

Material Safety Data for: secondary Butyl Alcohol

1. PRODUCT IDENTIFICATION

Name	secondary butyl alcohol
Synonyms	2-butanol, s-butyl alcohol, sec-butanol, 1-methylpropanol
CAS#	78-92-2
Europe EC#	201-158-5
Product Uses	solvent for paints, lacquers, resins, vegetable oils, etc

2. INGREDIENTS

	%	TWAEV / TLV mg/m ³	LD ₅₀ ORAL	(mg/kg) SKIN	LC ₅₀ ppm INHALATION
2-butanol	100%	100 / 300	2195	>2000	16,000

3. (a) HAZARDS SUMMARY

Hazards, Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, severe eye irritant; fire may create toxic fumes

Canada – WHMIS
Key:

B 2, D 2B
B 2 – Flash Point <38°C, B 3 – Flash Point >38°C & <93°C
D 1 – Immediately Toxic, D 2 – Chronic Toxicity
C – Oxidising Substance, E – Corrosive

U.S.A. – HMIS
Key:

Health – 2, Fire – 2, Reactivity – 0
0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe

3. (b) HAZARDS – TOXICITY

Effects, Acute Exposure

Skin Contact	slightly irritating
Skin Absorption	slight; no toxic effects likely by this route
Eye Contact	severely irritating, vapour may irritate
Inhalation	respiratory irritant; headache, dizziness, drowsiness, intoxication
Ingestion	headache, dizziness, drowsiness, intoxication – not a route of industrial exposure

Effects, Chronic Exposure

General	prolonged or repeated exposure may cause dermatitis
Sensitising	not a sensitiser in humans or animals (<i>only two reports of human sensitisation</i>)
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect	no known effect in humans, effect in animals only at doses producing maternal toxicity
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD ₅₀ (oral)	2195, 6480mg/kg (rat), 4900mg/kg (rabbit), 6200mg/kg (mouse)
LD ₅₀ (skin)	>2000mg/kg (rat),
LC ₅₀ (inhalation)	16,000ppm (rat)

Please ensure that this MSDS is given to, and explained to people using this product.

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4. FIRST AID

- SKIN: Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.
- EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.
- INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.
- INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.
- Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.*

5. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless liquid with sweet, alcoholic odour
Odour Threshold	~3ppm
Vapour Pressure	12.9mmHg / 1.7kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	0.8
Vapour Density (air = 1)	2.6
Boiling Range	99.5°C / 211°F
Freezing Point	-115°C / -175°F
Specific Gravity	0.807 (20/20°C)
Water Solubility	125 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	3.9centipoise (20°C / 68°F)
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 3.03mg/m ³
Molecular Weight	74grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	24°C / 75°F (closed cup)
Autoignition Temperature	405°C / 761°F
Flammable Limits	1.7% – 9.8%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	alcohol-resistant foam, dry chemical, water fog or spray, product floats on water; Fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

7. STABILITY / REACTIVITY

Dangerously Reactive With	strong oxidising agents; strong acids, acid anhydrides, acid chlorides, lithium aluminium hydrides, bromine or isocyanates react violently; sodium or potassium metal
Also Reactive With explosion;	alkali metals or alkaline earth metals release flammable hydrogen gas & may cause
Stability	reacts with aluminum at elevated temperature; attacks some elastomers
Decomposes in Presence of	stable; will not polymerize
Decomposition Products	oxygen – very prolonged storage in air creates unstable peroxides
Sensitive to Mechanical Impact	none apart from Hazardous Combustion Products and above
	no

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	100ppm / 303mg/m ³
OSHA PEL	150ppm / 450mg/m ³
STEL	150ppm / 455mg/m ³
Ventilation	mechanical ventilation may be required to maintain airborne titre below TWAEV
Hands	butyl or "Viton" gloves recommended – <i>other types may also protect; consult supplier to confirm suitability</i>
Eyes	safety glasses with side shields – <i>always protect the eyes</i>
Clothing	no special protective clothing required

9. HANDLING & STORAGE

Store in a cool, dry environment, away from sources of ignition, heat and oxidising agents. Use non-sparking bronze or aluminium hand tools. All electrical and mechanical equipment (including lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof.

