

Material Safety Data Sheet

(S)-(+)-sec-Butanol, 99%

ACC# 82031

Section 1 - Chemical Product and Company Identification

MSDS Name: (S)-(+)-sec-Butanol, 99%

Catalog Numbers: AC218030000, AC218030010, AC218030050

Synonyms: (S)-(+)-sec-Butyl alcohol; (S)-(+)-2-Butanol.

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
4221-99-2	(S)-(+)-2-Butanol	99	224-168-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 24 deg C.

Warning! Flammable liquid and vapor. Breathing vapors may cause drowsiness and dizziness. Causes eye and respiratory tract irritation. May form explosive peroxides.

Target Organs: Central nervous system, respiratory system, eyes.

Potential Health Effects

Eye: Causes eye irritation. Vapors cause eye irritation.

Skin: Repeated or prolonged exposure may cause drying and cracking of the skin. Brief exposures are not expected to cause skin irritation.

Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Vapors may cause dizziness or suffocation. May cause blood changes.

Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis. May cause liver and kidney damage. May cause lung damage. Animal evidence suggests that fetotoxicity and teratogenicity may be observed at doses that also cause harmful effects in the mothers.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.

Extinguishing Media: Use water spray, alcohol foam, CO2, dry chemical.

Flash Point: 24 deg C (75.20 deg F)

Autoignition Temperature: 405 deg C (761.00 deg F)

Explosion Limits, Lower: 1.7% @ 100°C

Upper: 9.8% @ 100°C

NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Do not allow to evaporate to near dryness. Do not store or handle in aluminum equipment at temperatures over 120°F.

Storage: Keep away from heat, sparks, and flame. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Storage under a nitrogen blanket has been recommended. Do not store in aluminum containers. Containers should be dated when opened and tested periodically for the presence of peroxides. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
(S)-(+)-2-Butanol	none listed	none listed	none listed
sec-Butyl alcohol	100 ppm TWA	100 ppm TWA; 305 mg/m3 TWA 2000 ppm IDLH	150 ppm TWA; 450 mg/m3 TWA

OSHA Vacated PELs: (S)-(+)-2-Butanol: No OSHA Vacated PELs are listed for this chemical. sec-Butyl alcohol: 100 ppm TWA; 305 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: strong odor - sweet, fruity odor

pH: Not available.

Vapor Pressure: 13 mm Hg @ 20 deg C

Vapor Density: 2.6 (air=1)

Evaporation Rate: Not available.

Viscosity: 3.5 cps @ 20 deg C

Boiling Point: 99.5 deg C @ 760 mm Hg

Freezing/Melting Point: -114 deg C

Decomposition Temperature: Not available.

Solubility: 12.5 g/100 ml @ 20°C

Specific Gravity/Density: 0.808 g/ml

Molecular Formula: C₄H₁₀O

Molecular Weight: 74.12

Section 10 - Stability and Reactivity

Chemical Stability: Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation.

Conditions to Avoid: High temperatures, light, ignition sources.

Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, aluminum, organic peroxides, isocyanates, aliphatic amines, chromium trioxide.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 4221-99-2 unlisted.

CAS# 78-92-2: EO1750000

LD50/LC50:

Not available.

CAS# 78-92-2:

Inhalation, rat: LC50 = 48500 mg/m3/4H;
Oral, rabbit: LD50 = 4893 mg/kg;
Oral, rabbit: LD50 = 4900 mg/kg;
Oral, rat: LD50 = 2193 mg/kg;
Oral, rat: LD50 = 6200 mg/kg;
Skin, rat: LD50 = >2 gm/kg;

Carcinogenicity:

CAS# 4221-99-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 78-92-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.

Teratogenicity: Inhalation, rat: TCLo = 5000 ppm/7H (female 1-19 day(s) after conception) Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).; Inhalation, rat: TCLo = 7000 ppm/7H (female 1-19 day(s) after conception) Effects on Embryo or Fetus - fetal death and Specific Developmental Abnormalities - musculoskeletal system.

Reproductive Effects: Inhalation, rat: TCLo = 7000 ppm/7H (female 1-19 day(s) after conception) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

Mutagenicity: No information available.

Neurotoxicity: No information available.

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Goldfish: LC50 = 4300 mg/L; 24 Hr; Unspecified If released on soil, sec-butyl alcohol will leach into the ground. It should also volatilize from dry soil and biodegradation will probably be the key process affecting sec-butyl alcohol's fate in soil. If released in water, biodegradation will probably also be the primary factor affecting its loss.

Environmental: Adsorption to sediment and bioconcentration in fish will not be significant transport processes. In the atmosphere, sec-butyl alcohol will be lost by reaction with photochemically produced hydroxyl radicals. Its estimated half-life is 2 days.

Physical: Log P(oct) = 0.61

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	BUTANOLS
Hazard Class:		3
UN Number:		UN1120
Packing Group:		III
Additional Info:		FLASHPOINT 26C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 4221-99-2 is not listed on the TSCA inventory. It is for research and development use only.

CAS# 78-92-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 78-92-2: immediate, delayed, fire, reactive.

Section 313

This material contains sec-Butyl alcohol (CAS# 78-92-2, -%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depleters.
This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 4221-99-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 78-92-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations**European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI

Risk Phrases:

R 10 Flammable.
R 36/37 Irritating to eyes and respiratory system.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 13 Keep away from food, drink and animal feeding stuffs.
S 24/25 Avoid contact with skin and eyes.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 46 If swallowed, seek medical advice immediately and show this container or label.
S 7/9 Keep container tightly closed and in a well-ventilated place.

WGK (Water Danger/Protection)

CAS# 4221-99-2: No information available.
CAS# 78-92-2: 1

Canada - DSL/NDSL

CAS# 78-92-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 78-92-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information
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MSDS Creation Date: 9/02/1997

Revision #7 Date: 10/03/2005

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.