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Safety Data Sheet

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

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

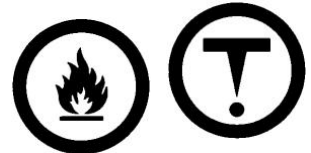
2. HAZARDS

GHS Class	flammable	acute, oral	eye irritant	STOT	STOT
(Category)	(3)	(5)	(2)	(3)	(3)
Signal Words	WARNING	WARNING no Pictogram	WARNING	WARNING	WARNING
Hazard Statements	flammable liquid & vapour (H226)	may be harmful if swallowed (H302)	causes serious eye irritation (H319)	may cause respiratory tract irritation (H335)	may cause dizziness or drowsiness (H336)



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, **F** – Reactive Substance



3. COMPOSITION

	%	TWAEV / TLV ppm / mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
2-Butanol	100%	100 / 300	2190	>2000	16,000

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.

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

5. FIRE FIGHTING & FLAMMABILITY

Flash Point	24°C / 75°F (closed cup)
Autoignition Temperature	406°C / 763°F
Flammable Limits	1.7% – 9.8%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Firefighting Precautions	alcohol-resistant foam, dry chemical, water fog or spray, product floats on water; firefighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

6. ACCIDENTAL RELEASE MEASURES

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

7. 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 & it is prudent to ground or electrically bond the source container, receiving container & 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 create unstable peroxides. Keep containers full & well 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.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV	100ppm / 303mg/m ³	Ontario STEV	150ppm / 454mg/m ³
ACGIH TLV	100ppm / 303mg/m ³	ACGIH STEL	150ppm / 454mg/m ³
OSHA PEL	100ppm / 300mg/m ³	OSHA STEL	150ppm / 450mg/m ³
Ventilation	mechanical ventilation may be required to maintain airborne titre below TWAEV		
Hands	butyl rubber 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. 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

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9. PHYSICAL PROPERTIES, cont'd

Specific Gravity	0.807 (20/20°C)
Water Solubility	125 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Log P _{O/W} (Octanol/H ₂ O partition)	0.61 & 0.65
Viscosity	3.9centipoise (20°C / 68°F)
pH	none – (does not liberate hydrogen ions when dissolved)
Conversion Factor	1ppm = 3.03mg/m ³
Molecular Weight	74grams per mole

10. 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	alkali metals or alkaline earth metals release flammable hydrogen gas & may cause explosion; reacts with aluminum at elevated temperature; attacks some elastomers
Stability	stable; will not polymerize
Decomposes in Presence of	oxygen – very prolonged storage in air creates unstable peroxides
Decomposition Products	none apart from Hazardous Combustion Products and above
Sensitive to Mechanical Impact	no

11. 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 – <i>not a route of industrial exposure</i>

Effects, Chronic Exposure

General	prolonged or repeated exposure may cause dermatitis
Sensitising	not a sensitizer 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)	2190 ¹ , 6480mg/kg (rat), 4900mg/kg (rabbit), 6200mg/kg (mouse)
LD ₅₀ (skin)	>2000mg/kg (rat) – <i>no mortality at this dose</i> ¹
LC ₅₀ (inhalation)	16,000ppm (rat) – <i>5/6 animals died during the 14 day post-testing observation period</i> ¹

12. ECOLOGICAL INFORMATION

Bioaccumulation	highly water soluble; not a bioaccumulator
Biodegradation	biodegrades readily & rapidly in the presence of oxygen; over 50% in 5 days; 86% in 5 days ¹ in the absence of oxygen (<i>anaerobic</i>), biodegradation of 93% was seen in 52 days
Abiotic Degradation	reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 20 hours ¹ , 40 hours & others
Mobility in soil, water	water soluble; moves readily in soil & water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	2993 ¹ & 3670mg/litre (Pimephelas promelas), 3520mg/litre (Leuciscus idus, 48)
EC ₅₀ (Crustacea, 48hr)	3750mg/litre (Daphnia magna), 2300mg/litre ¹ (Daphnia magna, 24hr)
NOEC (Algae)	95mg/litre (Scenedesmus quadricauda), 8900mg/litre (Chlorella pyrenoidosa)
EC ₅₀ (Bacteria)	1630mg/litre (Bacillus subtilis),
NOEC (Bacteria)	500mg/litre ¹ (Pseudomonas putida)

NOEC = (No Observed Effect Concentration)

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13. DISPOSAL

Waste Disposal Containers **do not flush to sewer**, recycle solvent if possible, may be incinerated in approved facility
Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
Pails must be vented and thoroughly dried prior to crushing and recycling.
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.
Never cut, drill, weld or grind on or near this container, even if empty

14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN-1120
AND	Shipping Name	butanols
U.S.A. 49 CFR	Class	3
	Packing Group	III
Marine Pollutant		not a marine pollutant
ERAP Required		NO



15. REGULATIONS

Canada DSL	on inventory
U.S.A. TSCA	on inventory
Europe EINECS	on inventory

U.S.A. Regulations:

Immediately Dangerous to Life or Health: 2000 ppm

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 150ppm (450mg/m³). Vacated 1989 OSHA PEL TWA 100ppm (305mg/m³) 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 & 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, environmental impact & energy requirements. *sec*-Butyl Alcohol is produced, as an intermediate or a final product, by process units covered under this subpart.

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. *sec*-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. OTHER INFORMATION

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

Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.

Preparation Date: November 2004 Revision Date: December 2007, November 2010, November 2013

(1) European Chemicals Agency (ECHA) Dossier, butan-2-ol,

http://apps.echa.europa.eu/registered/data/dossiers/DISS-9d9e5259-d98e-0239-e044-00144f67d249/AGGR-e81fe251-2da6-4b66-8466-9960fe5dce1b_DISS-9d9e5259-d98e-0239-e044-00144f67d249.html#AGGR-e81fe251-2da6-4b66-8466-9960fe5dce1b

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