

SAFETY DATA SHEET



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All non-emergency numbers should be directed
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SEC-BUTYL ALCOHOL

SDS No. M0023

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: sec-Butyl Alcohol

Synonyms: 2-Butanol; Butan-2-ol; s-Butyl alcohol; 2-Butyl alcohol; Butylene hydrate; Ethyl methyl carbinol; 2-Hydroxybutane; Methyl ethyl carbinol; 1-Methylpropanol; SBA; (+/-)-2-Butanol

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION



Classification:

Flammable Liquids: GHS Category 3

Organic Peroxides: GHS Category E

Skin Irritation: GHS Category 2

Eye Irritation: GHS Category 2

Target Organ System Toxicity, single exposure: GHS Category 3

Label Elements

Signal Word: DANGER!

Hazard Statements:

- H226 – Flammable liquid and vapor.
- H241 – Heating may cause fire or explosion
- H320 – Causes eye irritation.
- H332 – Harmful if inhaled.
- H336 – May cause drowsiness and dizziness.

Precautionary Statements:

- P210 – Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P301+P310 – If SWALLOWED: Immediately call or POISON CENTER or a doctor/physician.
- P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

Clear focus. Consistent results. Complete confidence.

P304+P341 – If inhaled: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Emergency Overview

Causes irritation to eyes and respiratory tract. Breathing vapors may cause drowsiness or dizziness. Flammable liquid and vapor. May form explosive peroxides. Target Organs: Central nervous system, respiratory system, and eyes.

HMIS Rating:

Health – 1 Flammability – 3 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
sec-Butyl Alcohol	78-92-2	>99%	Yes

4. FIRST-AID MEASURES

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

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

Skin Contact: Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation persists.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.

Notes to Physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Flammable liquid and vapor (GHS Category 2)

Auto-ignition Temperature: 405° C (761° F)

Flash Point: 24° C (75° F)

Flammable Limits: Lower Limit – 1.7 vol %, Upper Limit – 9.8 vol %

Products of Combustion: May decompose into irritating and highly toxic gases under fire conditions (carbon monoxide and carbon dioxide).

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Vapors may form explosive mixtures with air. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. 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.

Fire Fighting Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.

National Fire Protective Association: Health - 1, Flammability - 3, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Use water spray to reduce vapors. Water spray may reduce vapors but still not prevent ignition in closed spaces. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Do not use sawdust or any combustible material. Use spark-proof tools. Provide ventilation to the affected area and remove all ignition sources. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist. Do not allow to evaporate to near dryness. Do not store in aluminum equipment at temperatures over 120° F.

Storage: Keep in a flammables area away in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Storage under a nitrogen blanket has been recommended. Do not store in aluminum containers. Keep away from sources of ignition. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles or other appropriate eye protection. Use butyl rubber gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

- ACGIH – 100 ppm TWA
- NIOSH – 100 ppm TWA; 305 mg/m³ TWA; 2000 ppm IDLH;
- OSHA Final PELs – 150 ppm TWA; 450 mg/m³ TWA
- OSHA Vacated PELs: 100 ppm TWA; 305 mg/m³ TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Strong sweet. Fruity odor

Molecular Formula: C₂H₅CH(OH)CH₃

Molecular Weight: 74.12

Auto-ignition Temperature: 405° C (761° F)

Flash Point: 24° C (75° F)

Flammable Limits: Lower Limit – 1.7 vol %, Upper Limit – 9.8 vol %

pH: Not available.

Boiling Point: 99.5° C @ 760 mm Hg

Freezing/Melting Point: -115° C

Decomposition Temperature: Not available

Specific Gravity: 0.808 g/cm³

Vapor Density (Air=1): 2.6

Vapor Pressure: 12 mm Hg @ 20° C.

Evaporation Rate (Butyl acetate = 1): Not available.

Viscosity: 3.5 cP 20° C

Solubility: Slightly soluble

Conductivity: Conductive; Conductivity = $<1 \times 10^7$ pS/m; Dielectric Constant = 16.56; Relaxation Time Constant = $>1.5 \times 10^{-5}$ seconds

10. STABILITY AND REACTIVITY

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.

