA: 305 mg/m ³ STEL: 150 ppm STEL: 455 mg/m ³	STEL: 150 ppm 15 min STEL: 462 mg/m ³ 15 min TWA: 100 ppm 8 hr TWA: 308 mg/m ³ 8 hr	

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Monitoring methods

BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS70 General methods for sampling airborne gases and vapours MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas chromatography MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

Exposure Controls**Engineering Measures**

Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Butyl rubber	> 480 minutes	0.38 mm	Level 6	As tested under EN374-3 Determination of Resistance to Permeation by Chemicals
Neoprene gloves	> 480 minutes	0.45 mm	EN 374	
Viton (R)	> 480 minutes	0.3 mm		

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

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Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced Recommended Filter type: Organic gases and vapours filter Type A Brown conforming to EN14387
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. Recommended half mask:- Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141 When RPE is used a face piece Fit Test should be conducted
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.
Environmental exposure controls	No information available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless	
Physical State	Liquid	
Odor	sweet	
Odor Threshold	No data available	
pH	No information available	
Melting Point/Range	-115 °C / -175 °F	
Softening Point	No data available	
Boiling Point/Range	99 °C / 210.2 °F	@ 760 mmHg
Flash Point	24 °C / 75.2 °F	Method - No information available
Evaporation Rate	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	Lower 1.7 vol% Upper 9.8 vol%	
Vapor Pressure	17 mbar @ 20 °C	
Vapor Density	2.6	(Air = 1.0)
Specific Gravity / Density	0.800	
Bulk Density	Not applicable	Liquid
Water Solubility	125 g/L (20°C)	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	log Pow	
sec-Butyl alcohol	0.6	
Autoignition Temperature	390 °C / 734 °F	
Decomposition Temperature	No data available	
Viscosity	4.2 mPa.s @ 20 °C	
Explosive Properties		explosive air/vapour mixtures possible
Oxidizing Properties	No information available	
Molecular Formula	C4 H10 O	
Molecular Weight	74.12	

SECTION 10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions. May form explosive peroxides on prolonged storage.
Hazardous Reactions	None under normal processing.
Hazardous Polymerization	Hazardous polymerization does not occur.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition. Incompatible products. Exposure to light. Exposure to air.

Materials to avoid Strong oxidizing agents. Acid chlorides. Acid anhydrides.

Hazardous Decomposition Products Carbon monoxide (CO). Carbon dioxide (CO₂). peroxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Product Information

(a) acute toxicity;

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
sec-Butyl alcohol	2200 mg/kg (Rat) 2193 mg/kg (Rat)	> 2 g/kg (Rat)	49 mg/L (Rat) 4 h (vapour)

(b) skin corrosion/irritation;

Test method Based on available data, the classification criteria are not met
OECD 404
Test species rabbit
Observational endpoint No skin irritation

(c) serious eye damage/irritation;

Test method Category 2
OECD 405
Test species rabbit
Observation end point Irritating to eyes

(d) respiratory or skin sensitization;

Respiratory No data available
Skin Based on available data, the classification criteria are not met

Component	Test method	Test species	Study result
sec-Butyl alcohol 78-92-2 (>95)	OECD Test Guideline 406	guinea pig	non-sensitising

(e) germ cell mutagenicity;

No data available
Not mutagenic in AMES Test

(f) carcinogenicity;

No data available
There are no known carcinogenic chemicals in this product

(g) reproductive toxicity;

No data available

(h) STOT-single exposure;

Results / Target organs Category 3
Respiratory system
Central nervous system (CNS)

(i) STOT-repeated exposure;

Target Organs No data available
No information available.

(j) aspiration hazard;

No data available

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

SECTION 12. ECOLOGICAL INFORMATION

(+/-)-2-Butanol**Ecotoxicity effects**

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
sec-Butyl alcohol	Pimephales promelas: LC50: 3670 mg/L/96h	EC50: 3750 mg/L/24h		Pseudomonas putida: 500 mg/L/16h

**Persistence and Degradability
Persistence**

Readily biodegradable
Soluble in water, Persistence is unlikely, based on information available.

Bioaccumulative Potential

Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
sec-Butyl alcohol	0.6	No data available

Mobility in soil

The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility Highly mobile in soils

**Endocrine Disruptor Information
Persistent Organic Pollutant
Ozone Depletion Potential**

This product does not contain any known or suspected endocrine disruptors
This product does not contain any known or suspected substance
This product does not contain any known or suspected substance

SECTION 13. DISPOSAL CONSIDERATIONS**Waste from Residues/Unused
Products**

Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

Other Information

Waste codes should be assigned by the user based on the application for which the product was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with local regulations.

SECTION 14. TRANSPORT INFORMATION**Road and Rail Transport**

UN-No UN1120
Proper Shipping Name Butanols
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN1120
Proper Shipping Name Butanols
Hazard Class 3
Packing Group III

IATA

UN-No UN1120
Proper Shipping Name Butanols
Hazard Class 3

(+/-)-2-Butanol**Packing Group** III**Special Precautions for User** No special precautions required**SECTION 15. REGULATORY INFORMATION****International Inventories**

X = listed, China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

Component	The Inventory of Hazardous Chemicals (2015 Edition)	List of dangerous goods GB 12268 - 2012	TCSI	IECSC	EINECS	TSCA	DSL	PICCS	ENCS	ISHL	AICS	KECL
sec-Butyl alcohol	X	X	X	X	201-158-5	X	X	X	X	X	X	KE-03868

National Regulations**SECTION 16. OTHER INFORMATION**

Prepared By Health, Safety and Environmental Department
Creation Date 29-Jun-2009
Revision Date 07-Mar-2024
Revision Summary New emergency telephone response service provider.

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Chemical incident response training.

Fire prevention and fighting, identifying hazards and risks, static electricity, explosive atmospheres posed by vapours and dusts.

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

IECSC - Chinese Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

DNEL - Derived No Effect Level

RPE - Respiratory Protective Equipment

LC50 - Lethal Concentration 50%

NOEC - No Observed Effect Concentration

PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

PNEC - Predicted No Effect Concentration

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

ADR - European Agreement Concerning the International Carriage of

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

(+/-)-2-Butanol

Dangerous Goods by Road

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

MARPOL - International Convention for the Prevention of Pollution from Ships

ATE - Acute Toxicity Estimate

VOC - (Volatile Organic Compound)

Key literature references and sources for data<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet