

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
 	Flammable material; avoid heat and sources of ignition. Irritating to skin, eyes, and the respiratory system. Harmful compound, minimize exposure. Vapors may cause drowsiness or dizziness.	   

Section I. Chemical Product and Company Identification

Chemical Name	2-Butanol		
Catalog Number	B0705	Supplier	TGI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
Synonym	Methylethylcarbinol		
Chemical Formula	CH ₃ CH ₂ CH(OH)CH ₃		
CAS Number	78-92-2	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
2-Butanol	78-92-2	Min. 99.0 (GC)	Not available.	Rat LD ₅₀ (oral) 2193 mg/kg Rat LC ₅₀ (inhalation) 48500 mg/m ³ /4H Rat LD ₅₀ (intraperitoneal) 1193 mg/kg Rat LD ₅₀ (intravenous) 138 mg/kg

Section III. Hazards Identification

Acute Health Effects	Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Vapors may cause drowsiness or dizziness. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Reproductive Effects. Rat TCLo Inhalation 5000 ppm/7 hours, female 1-19 days of pregnancy. TOXIC Effects: Effects on Embryo or Fetus - Fetotoxicity Rat TCLo Inhalation 7000 ppm/7 hours, female 1-19 days of pregnancy. TOXIC Effects: Effects on Fertility - Post implantation mortality Effects on Embryo or Fetus - Fetal Death Specific Developmental Abnormalities - Musculoskeletal system

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data			
Flammability	Flammable.	Auto-Ignition	406 °C (762.8 °F)
Flash Points	24 °C (75.2 °F).	Flammable Limits	LOWER: 1.7% UPPER: 9.8%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂).		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures	
Spill Cleanup Instructions	Flammable material. Harmful material. Irritating material. Vapors may cause drowsiness or dizziness. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage	
Handling and Storage Information	FLAMMABLE. HARMFUL. IRRITANT. VAPORS MAY CAUSE DROWSINESS OR DIZZINESS. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Always store away from incompatible compounds such as oxidizing agents, acids.

Section VIII. Exposure Controls/Personal Protection	
Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
	
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties			
Physical state @ 20°C	Liquid. (Clear, colorless.)	Solubility	Soluble in Water. Miscible with Ether, Alcohol.
Specific Gravity	0.81(water=1)		
Molecular Weight	74.12	Partition Coefficient	Not available.
Boiling Point	100 °C (212 °F)	Vapor Pressure	3.2 kPa (@ 30 °C)
Melting Point	-115 °C (-175 °F)	Vapor Density	2.6 (Air = 1)
Refractive Index	1.396 - 1.398	Volatility	Not available.
Critical Temperature	Not available.	Odor	Characteristic.
Viscosity	Not available.	Taste	Not available.

Section X. Stability and Reactivity Data	
Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, acids. acid chlorides, acid anhydrides, Halogens, Peroxides.

Section XI. Toxicological Information	
RTECS Number	EO1750000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 2193 mg/kg Rat LC ₅₀ (inhalation) 48500 mg/m ³ /4H Rat LD ₅₀ (intraperitoneal) 1193 mg/kg Rat LD ₅₀ (intravenous) 138 mg/kg
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Reproductive Effects. Rat TCLo Inhalation 5000 ppm/7 hours, female 1-19 days of pregnancy. TOXIC Effects: Effects on Embryo or Fetus - Fetotoxicity Rat TCLo Inhalation 7000 ppm/7 hours, female 1-19 days of pregnancy. TOXIC Effects: Effects on Fertility - Post implantation mortality Effects on Embryo or Fetus - Fetal Death Specific Developmental Abnormalities - Musculoskeletal system
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Section XII. Ecological Information	
Ecotoxicity	Not available.
Environmental Fate	sec-Butyl alcohol's production and use as a solvent for many natural resins, an ingredient in paint removers and industrial cleaners and as a chemical intermediate in the production of methyl ethyl ketone may result in its release to the environment through various waste streams. sec-Butyl alcohol is an aroma component of apples and pears and is also found in poultry manure. If released to air, a vapor pressure of 18.3 mm Hg at 25 deg C indicates sec-butyl alcohol will exist solely as a vapor in the ambient atmosphere. Vapor-phase sec-butyl alcohol will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 40 hours. If released to soil, sec-butyl alcohol is expected to have high mobility based upon an estimated Koc of 50. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 9.06X10 ⁻⁶ atm-cu m/mole. sec-Butyl alcohol may volatilize from dry soil surfaces based upon its vapor pressure. Screening tests using sewage seed or activated sludge have shown that sec-butyl alcohol degrades rapidly. sec-Butyl alcohol achieved 44.2 and 72.3% of its theoretical BOD after 10 and 20 day incubation periods, respectively using a domestic sewage sludge inoculum. If released into water, sec-butyl alcohol is not expected to adsorb to suspended solids and sediment in water based upon the estimated Koc. Volatilization from water surfaces is expected to be an important environmental fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 2 and 29 days, respectively. In a river die-away test, sec-butyl alcohol achieved 55% of its theoretical BOD in 5 days, suggesting biodegradation will be an important fate process. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions. Occupational exposure may occur through inhalation and dermal contact with this compound at workplaces where sec-butyl alcohol is produced or used. The general population is exposed to sec-butyl alcohol through the ingestion of foods that contain this compound.

Section XIII. Disposal Considerations	
Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information	
DOT Classification	DOT CLASS 3: Flammable liquid
PIN Number	UN1120
Proper Shipping Name	Butanols
Packing Group (PG)	III
DOT Pictograms	

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	On DSL
EINECS Number (EEC)	201-158-5
EEC Risk Statements	R10- Flammable. R18- In use, may form flammable/explosive vapor-air mixture. R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin.
Japanese Regulatory Data	ENCS No. 2-3049

Section XVI. Other Information

Version 1.0
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Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.