



Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name	Glycol Ether EB
Synonyms	2-butoxy-1-ethanol, 2-butoxyethanol, ethylene glycol monobutyl ether, ethylene glycol n-butyl ether, EB
CAS#	111-76-2
EC#	203-905-0
Product Uses	solvent in cleaners, coupling agent in lubricants & coatings

2. HAZARDS

Quick Guide: combustible liquid, irritating to skin & eyes, suspected carcinogen, suspected reproductive toxin

Canada – WHMIS

Key:
<93°C

B 3, D 1A, D 2B

B 2 – Flash Point <38°C, B 3 – Flash Point >38°C &

D 1 – Immediately Toxic, D 2 – Chronic Toxicity

C – Oxidising Substance, E – Corrosive, F – Reactive Substance



B3 – Combustible Liquid



D1A – Very Toxic

U.S.A. – HMIS

Key:

Health – 3, Fire – 2, Reactivity – 0

0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe



D2B – Toxic

3. COMPOSITION

	%	TWAEV / TLV mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
2-butoxy-1-ethanol	100%	20 / 100 (skin)	>300	>450	>450

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. FIRE FIGHTING & FLAMMABILITY

Flash Point	62°C / 143°F (closed cup) – see Classification for Transport, Part 14
Autoignition Temperature	238°C / 460°F
Flammable Limits	1.1% – 12.7%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Firefighting Precautions	alcohol foam, dry chemical, water fog or spray, product floats on water – water jet spreads flames; firefighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

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

6. ACCIDENTAL RELEASE MEASURES

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, 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. Keep away from food or animal feedstuffs.

This product may react with oxygen in the air to form explosive or flammable peroxides (*accelerated by ultraviolet radiation*). (NOTE that these peroxides are present in low concentration, but may become dangerous if the product is distilled to dryness.) Ensure that containers are full & tightly sealed. Empty containers may contain a flammable/explosive vapour. Ensure that containers, empty 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 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	20ppm / 96mg/m ³ (skin)	Ontario STEV	not listed
ACGIH TLV	20ppm / 96mg/m ³ (skin)		
OSHA PEL	25ppm / 120mg/m ³ (skin)		
Ventilation	mechanical ventilation may be required to maintain airborne titre below regulated the limit		
Hands	butyl rubber gloves should be worn – <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 any danger of splashing		

9. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless liquid with mild pleasant ether odour
Odour Threshold	0.1ppm
Vapour Pressure	0.76mmHg / 0.101kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	0.07
Vapour Density (air = 1)	4.1
Boiling Range	168°C / 331°F
Freezing Point	-75°C / -103°F
Specific Gravity	0.901 (20/20°C)
Water Solubility	complete
Also soluble in	most organic solvents
Viscosity	3.2centipoise (20°C / 68°F)
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 4.82mg/m ³
Molecular Weight	118grams per mole

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10. REACTIVITY

Dangerously Reactive With	strong oxidising agents. strong alkalies; explosion hazard with 50-95% perchloric acid
Also Reactive With	may attack certain stainless steels & copper; softens polyvinylchloride (PVC) & some other plastics including high density polyethylene
Stability <i>ultraviolet</i>	generally stable; forms explosive peroxides on prolonged contact with air (<i>faster in light</i>); will not polymerize
Decomposes in Presence of	perchloric acid – <i>reaction may be violent</i>
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

11. TOXICITY**Effects, Acute Exposure**

Skin Contact	may irritate – severe irritant in animal testing; <i>no irritation in human volunteers after 2hr contact</i>
Skin Absorption	yes; toxic effects may occur by this route – (<i>from liquid & vapour</i>) – <i>large area must be exposed</i>
Eye Contact	liquid severely irritating – vapour above 100ppm for >4 hours irritating to human volunteers
Inhalation	irritating above 100ppm; headache, nasal discharge, coughing, chest pain, nausea, dizziness, confusion
Ingestion	other effects may develop above 200ppm; <i>low vapour pressure makes toxicity by this route less likely</i> not known; effects similar to “inhalation” anticipated – not a route of industrial exposure

Effects, Chronic Exposure

General cause	prolonged exposure may cause dermatitis & skin cracking; metabolism of EB to oxalic acid may cause kidney stones in humans; <i>red cell damage occurs in rodents; human red cells are more resistant</i>
Sensitising	not a sensitiser in humans or animals
Carcinogen/Tumorigen	experimental animal carcinogen (ACGIH – A-3) of unknown relevance to humans; not classified as a tumorigen or carcinogen in humans (IARC & NTP)
Reproductive Effect	no known effect in humans or animals
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD ₅₀ (oral)	450–3000mg/kg (rat), 1000–1700mg/kg (mouse), 1200mg/kg (guinea pig), 300 & 320mg/kg (rabbit)
LD ₅₀ (skin)	400 & 510mg/kg (rabbit), 210mg/kg (guinea pig)
LC ₅₀ (inhalation)	450, 486 & 950ppm (rat), 700ppm (mouse), >635ppm (guinea pig)

