

Material Safety Data for: *n*-Butyl Alcohol

1. PRODUCT IDENTIFICATION

Name n-Butanol
Synonyms normal butanol, butyl alcohol, 1-butanol, butyric alcohol, and others
CAS# 71-36-3
Product Uses solvent in coatings, organic chemical synthesis, & others

2. INGREDIENTS

	%	TWAEV / TLV mg/m ³	LD ₅₀ ORAL	(mg/kg) SKIN	LC ₅₀ ppm INHALATION
1-butanol	100%	20 / 61	790	3400	8000

3. (a) HAZARDS SUMMARY

Hazards, Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, irritating to eyes & respiratory system

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 mild to moderate irritant
 Skin Absorption slight; no toxic effects likely by this route
 Eye Contact severe irritant; probably will not damage; vapour irritating above 50ppm; eye inflammation
 &
 blurred vision above 100ppm
 Inhalation irritating @ 25ppm (coughing); pronounced irritation @ 50ppm, may cause headache, dizziness, drowsiness
 Ingestion headache, dizziness, drowsiness, intoxication – *unlikely route of industrial exposure*

Effects, Chronic Exposure

General prolonged exposure may cause dermatitis; equivocal information that exposure to >80ppm may cause hearing loss;
 Sensitising not a sensitiser in humans or animals – *one reported case of sensitisation*
 Carcinogen/Tumorigen not considered a tumorigen or a carcinogen in humans or animals
 Reproductive Effect no known effect in humans or in animals at doses not also causing maternal toxicity
 Mutagen no known effect on humans or animals
 Synergistic With aromatic hydrocarbons and chlorinated hydrocarbons
 LD₅₀ (oral) 790mg/kg (♂rat), 2020mg/kg (♀rat), 2510mg/kg (rat), 1200mg/kg (hamster), 3400 & 3485mg/kg (rabbit),
 LD₅₀ (skin) 3400 & 4200mg/kg (rabbit)
 LC₅₀ (inhalation) 7900-8000ppm (rat)

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

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 sharp, choking alcoholic odour
Odour Threshold	~6ppm – varies widely
Vapour Pressure	5mmHg / 0.67kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	0.5
Vapour Density (air = 1)	2.6
Boiling Range	118°C / 244°F
Freezing Point	-89°C / -129°F
Specific Gravity	0.810 (20/20°C)
Water Solubility	77 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	3centipoise (20°C / 68°F)
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 3.03g/m ³
Molecular Weight	74grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	37°C / 98°F (closed cup)
Autoignition Temperature	343°C / 650°F
Flammable Limits	1.4% – 11.2%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	alcohol-resistant foam, dry chemical; water fog or spray to cool & dilute, product floats on water – water jet spreads flames; 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; sodium or potassium metal; halogens (chlorine etc), isocyanates
Also Reactive With	aluminium at above 75°C to form flammable hydrogen gas; acids or acid anhydrides; forms explosive compounds with perchlorates; attacks some plastics (PVC, ABS at high temp.)
Stability	stable; will not polymerize
Decomposes in Presence of	not known
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	20ppm / 61mg/m ³
OSHA PEL	100ppm / 300mg/m ³
STEL	not listed
Ventilation	mechanical ventilation may be required to maintain airborne titre below TLV
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	wear impermeable (above) apron, boots, & long sleeves if there is a risk of splashing

9. HANDLING & STORAGE

Store in a cool, dry environment, away from sources of ignition, heat and substances listed in Part 7. If used above 30°C / 86°F, use non-sparking bronze or aluminium hand tools and explosion-proof electrical / mechanical equipment (including lighting, switchgear and forklift trucks).

This product cannot retain a static charge on agitation or transfer between containers. Nevertheless, it is prudent to ground or electrically bond the source container, 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.

Empty containers may contain a flammable / explosive vapour. Ensure that containers, whether empty or full, or part full, are tightly sealed unless in use. Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear a suitable respirator (see Part 8). Since n-butyl alcohol vapour causes coughing, the requirement for a respirator will be obvious!

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

Summer Fire Risk: Above 30°C, blanket spill with foam as a precaution against accidental ignition. Take 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	do not flush to sewer , recycle if possible, may be incinerated in approved facility
Containers	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. <i>Never cut, drill, weld or grind on or near this container, even if empty</i>

12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is not a bioaccumulator; in rats, 83% of butanol dose metabolised within 24 hours
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; 66% biodegrades within 5 days
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; estimated half-life in air is 46 hours
Mobility in soil, water	this product is water soluble and will move readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	1730 & 1940mg/litre (pimephales promelas), 2200-2400mg/litre (alburnus alburnus)
LC ₅₀ (Crustacea, 48hr)	2100mg/litre (nitocra spinipes), 2950mg/litre (artemia salina)
EC ₅₀ (Crustacea, 48hr)	1983mg/litre (daphnia magna);
TT (Algae)	875mg/litre (scenedesmus quadricauda), 100mg/litre (microcystis aeruginosa)

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13. TRANSPORT REGULATIONS

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

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 (EC# 200-751-6)
Immediately Dangerous to Life or Health: 1400 ppm	

Allowable Tolerances: Residues of n-butanol are exempted from the requirement of a tolerance when used as a solvent or cosolvent in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. n-Butanol is exempted from the requirement of a tolerance when used as a solvent for blended emulsifiers in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 100 ppm (300 mg/cu m). Vacated 1989 OSHA PEL Ceiling limit: 50 ppm (150 mg/cu m), skin designation, is still enforced in some states.

NIOSH Recommendations: Recommended Exposure Limit: (15 Min) Ceiling value: 50 ppm (150 mg/cu m) [skin].

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 20 ppm. Excursion Limit Recommendation: Excursions in worker exposure levels may exceed 3 times the TLV-TWA for no more than a total of 30 minutes during a work day, and under no circumstances should they exceed 5 times the TLV-TWA, provided that the TLV-TWA is not exceeded.

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. n-Butyl alcohol is produced, as an intermediate or a final product, by process units covered under this subpart.

State Drinking Water Guidelines: Minnesota 700 ug/l, Florida 700 ug/l

CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5000 lb or 2270 kg. The toll free number of the NRC is (800) 424-8802; In the Washington D.C. metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

RCRA Requirements: As stipulated in 40 CFR 261.33, when n-butyl alcohol, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). When n-butyl alcohol is a spent solvent, it is classified as a hazardous waste from a nonspecific source, as stated in 40 CFR 261.31, and must be managed according to State and/or Federal hazardous waste regulations.

FIFRA Requirements: Residues of n-butanol are exempted from the requirement of a tolerance when used as a solvent or cosolvent in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. n-Butanol is exempted from the requirement of a tolerance when used as a solvent for blended emulsifiers in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

FDA Requirements: n-Butyl alcohol (without residue) may be used in inks for marking food supplements in tablet form, gum, and confectionery.

16. PREPARATION INFORMATION

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

File Name: **Butyl Alcohol**

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

Preparation Date: **November 2003** Revision Date: **August 2006, August 2009**

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