Although this product cannot retain a static charge on agitation or transfer from one container to another, its flash point is low and it is prudent to ground or electrically bond both the source container and the receiving container, and transfer pump before transferring contents. Avoid splashing by ensuring that the product nozzle is below the surface in the receiving container.

Stored product may oxidise slowly (years) in air to unstable peroxides. Keep containers full and tightly sealed. Empty containers may contain a flammable/explosive vapour.

Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear an efficient respirator with an organic vapour cartridge. Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

10. SPILL PROCEDURES

Serious Fire Potential: blanket spill with foam as a precaution against accidental ignition. Take extreme care to avoid sparks – do not operate (turn on OR off) electrical appliances near spill, unless explosion proof.

Leak Precaution	dyke to control spillage and prevent environmental contamination
Handling Spill	ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal

11. DISPOSAL

Waste Disposal Containers	<p>do not flush to sewer, recycle solvent if possible, may be incinerated in approved facility</p> <p>Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.</p> <p>Pails must be vented and thoroughly dried prior to crushing and recycling.</p> <p>IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years.</p> <p><i>Never cut, drill, weld or grind on or near this container, even if empty</i></p>
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12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is highly water soluble and not a bioaccumulator
Biodegradation	this product degrades readily & rapidly in the presence of oxygen; over 50% biodegradation in 5 days;
Abiotic Degradation	in the absence of oxygen biodegradation of 93% was seen in 52 days
Mobility in soil, water	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 40 hours this product is water soluble and will move readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	3670mg/litre (Pimephelas promelas)
EC ₅₀ (Crustacea, 48hr)	3750mg/litre (Daphnia magna)
NOEC (Algae)	95mg/litre (Scenedesmus quadricauda), 8900mg/litre (Chlorella pyrenoidosa)
	NOEC = (No Observed Effect Concentration)
EC ₅₀ (Bacteria)	1630mg/litre (Bacillus subtilis)

13. TRANSPORT REGULATIONS

Canada TDG	PIN	UN-1120
AND	Shipping Name	butanols
U.S.A. 49 CFR	Class	3
	Packing Group	II
Marine Pollutant		not a marine pollutant

14. EMERGENCY INFORMATION

Canada	Call CANUTEC (collect)	(613) 996-6666
U.S.A.	Call CHEMTREC	(800) 424-9300

15. REGULATIONS

Canada DSL	on inventory
U.S.A. TSCA	on inventory
Europe EINECS	on inventory
Europe Risk Phrases	R 10, 20 – flammable, harmful by inhalation
Europe Safety Phrases	S 16 – keep away from sources of ignition

Immediately Dangerous to Life or Health: 2000 ppm

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 150 ppm (450 mg/cu m). Vacated 1989 OSHA PEL TWA 100 ppm (305 mg/cu m) is still enforced in some states.

NIOSH Recommendations: Recommended Exposure Limit: 15 Min Short-Term Exposure Limit: 150 ppm (455 mg/cu m).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 100 ppm /sec-Butanol/ Excursion Limit Recommendation: Excursions in worker exposure levels may exceed three times the TLV-TWA for no more than a total of 30 min during a work day, and under no circumstances should they exceed five times the TLV-TWA, provided that the TLV-TWA is not exceeded. /sec-Butanol/

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. s-Butyl alcohol is produced, as an intermediate or a final product, by process units covered under this subpart.

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TSCA Requirements: Section 8(a) of TSCA requires manufacturers of this chemical substance to report preliminary assessment information concerned with production, use, and exposure to EPA as cited in the preamble in 51 FR 41329. Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. s-Butyl alcohol is included on this list.

FDA Requirements: 2-butanol is a food additive permitted for direct addition to food for human consumption, as long as 1) the quantity added to food does not exceed the amount reasonably required to accomplish its intended physical, nutritive, or other technical effect in food, and 2) when intended for use in or on food it is of appropriate food grade and is prepared and handled as a food ingredient.

16. PREPARATION INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577

With data from RTECS, Haz. Substance Data Base, Cheminfo (CCOHS), IUCALID Datasheets (European Chem. Substance Info. System), & others, as available

*Preparation Date: **November 2004** Revision Date: **December 2007, November 2010***

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