Incompatibility With Various Substances: 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.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: May cause central nervous system effects characterized by excitement followed by headache, drowsiness, nausea, and vomiting. Advanced stages may cause collapse, unconsciousness, and coma. Causes respiratory tract irritation. Vapors may cause dizziness or suffocation. May cause blood changes.

INGESTION HAZARD: Causes gastrointestinal irritation with nausea, vomiting, and diarrhea. May cause central nervous system depression with excitement followed by headache, drowsiness, nausea, and vomiting. Advanced stages may cause collapse, unconsciousness, coma, and possible death. Aspiration into lungs may cause chemical pneumonitis, which may be fatal.

SKIN CONTACT HAZARD: Brief exposure is not expected to cause irritation. Repeated or prolonged exposure may cause drying and cracking of skin.

EYE CONTACT HAZARD: Causes eye irritation.

Chronic Exposure Hazards: Repeated or prolonged exposure may cause dermatitis and defatting of skin. 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 harm to the mother.

Animal Toxicity:

Inhalation, rat: LC50 = 48,500 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 g/kg;

Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Epidemiology: No information available.

Teratogenicity: Inhalation, rat: TCLo = 5000 ppm/7H (female 1-19 days after conception) Effects on embryo or fetus - toxicity (except death e.g. stunted fetus); Inhalation, rat: TCLo = 7000 ppm/7H (female 1-19 days 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 days 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.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: Goldfish: LC50 = 4300 mg/L, 24H, unspecified;
 If released to the soil, sec-butanol will leach into the ground. It should volatilize from dry soil and biodegradation will probably be the key process affecting fate in the soil. If released to the water, biodegradation will also probably be the key process affecting fate in the water.

Environmental Fate: Adsorption to sediment and bioconcentration in fish will not be significant transportation processes. In the atmosphere, sec-butanol will be lost by reaction with photochemically produced hydroxyl radicals. Estimated half-life is 2 days. Log P (oct) = 0.61.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

US DOT, IATA, IMO

Proper Shipping Name: Butanols

Hazard Class: 3

UN Number: UN1120

Packing Group: III

Canada TDG

Additional Information: Flashpoint 26 C

15. REGULATORY INFORMATION

US Federal Regulations:

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

Health and Safety Reporting List: Not listed.

Chemical Test Rules: CAS# 78-92-2: Not listed.

Section 12b: Not listed.

TSCA Significant New Use Rule: Does not have an SNUR under TSCA.

CERCLA Hazardous Substances: CAS# 78-92-2 does not have an RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 78-92-2 – immediate, delayed, fire, reactive

Section 313: sec-butanol (CAS# 78-92-2) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: CAS# 78-92-2 is not listed as a hazardous air pollutant (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Water Act: CAS# 78-92-2 is not listed as a Hazardous Substance. It is not a Priority Pollutant. It is not a Toxic Pollutant.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

CAS# 78-92-2 3 is on the following state right-to-know lists: California, New Jersey, Pennsylvania, Minnesota, and Massachusetts

California Prop 65: California No Significant Risk Level: Not listed

Canada:

DSL/NDSL: CAS# 78-92-2 is listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of B2, D2B. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations. Ingredient Disclosure List: CAS#78-92-2 is listed on Canada's Ingredient Disclosure List.

DSCL (EEC):

Hazard Symbols: Xi, F

Risk Phrases: R10 – Flammable; R36/37 – Irritating to eyes and respiratory system; R67 – vapors may cause drowsiness and dizziness.

Safety Phrases: S7/9 – Keep container tightly closed and in a well-ventilated place; S13 – Keep away food, drinks, and animal feeding stuffs; S24/25 – Avoid contact with skin and eyes; S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice; S46 – If swallowed, seek medical advice immediately and show this container or label.

WGK (Water Danger/protection): CAS# 78-92-2: 1

16. OTHER INFORMATION

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Last Revised: 12/15/2011 – Converted to GHS format.

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