

Material Safety Data for: Isobutanol

1. PRODUCT IDENTIFICATION

Name	2-methyl-1-propanol
Synonyms	2-methylpropyl alcohol, isobutanol, isobutyl alcohol, 1-hydroxymethylpropane
CAS#	78-83-1
Europe EC#	201-148-0
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-methyl-1-propanol	100%	50 / 152	2460	3400	2630

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 – 3, 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	liquid severely irritating, vapour is likely to irritate
Inhalation	respiratory irritant causing coughing; headache, dizziness, drowsiness, intoxication
Ingestion	headache, dizziness, drowsiness, intoxication, weakness & possible collapse – <i>not a route of industrial exposure</i>

Effects, Chronic Exposure

General	prolonged skin exposure may cause drying, cracking and dermatitis; liver & kidney damage may occur; central nervous effects (headaches, dizziness) have been reported in people working in the presence of high vapour pressures
Sensitising	not a sensitizer in humans or animals (<i>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)	2460-3350mg/kg (rat), 3500mg/kg (mouse), 3000 & 3750mg/kg (rabbit)
LD ₅₀ (skin)	3400 & 4240mg/kg (rabbit)
LC ₅₀ (inhalation)	6340 & 8100ppm (rat), 5100ppm (mouse), 2630 & 8670ppm (rabbit), 6600ppm (guinea pig)

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, musty, alcoholic odour
Odour Threshold	2-50ppm (highly variable)
Vapour Pressure	8.8mmHg / 1.17kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	0.8
Vapour Density (air = 1)	2.6
Boiling Range	108°C / 227°F
Freezing Point	-108°C / -162°F
Specific Gravity	0.805 (20/20°C)
Water Solubility	98 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	4.7centipoise (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	28°C / 82°F (closed cup)
Autoignition Temperature	415°C / 780°F & 427°C / 800°F
Flammable Limits	1.7% – 10.6%
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; chromium trioxide causes ignition
Also Reactive With	may attack certain plastics and rubbers
Stability	stable; will not polymerize
Decomposes in Presence of	not known
Decomposition Products	none apart from Hazardous Combustion Products and above
Sensitive to Mechanical Impact	no

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	50ppm / 152mg/m ³
OSHA PEL	100ppm / 300mg/m ³
STEL	not listed
Ventilation	mechanical ventilation may be required to control airborne titre below regulated limits
Hands	butyl, neoprene or "Viton" gloves recommended – <i>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, 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.

Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear an organic vapour respirator.

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 Potential: In summer 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 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>

12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is highly water soluble and not a bioaccumulator
Biodegradation	this product degrades rapidly in the presence of oxygen; >58% biodegradation in 5dy, 90% in 2wk
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 56 hours
Mobility in soil, water	this product is water soluble and will move readily in soil and water

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Aquatic Toxicity

LC ₅₀ (Fish, 96hr)	2330mg/litre (Carassius auratus), 1800mg/litre (Gambusia affinis), 1460mg/litre (Ictalurus punctatus), 1600mg/litre (Lepomis macrochirus), 1430 & 1510mg/litre (Pimephelas promelas), 1330mg/litre (Salmo gairdneri) & others
EC ₅₀ (Crustacea, 48hr)	1030, 1220 & 1440mg/litre (Daphnia magna), 1100mg/litre (Daphnia pulex), 600mg/litre (Artemia salina) & others
EC ₅₀ (Algae)	1250mg/litre (Scenedesmus subspicatus), 6400mg/litre ("plankton")
EC ₅₀ (Bacteria)	1225mg/litre (Photobacterium phosphoreum)

13. TRANSPORT REGULATIONS

Canada TDG	PIN	UN-1212
AND	Shipping Name	Isobutanol or Isobutyl Alcohol
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

Europe Risk Phrases	R: 10, Xi, R 67 – flammable, irritant, vapours may cause drowsiness & dizziness
Europe Safety Phrases	S: 9, 13, 26, 37, 39, 46 – Keep container tightly closed and in a well ventilated place. Keep away from food, drink and animal feeding stuffs. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face protection. If swallowed seek medical advice immediately

Immediately Dangerous to Life or Health: 1600 ppm

Allowable Tolerances: Isobutyl alcohol is exempted from the requirement of a tolerance when used as a solvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

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

NIOSH Recommendations: Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 50 ppm (150 mg/cu m).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 50 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. Isobutanol is produced, as an intermediate or a final product, by process units covered under this subpart.

State Drinking Water Guidelines: Florida 2,100 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).

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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. 1-propanol, 2-methyl is included on this list.

RCRA Requirements: As stipulated in 40 CFR 261.33, when isobutyl 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).

FIFRA Requirements: Isobutyl alcohol is exempted from the requirement of a tolerance when used as a solvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

FDA Requirements: Isobutyl alcohol is a food additive permitted for direct addition to food for human consumption as a synthetic flavoring substance and adjuvant in accordance with the following conditions: a) they are used in the minimum quantity required to produce their intended effect, and otherwise in accordance with all the principles of good manufacturing practice, and 2) they consist of one or more of the following, used alone or in combination with flavoring substances and adjuvants generally recognized as safe in food, prior-sanctioned for such use, or regulated by an appropriate section in this part. Isobutyl alcohol is an indirect food additive for use only as a component of adhesives. Isobutyl 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

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

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