12. ECOLOGICAL INFORMATION

Bioaccumulation	rapidly eliminated from the body, cannot bioaccumulate; biological ½-life <48hr
Biodegradation	biodegrades readily & rapidly in the presence of oxygen; 75%-100% in 5-28 days (<i>var. tests</i>)
Abiotic Degradation	reacts with atmospheric hydroxyl radicals; estimated ½-life in air 16 hours & 5.6hours (<i>2 tests</i>)
Mobility in soil, water	water soluble; moves readily & rapidly in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	1490 & 2950mg/litre (Lepomis macrochirus), 1250mg/litre (Menidia beryllina),
EC ₅₀ (Crustacea, 24hr)	1700-1940 & 5000mg/litre (Daphnia magna), 550-1000mg/litre (Crangon crangon, 48hr)
“Growth Inhibition” (Algae)	35mg/litre (Microcystis aeruginosa), 900mg/litre (Scenedesmus quadricauda)
“Cell Multiplication” (Bacteria)	911mg/litre (Chilomonas paramecium), 700mg/litre (Pseudomonas putida)

13. DISPOSAL

Waste Disposal	do not flush to sewer , recycle solvent 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>

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14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN-not regulated for transport
	Shipping Name	not regulated for transport
	Class	not regulated for transport
	Packing Group	not regulated for transport
U.S.A. 49 CFR	PIN	NA-1993, or “not regulated” (see NOTE below)
	Shipping Name	COMBUSTIBLE LIQUIDS N.O.S. (Glycol Ether EB)
	Class	3, combustible liquids
	Packing Group	none
Marine Pollutant		not a marine pollutant
ERAP Required		NO

NOTE: Looking at data from 6 manufacturers, 4 give a Flash Point above 61° C, one is 61° C, & 1 is below 61° C. Flash Point depends on the test protocol & on the operator making it notoriously difficult to determine with precision. Depending on the supplier, in the USA this product may be shipped as UN-1993, Flammable Liquids N.O.S., NA-1993. Combustible Liquids, or “not regulated for transport”. In Canada it is “not regulated for transport”.

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 Classification Harmful

Europe Risk Phrases R: 20/21/22, 36/38 - Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes and skin.

Europe Safety Phrases S: 36/37, 46 – Wear suitable protective clothing and gloves. If swallowed, seek medical advice immediately.

Immediately Dangerous to Life or Health: 700 ppm

Allowable Tolerances: Residues of ethylene glycol monobutyl ether are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Residues of the following chemical substances are exempted from the requirement of a tolerance when used in accordance with good manufacturing practice as ingredients in an antimicrobial pesticide formulation, provided that the substance is applied on a semi-permanent or permanent food-contact surface (other than being applied on food packaging) with adequate draining before contact with food. ... (c) The following chemical substances when used as ingredients in an antimicrobial pesticide formulation may be applied to: Food-processing equipment and utensils. Ethanol, 2 butoxy- is included on this list.

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time-Weighted Avg: 50 ppm (240 mg/cu m). Skin designation. Vacated 1989 OSHA PEL TWA 25 ppm (120 mg/cu m), skin designation, is still enforced in some states.

NIOSH Recommendations: Recommended Exposure Limit: 10 Hour Time-Weighted Average: 5 ppm (24 mg/cu m). Skin designation.

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 20 ppm. 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. A3: Confirmed animal carcinogen with unknown relevance to humans.

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. Ethylene glycol monobutyl ether is produced, as an intermediate or a final product, by process units covered under this subpart.

State Drinking Water Guidelines: Maine 3,500 ug/l

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15. REGULATIONS

TSCA Requirements: 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. 2-Butoxyethanol is included on this list. Effective date: 4/13/89; Sunset date: 6/30/98.

FIFRA Requirements: Residues of ethylene glycol monobutyl ether are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Residues of the following chemical substances are exempted from the requirement of a tolerance when used in accordance with good manufacturing practice as ingredients in an antimicrobial pesticide formulation, provided that the substance is applied on a semi-permanent or permanent food-contact surface (other than being applied on food packaging) with adequate draining before contact with food. ... (c) The following chemical substances when used as ingredients in an antimicrobial pesticide formulation may be applied to: Food-processing equipment and utensils. Ethanol, 2-butoxy- is included on this list. As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their continued use. Under this pesticide reregistration program, EPA examines newer health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether the use of the pesticide does not pose unreasonable risk in accordance to newer safety standards, such as those described in the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA '88 were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern than those on List C, and with List C containing pesticides of greater concern than those on List D. Butoxyethanol is found on List C. Case No: 3036; Pesticide type: fungicide, antimicrobial; Case Status: No products containing the pesticide are actively registered. Therefore, we are characterizing the case as "cancelled." Under FIFRA, pesticide producers may voluntarily cancel their registered products. EPA also may cancel pesticide registrations if registrants fail to pay required fees or make/meet certain reregistration commitments, or if EPA reaches findings of unreasonable adverse effects.; Active ingredient (AI): butoxyethanol; AI Status: The active ingredient is no longer contained in any registered products. Thus, we characterize it as "cancelled."

FDA Requirements: Ethylene glycol monobutyl ether is an indirect food additive for use only as a component of adhesives.

16. OTHER INFORMATION

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

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